Hydro-Québec Annual Report 1973

Hydro-Québec Annual Report 1973

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Cover photo:
Jacques Lambert

Department of Natural Resources
Province of Québec
Office of the Minister

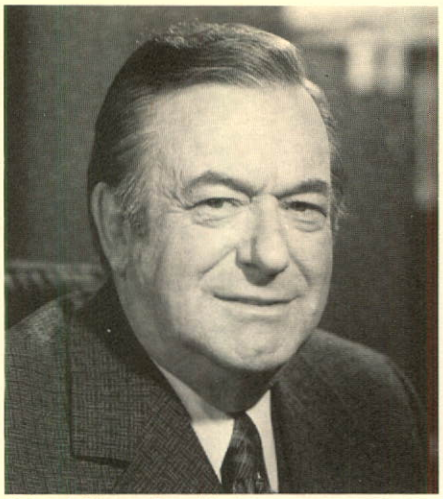
The Honourable Lieutenant-Colonel
Hugues Lapointe, Q.C.
Lieutenant-Governor of
the Province of Québec

May it please Your Honour,

The undersigned has the honour
to present the report of the
Québec Hydro-Electric Commission
for the year ended
December 31, 1973

Respectfully submitted,

Minister of Natural Resources
Québec, March 21, 1974



Roland Giroux, President

Georges Gauvreau

The Commission

President
Roland Giroux

Commissioners
Georges Gauvreau, N.P.
Yvon DeGuise, Eng.
Robert A. Boyd, Eng.
Paul Dozois

Controller
Roger Girard, C.A.

Joint Secretaries
Bernard Lacasse, Q.C.
William E. Johnson

General Auditor
Marcel Jean, C.A.

The Québec Hydro-Electric Commission (or Hydro-Québec) was created on April 14, 1944, by an Act of the Provincial Legislature as a government-owned enterprise responsible for producing and distributing electricity in the Province of Québec.

General Managers

Construction Dept.
Guy Monty, Eng.

Distribution and Sales Dept.
Maurice Saint-Jacques, Eng.

Engineering Dept.
Lionel Cahill, Eng.

Finance and Accounting Dept.
Edmond A. Lemieux, C.A.
Treasurer
Georges Lafond, C.A.

Personnel Dept.
Alexandre Beauvais, Eng.

Production and Transmission Dept.
J. J. Villeneuve, Eng.

Supply Dept.
Roger A. Labrie

Directors of Consulting Directorates

Economic Research
Jean-Charles de Groote

Electronic Data Processing
André Duval

Environmental Planning
Gaston Galibois, Eng.

Institute of Research
Lionel Boulet, Eng.

Law
Jean Boulanger, Q.C.

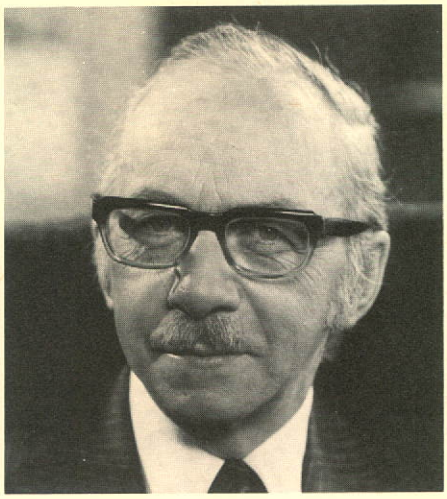
Organization
Jean Lespérance

Programming and Control
Edward S. Davis, Eng.
(interim)

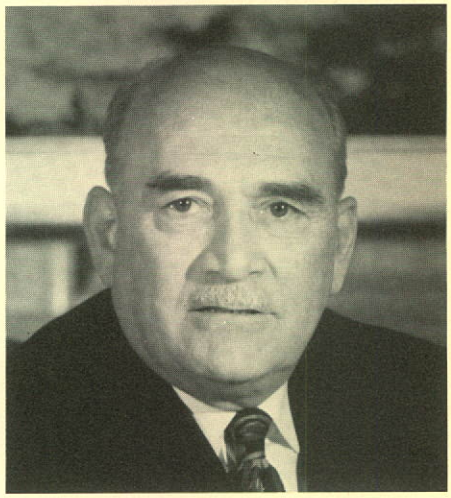
Projects
Gaston Turenne, Eng.

Public Relations
Marcel Couture

Yvon DeGuise



Robert-A. Boyd



Paul Dozois

Regional Directors

Abitibi
Maurice Huppé, Eng.

Laurentides
Marcel Lapierre, Eng.

Maisonneuve
Georges A. Lauzon, Eng.

Manicouagan
Gérard R. Labossière, Eng.

Matapédia
Gilles Béliveau, Eng.

Mauricie
Robert Brunette, Eng.

Montmorency
Pierre Godin, Eng.

Richelieu
Pierre Simard, Eng.

Saguenay
Jean-Claude Grégoire, Eng.

Saint-Laurent
Louis G. Boivin, Eng.

President's Report

During the thirtieth year of its existence, while the rest of the world was at grips with an energy crisis that heralded eventual depletion of the planet's fossil-fuel resources, Hydro-Québec found itself in an enviable situation in comparison with electric utilities that must depend on thermal-electric production facilities.

Although escalating operating and construction costs reduced our ability to finance new equipment programs from internally generated funds, hydroelectric plants and the water that drives their turbines were unaffected by the rise in oil prices. In fact, nature provided us with an exceptionally large amount of water in 1973, to the extent that we were able to meet all the needs of our Québec customers and even augment our revenues by selling large amounts of energy to neighboring systems.

The substantial increase in sales combined with the rate increase implemented in April 1973 means that Hydro-Québec will be one of the few electric utilities in the world not obliged to burden the family budget with a rate increase in 1974. Unfortunately, inflation will probably continue to worsen before the world economy regains some semblance of balance, but our water resources will enable us to keep future rate increases lower than the large increases that other electric utilities will be forced to implement.

By reinvesting its net income, Hydro-Québec has succeeded since 1944 in creating a reserve or net worth of more than one and a quarter billion dollars, which represents 26.1 per cent of its invested capital. And in the present circumstances, the Commission's main problem with regard to inflation consists in maintaining this ratio, on which Hydro-Québec's credit on the financial market depends.

By causing a large increase in the price of heating oil, the energy crisis has exposed Hydro-Québec to a substantial increase in the demand for electricity. At December 31, the total number of customer accounts with electric heating stood at 180,816 compared with 123,359 a year earlier. This is an increase of 46.6 per cent.

Our climate is such that heating cannot simply be considered a matter of comfort or luxury, for it is a condition of actual survival during the winter months. Before now, the low price of fossil fuels obscured the fact that an enormous amount of heat can be wasted as a result of poor insulation. Our promotion of electric heating always put great emphasis on building insulation. In reorienting our marketing policies in the last part of the year, we made every endeavor to stress the urgency of having a sufficient minimum of thermal insulation made obligatory in home building, regardless of the type of heating system employed.

During the year, we carefully studied and tried to perfect methods used to forecast the future power needs of our Québec customers. This work, which will mainly interest specialists, was not yet completed at year-end. However, all forecasting methods used by electric utilities have one prime objective: to initiate construction programs well enough in advance to avoid supply shortages.

In addition, since its inception in 1944, the Commission has always made sure that its construction program for power stations, substations and transmission lines had the flexibility required for individual projects to be accelerated, slowed down or suspended as circumstances arise.

The year 1973 will prove to have been very important for the future energy supply of Québec. The *James Bay Energy Corporation* started construction work at power sites on the Québec side of the James Bay watershed, and in collaboration with our Engineering Department, continued major economic, ecological and social studies. The final development plan for the La Grande River, which will evolve from these studies, will be known at the time of publication of this report.

At Gentilly, we have started to build a second nuclear power station, which will have a capacity of 600,000 kilowatts. In addition, we have opened discussions with Atomic Energy of Canada Limited (AECL) concerning the electricity and steam supply for the heavy-water plant the federal government intends to have AECL build at Gentilly. This means that the start of work to harness some of the last of Québec's major hydroelectric potential could have coincided with the birth of the province's first nuclear complex. These events give reason to believe that in Québec the transition from hydroelectric to nuclear power is occurring with an ease that other countries may not experience. Moreover, these events are occurring in the context of an industrial development that will launch Québec into a period of economic growth involving almost the entire territory of the province.

During 1973, the Commission decided to create a directorate for Environmental Planning which would have the job of protecting the environment throughout all phases of design, construction and operation of the facilities Hydro-Québec employs to produce, transmit and distribute electricity. The new directorate will comprise a permanent staff of about 30 specialists in physical and human ecology and will be able to call upon the services of outside offices as the need arises.

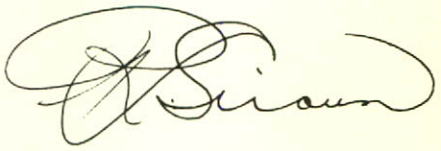
This concern for the environment will entail considerable additional expense. But these expenditures are necessary in order to protect the quality of life in Québec against the inevitable encroachment that will result on an increasing scale from the construction of new transmission lines, new transformer substations, and new base-load and peak-load generating stations. These expenditures are also vital to avoid costly delays in the commissioning of facilities required to meet the increase in the population's demand for electricity in the most economic way possible.

During the year, also, we further improved the day-to-day relationships between Hydro-Québec and its individual customers. Our *Customer Service* was extended to the last two regions, Richelieu and Matapédia, and it is now possible for more than 1,800,000 customers to communicate directly with staff members in 51 offices across the province who are assigned exclusively to customer needs. The benefits are both considerable and mutual. On the one hand, the customer who visits us or contacts us by phone or mail receives immediate personal attention, while on the other hand members of the operating staff are not constantly disturbed at their work.

Of the other improvements implemented during the year, the most noteworthy are technical changes that have greatly enhanced the flexibility, productivity and reliability of our major transmission lines and new savings that have resulted from increased use of remote-control and automation in our system operations.

As in preceding years, every effort has been made to make the annual report as complete as possible. However, this year, for the first time, in addition to the annual report we are publishing an activities report, a copy of which can be obtained on request. The new report gives considerable detail and explanation concerning the activity of the various general and consulting departments during 1973.

Once again, my colleagues and I wish to express our appreciation to the entire personnel for the cooperation they have brought to our common cause during the past year — the thirtieth anniversary of Hydro-Québec.



President
Montreal, March 18, 1974

An experimental line on the Magdalen Islands.

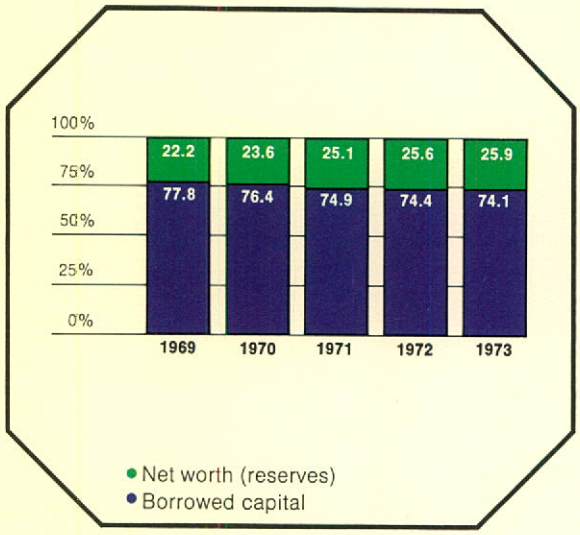
10 Years' Progress

	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964
Financial situation (in millions of dollars)										
Property and plant, at cost	$ 4,834	4,599	4,251	3,899	3,404	2,992	2,842	2,622	2,428	2,160
Long-term debt and notes payable	$ 3,566	3,299	3,026	2,805	2,738	2,546	2,399	2,176	1,928	1,810
Reserves or net worth	$ 1,260	1,140	1,041	913	796	712	634	558	507	450
Total revenue from electricity sales	$ 654	561	518	478	416	387	354	314	288	269
Total operating and interest charges	$ 573	499	427	397	362	328	297	274	241	223
Effects of growth										
Installed capacity (in megawatts*) at December 31	11,148**	11,107**	11,107	10,617	9,809	8,365	8,179	7,763	7,350	6,562
Maximum firm-power demand in the service area (in megawatts*)	11,135	9,747	9,173	8,873	8,100	7,664	6,930	6,562	6,053	5,648
Total energy sales (in billions of kilowatthours)	68.7	60.4	52.5	50.6	46.3	43.1	41.2	39.7	36.1	35.3
Total number of customer accounts (in thousands)	2,017	1,943	1,895	1,852	1,773	1,720	1,656	1,581	1,539	1,492
Number of permanent employees	13,027	12,627	12,245	12,012	11,890	11,723	11,637	11,466	10,976	10,261

*1 megawatt (or 1 MW) = 1,000 kilowatts = 1,000,000 watts

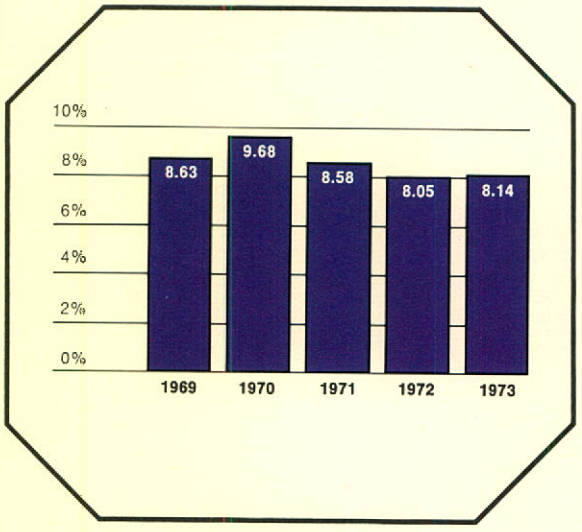
**Excluding Churchill Falls

Composition of capital*



*Average of figures for beginning and end of each year.

Interest rates
Annual average effective interest rate on long-term borrowings



Financial results*

In 1973, Hydro-Québec's financial situation was improved by the upswing in the Québec economy, the rate increase that went into effect on April 20, and the sale of large amounts of firm energy and surplus energy to neighboring systems. However, these factors did not entirely counteract the effect that growing inflation has had on our overall expenses since 1971.

Total revenues *(revenue* plus *other income)* amounted to $693,569,000, an increase of $95,287,000 or 15.9% over 1972. However, since 1971 the average annual increase in total revenues has been only 11.8%.

Total expenses *(expenditure* plus *interest charges)* were $572,960,000, an increase of $73,581,000 or 14.7% over 1972. Since 1971, however, the average annual increase in total expenditures has been 15.8%.

Net income before interest on reserves totaled $120,609,000. Although this was $21,706,000 or 21.9% more than in 1972, it was less than the 1971 total of $127,752,000.

This situation occurred at a time when construction expenses, which must be financed partly from *net income,* increased by $127 million compared with 1972 and $165 million compared with 1971.

The increase in rates, which applied to all categories of contracts, produced additional revenue estimated at $30,600,000.

Increased expenses in 1973 were attributable to three items: *power purchased, interest charges,* and *operating, maintenance, administration and other expenses.*

*Words in italics correspond to terms used in the Financial and Statistical Statements.

The last item was $201,641,000, which was $29,341,000 or 17% more than in 1972. This reflects increases in the cost of salaries and employee benefits as well as in the volume and cost of materials and services purchased.

Larger expenditures for *power purchased* were due entirely to increased energy deliveries from Churchill Falls power station, where seven of the planned eleven 475-MW units were in service at the year-end. This expenditure rose 82.2% from $34,446,000 to $62,753,000, and included $6,241,000 for the amortization of Hydro-Québec's share of the interest charges of Churchill Falls (Labrador) Corporation Limited (see notes 1 and 8 of the Consolidated Financial Statements).

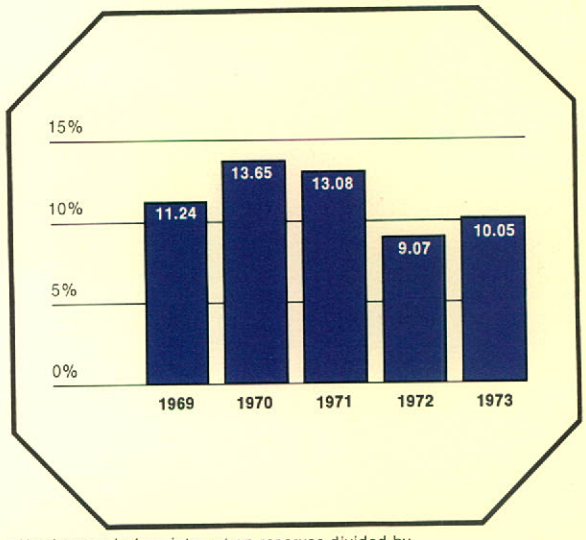
Total interest charges were $231,534,000, an increase of $31,863,000 or 16% over 1972, and included $40,412,000 in *interest charged to construction work in progress* at the James Bay sites, Manic 3 and elsewhere. Interest charges attributable to operations were $191,122,000, which was 9.9% more than in 1972.

On April 1, 1973, the Québec government abolished the *provincial levy on energy generated,* and replaced it by a fixed *provincial levy* of $20,000,000 a year. *School and municipal taxes* were $18,783,000, as against $18,875,000 in 1972.

Funds generated internally by the year's operations totaled $204,257,000, which was $32,577,000 or 19% more than the preceding year.

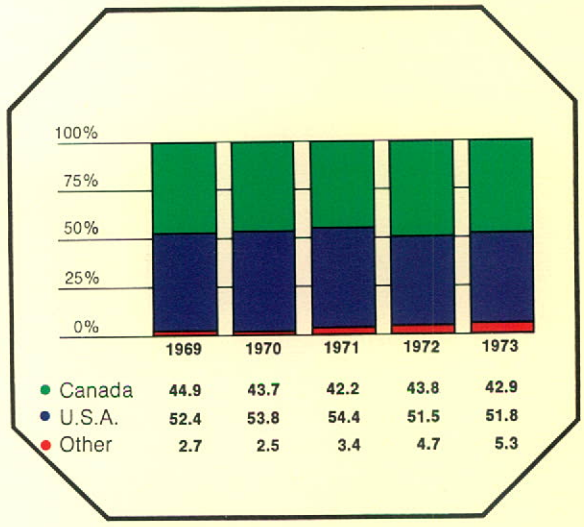
As shown in the *Consolidated Statement of Source and Application of Funds,* this amount comprises *net income before interest on reserves* less *net profit on*

Return on net worth*



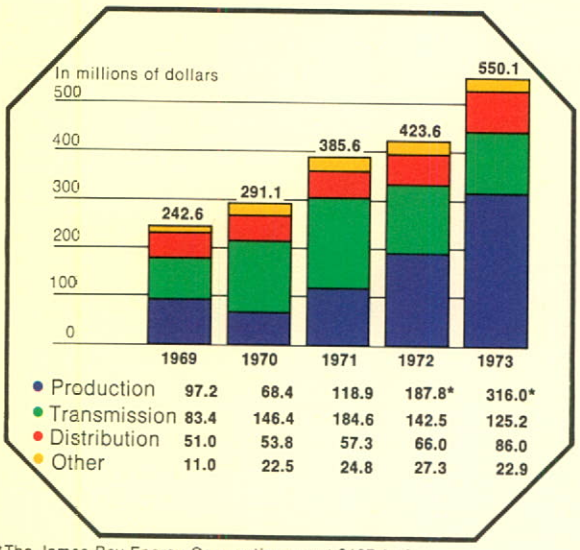
**Net income before interest on reserves* divided by the average of reserves at the beginning and end of each year.*

Composition of long-term debt*



*Not counting sinking funds.

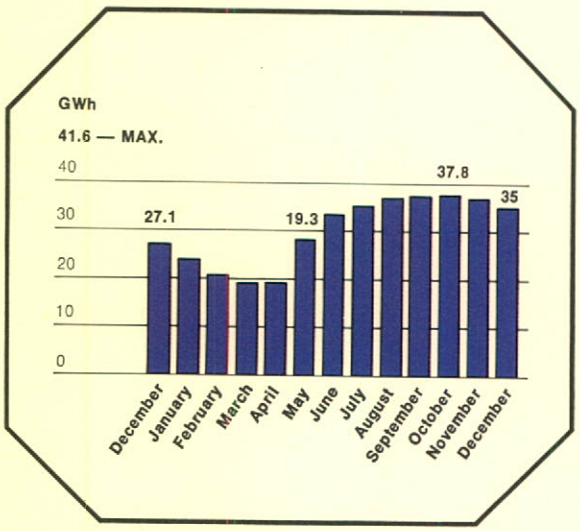
Breakdown of capital expenditures*



*The James Bay Energy Corporation spent $107.1 of this amount in 1972 and $229.2 million in 1973.

Water reserves in 1973

Accumulation of usable reserves, expressed in billions of kWh, in all reservoirs during the year. Maximum energy potential of all reservoirs is 41.6 billion kWh.



repurchase of debentures (which is not a cash inflow) plus charges not requiring cash outlays, the main one being *provision for renewals.*

This money was used to redeem maturing long-term debt in the amount of $95,686,000, including $2,046,000 which eliminated the bond debt of Gatineau Power Company, one of the firms nationalized in 1963; it was also used to invest $47,200,000 in *sinking fund investments,* which left a balance of $61,371,000 to help finance plant additions.

Total plant investment for the year amounted to $550,121,000, comprising $125,200,000 for the transmission system, $86,000,000 for the distribution system, and $316,000,000 for production equipment, including $229,200,000 for work on the James Bay project.

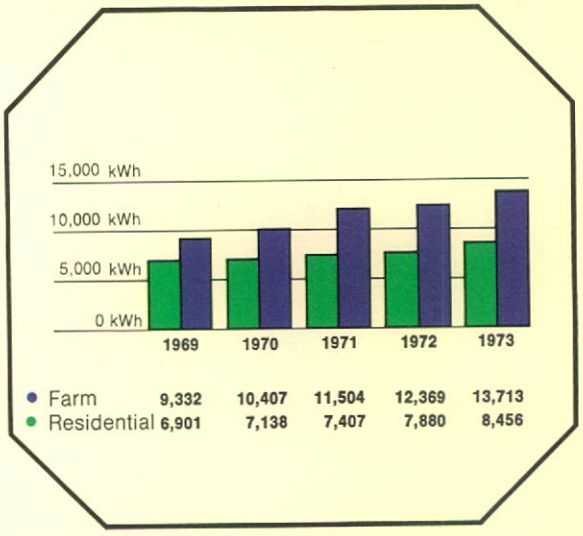
To finance the year's capital expenditures, Hydro-Québec negotiated long-term loans which produced a net amount of $429,597,000. The balance of $120,524,000 was financed in the amount of $61,371,000 by available funds and in the amount of $59,153,000 by withdrawals from working capital.

The Canadian market furnished $205,000,000 or 44.1% of total borrowings contracted during the year ($465,234,000). The Québec Deposit and Investment Fund subscribed for $125,000,000 of this amount. On the West German market, the Commission borrowed 100 million Deutschemarks in March, when it was worth $35,234,000, at an effective interest rate of 6.86%. On the U.S. market, a $125,000,000 debenture issue was negotiated in January

and a $100,000,000 issue in August, although a $32,500,000 installment was not expected until early 1974. The effective cost of issues floated on North American markets ranged from 7.63% to 8.85%. The average effective interest rate on all borrowings contracted during the year was 8.14%.

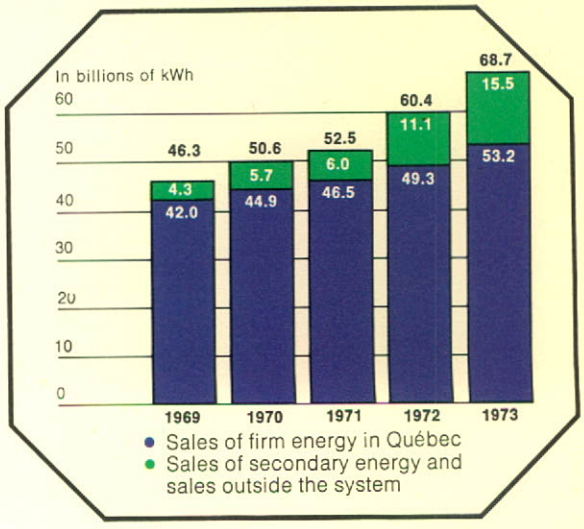
At December 31, 1973, as a result of new debenture issues, redemption of matured issues and purchases for the sinking fund, the net amount of long-term debt rose to $3,513,158,000, an increase of $284,409,000. On the same date, reserves, which constitute the Commission's net worth, stood at $1,260,345,000 and represented 26.1% of invested capital (comprising total assets less *current liabilities* and *other liabilities).*

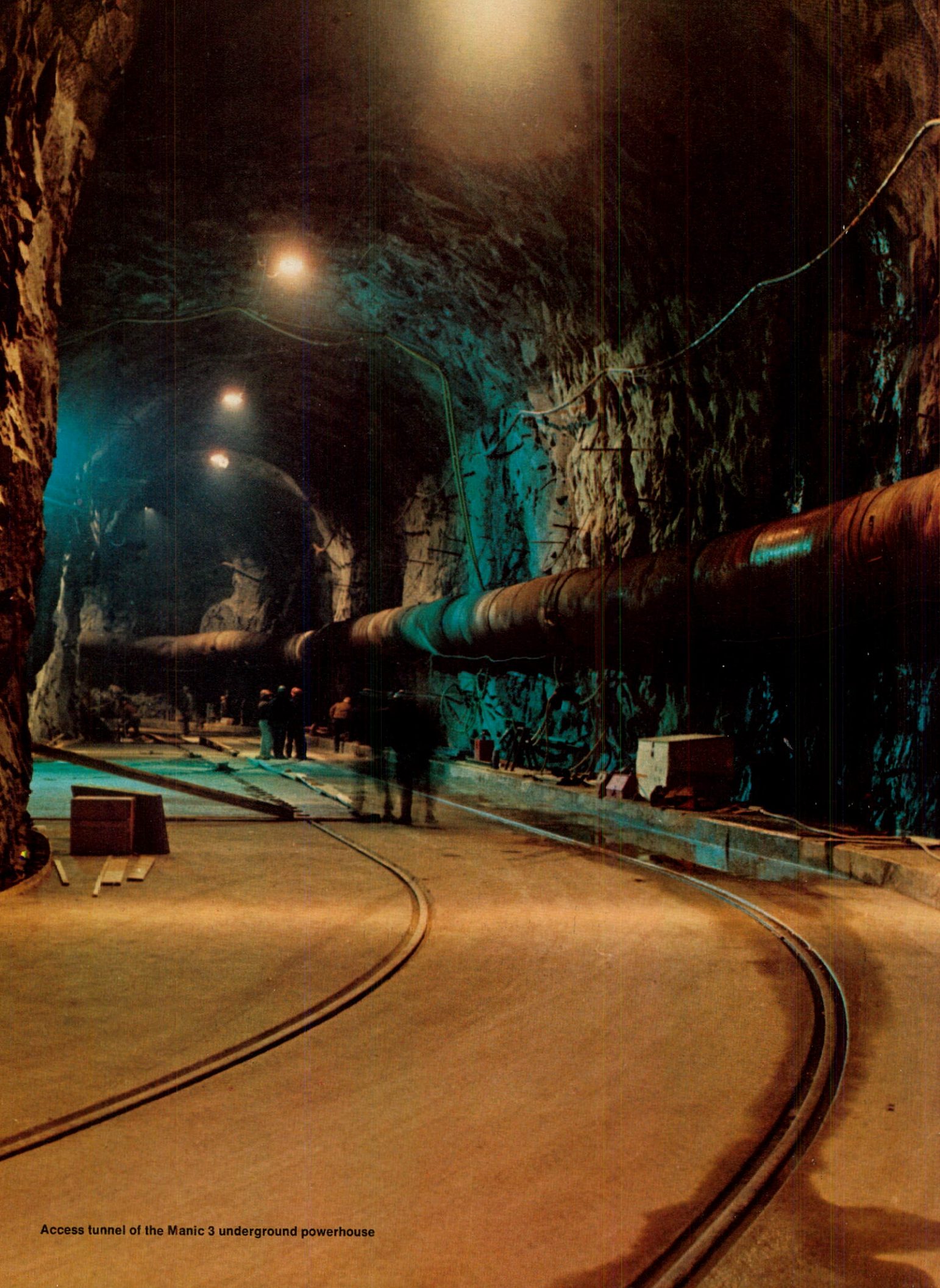
Average annual consumption per farm and residential customer account*



*Based on the average number of accounts in each year.

Breakdown of sales





Access tunnel of the Manic 3 underground powerhouse

Electricity sales

Electricity sales in 1973 totaled 68.7 billion kWh*, against 60.4 billion kWh in 1972, an increase of 13.7%. The 1973 sales produced revenues totaling $654,103,000, compared with $561,145,000 in 1972, an increase of 16.6%.

Sales in Québec — The total volume of firm-energy sales in Québec amounted to 53.2 billion kWh, an increase of 3.9 billion kWh or 7.95% over 1972. This was a considerable improvement over the 5.8% and 3.6% increases of the two previous years, despite the fact that strikes during 1973 reduced sales by at least 455 million kWh, mainly in the pulp and paper industry.

Sales of firm energy to Québec customers produced $600,225,000, compared with $528,778,000 in 1972, an increase of $71,447,000 or 13.5%.

Sales to residential customers amounted to 14.13 billion kWh and brought in revenue of $220,343,000, which was 11.2% more in volume and 16.2% more in revenue than 1972 sales.

The number of residential accounts increased substantially. There were 1,705,539 such accounts in 1973, which was an increase of 69,093 or 4.2% over the previous year. In 1973, the average annual consumption per residential account rose to 8,456 kWh, an increase of 576 kWh or 7.3%, which was mainly attributable to electric heating.

Sales to farm customers amounted to 1.09 billion kWh in volume and $15,272,000 in revenue, representing increases of 9.1% and 13.4% respectively. There were 78,332 farm accounts at the end of 1973, compared with 80,083 the previous year and 90,280 at the end of 1966. The average annual consumption per farm account was 13,713 kWh in 1973, an increase of 10.9%.

Sales in the commercial category amounted to 11.1 billion kWh and produced $164,842,000 in revenue. Sales in the industrial category reached 24.6 billion kWh and produced $171,760,000. Together these two categories consumed 35.7 billion kWh, compared with 33.4 billion kWh in 1972, an increase of 6.9%. These sales produced $336,602,000 in revenue, against $300,248,000 in 1972, an increase of 12.1%.

In addition, Hydro-Québec was able to provide more secondary energy than usual to Québec industry: 3.5 billion kWh, compared with 2.1 billion kWh in 1972. These sales produced $7,181,000 in revenue compared with $4,475,000 the preceding year.

Exports — Temporary surpluses of power and energy made it possible to deliver 9.5 billion kWh of firm energy and 2.5 billion kWh of secondary energy to neighboring systems, for a total of 12 billion kWh, which was 3 billion more than in 1972.

These sales, most of which went to Ontario, brought in revenue amounting to $46,697,000 of which $38,404,000 was for firm energy. In 1972, exports produced revenue totaling $27,891,000, of which $23,990,000 was for firm energy.

*kWh = kilowatthours

An all-electric housing development

Marketing

During the last months of 1973, the relationship between electricity and its competitors was totally changed by the shortages and increased prices of fossil fuels. Hydro-Québec therefore modified its marketing policy and intensified emphasis on the rational use of electricity.

Customers are still being offered certain special facilities or services such as installation of electric water-heaters on a rental basis. With regard to electric heating, agreements already concluded with builders of housing units will stand and 1974 should see the construction of a large number of dwellings in accordance with NOVELEC standards of thermal insulation. Future projects include action on the provincial and federal levels to make a minimum of thermal insulation obligatory in the construction of new dwelling-units.

Industrial contracts

During 1973, Hydro-Québec was particularly active in the industrial sector. There were 69 contract renewals for the supply of electricity to industrial customers. These contracts totaled 1,100 MW, including 190 MW in new maximum demand. New contracts were concluded for a total of 235 MW in maximum demand, most for the extraction of iron ore.

In the manufacturing sector, Hydro-Québec contributed to the expansion or setting up of eight industrial establishments (notably at Valleyfield and Montreal) which will considerably increase the number of jobs without, however, increasing the load by very much (25 MW).

Moreover, at the year-end contract negotiations were completed or being finalized in connection with five major industrial development or expansion projects — two in the steel sector, two in the chemical sector, and one on the St. Lawrence north shore in the pulp and paper sector. These five projects represent an additional load of 170 MW and additional revenue of some $7 million a year.

Production

At December 31, the amount of production capacity available to meet the needs of Québec customers totaled 12,914 MW. This figure includes the installed capacity of the 64 power stations owned and operated by Hydro-Québec, which totaled 11,148 MW, and the net addition that resulted from power purchase and sales contracts with neighboring systems, which totaled 1,766 MW.

Hydro-Québec's installed capacity will remain virtually unchanged until the Manic 3 power station is commissioned in 1975 and 1976. In the meantime, the increase in Québec demand will be covered mainly by energy obtained under contract from the Churchill Falls power station, where seven of an eventual eleven 475-MW units were in service at the year-end.

Maximum demand — The year's maximum firm-power demand in Québec (including losses) occurred on December 17 and was 11,135 MW, an increase of 1,388 MW or 14.2%. The 1972 peak occurred on December 19 under similar weather and temperature conditions.

Production capability — Production capability, or the energy potential of net run-off, was extremely high in 1973, totaling 65.4 billion kWh or 11% more than average. This coincided with a considerable increase in energy purchases, which rose to 18.40 billion kWh from 11.56 billion kWh in 1972. The energy imported from Churchill Falls generating station alone increased from 6.3 to 13.8 billion kWh.

The result was that while the rest of the world was at grips with an energy crisis, Hydro-Québec found itself in the enviable position of being able to meet the growing needs of its Québec customers, to honor its export commitments, to provide the market with substantial quantities of secondary energy, and to increase its usable reserves by 7.8 billion kWh or 29%.

Mutual assistance pact between Québec and New York

Hydro-Québec and the Power Authority of the State of New York (Pasny) signed a 20-year contract which, if approved by the Québec and Canadian governments, will establish a mutual-aid program between the systems of Hydro-Québec and the New York City area. The contract also provides for construction of the first extra-high-voltage transmission line between Québec and the United States.

Hydro-Québec had been authorized by the Québec National Assembly to conclude this agreement either with Pasny or the Consolidated Edison Company of New York. This type of agreement is possible because the systems of Hydro-Québec and the New York City area experience their heaviest demand for electricity at different times of the year. The contract will go into effect June 1, 1977, or whenever the interconnecting line is completed, and will last for 20 years. Hydro-Québec has agreed to make 800 MW available to Pasny during the summer months, but between 1991 and 1996 this capacity can be reduced if the summer load in Québec warrants it.

During the first five years of the contract (1977 to 1981), Hydro-Québec has agreed to deliver to Pasny a total of 14.14 billion kWh for an amount of $123,000,000. Afterwards, Pasny will have to deliver to Hydro-Québec during the winter months, at the same price, the same amount of energy it received the previous summer, less any amounts that Hydro-Québec agrees to sell to Pasny.

The Hydro-Québec and New York systems will be linked by a 765-kV extra-high-voltage transmission line whose Canadian section will be about 38 miles long. It will leave a new substation located near Beauharnois generating station, where certain units will provide the energy supplied to Pasny. On the American side, the line will terminate at a substation located near Pasny's Robert Moses generating station, on the St. Lawrence River, which will eventually provide energy for the Hydro-Québec system in winter.

By virtue of an emergency agreement concluded at the end of the year, Hydro-Québec will deliver to the Consolidated Edison Company of New York about 750 million kWh between January 1 and June 30, 1974, using a 48-mile-long, 120-kV, double circuit transmission line between the Les Cèdres generating station near Montreal and the United States border near Cornwall, Ontario. This contract will mean at least $6,000,000 in revenue for Hydro-Québec.

Manic 3: main dam under construction

Construction of power stations

During the year, Hydro-Québec invested $316,000,000 in new generating plant (including $229,200,000 for the James Bay project), which was $128,200,000 more than in 1972.

In 1973, in addition to continuing construction of the 1,183-MW Manic 3 power station, Hydro-Québec decided to resume work suspended in 1968 at the Outardes 2 site and to build a second nuclear plant at Gentilly. Outardes 2,which will have a capacity of 454 MW, will be commissioned in 1978 thus completing development of the Manicouagan and Outardes Rivers. Gentilly 2, with a 600-MW capacity, will be placed in service early in 1979.

Studies were carried out on various other projects designed to cover the load increase forecast for 1978 and 1979.

For its part, the James Bay Energy Corporation started construction work at the power sites on the Québec side of James Bay and continued to refine details of the plan for development of the vast hydroelectric complex on the La Grande River, which flows into James Bay at Fort George.

Manic 3 — At the Manic 3 site, concreting of the underground powerhouse was sufficiently advanced at year-end for installation of the turbines to start in the spring of 1974.

The main dam will be 1,180 feet long at the crest and 350 feet high. It will contain 11 million cubic yards of earth and rockfill, about 46% of which had been placed at year-end.

Outardes 2 — At the Outardes 2 site, the seventh and last of Hydro-Québec's planned power stations on the neighboring Manicouagan and Outardes Rivers, which flow on the North Shore and discharge into the St. Lawrence River at Baie-Comeau, will replace a small 61-MW power station operated by a private company at the mouth of the Outardes River since 1937.

Outardes 2 will have a capacity of 454 MW from three generating units operating under a gross head of 277 feet and its average annual production will total 2.57 billion kWh.

Gentilly 2 — In the fall, Hydro-Québec began construction of a 600-MW nuclear power station on the south shore of the St. Lawrence River halfway between Montreal and Québec City. This station, to be called Gentilly 2, will be built alongside the existing 266-MW Gentilly 1 plant which is an experimental prototype owned by Atomic Energy of Canada Limited (AECL) and operated by Hydro-Québec.

The Gentilly 2 plant will be the proven CANDU-PHW type (Canadian Deuterium Uranium, Pressurized Heavy Water), which uses natural uranium as fuel and heavy water as both moderator and coolant. The plant is scheduled for commercial service early in 1979. The estimated cost in 1973 was $385,000,000.

During the year, Hydro-Québec started discussions with AECL concerning the supply of electricity and steam for a heavy-water plant which the federal government intends to have AECL build at Gentilly. The plant would have a capacity of 800 tons a year. This would mark the beginning of Québec's first nuclear power complex.

Gentilly 1 — The Gentilly 1 plant, a prototype which uses ordinary water as the coolant, will have its supply of heavy water returned in time to recommence operation in the summer or fall of 1974. This plant began operation in 1971, but in the fall of 1972 most of its heavy water was requisitioned for the Douglas Point nuclear power station in Ontario, where it helped produce steam to supply the nearby Bruce heavy-water plant.

Lower and upper St. Maurice River — Studies under way concerning new plant required for 1978 and 1979 include installation of gas turbines and construction of peaking plants on the lower and upper St. Maurice River.

On the lower St. Maurice River, it would be possible to increase the installed capacity at Grand'Mère and Shawinigan so as to obtain 175 to 345 MW of additional net capacity. On the upper St. Maurice, it would be possible to build power stations at Rapide des Coeurs and Rapide du Lièvre having a combined capacity of 800 MW, with a load factor of 25%.

Various pumped storage stations are also under study, but in August Hydro-Québec withdrew from the Jacques-Cartier River valley where it had planned to build a pumped storage station (Champigny project). The original objective of commissioning a station at this location in 1979 has been abandoned.

James Bay — On the La Grande River, 650 miles north of Montreal, construction work started in 1973 with the drilling of two diversion tunnels at the site chosen for the largest station of the complex — La Grande 2 or LG-2 — whose first units will come on line in 1980.

The 430-mile road from Matagami to Fort George, including a 12-mile side road to the LG-2 site, has been opened to traffic over its entire length. The permanent airport at LG-2, which can handle the Boeing 737 jet, was opened in September.

At year-end, the James Bay Energy Corporation was carrying out studies that will enable the exact size and final characteristics of the La Grande complex to be determined in 1974. The original plans called for four power stations with a combined capacity of 8,300 MW, but both the number and capacities of the power stations could be changed.

Manic 3: auxiliary dam under construction

Transmission system

Expenditures on new transmission facilities totaled $125,200,000 in 1973, compared with $142,500,000 in 1972.

Expansion of the transmission system, which comprises lines and substations operating at voltages between 120 and 735 kV*, continued at an accelerated rate during 1973 and was accompanied by implementation of technical improvements designed to maintain the quality of service and rapidly indicate the interventions required in case of disturbances or failures.

After three years of study, it was concluded that from the technical, economic and financial viewpoints, the best method of transmitting energy from James Bay would be a 735-kV alternating-current system similar to that used for transmitting energy from the Manic-Outardes complex and Churchill Falls.

Taking into account withdrawals from service, 666 miles of 120 to 735-kV circuits were added to the transmission system during 1973. An additional 700 miles of circuits were under construction at the year-end.

The third and last 735-kV line between Churchill Falls and the Hydro-Québec system (257 miles) was energized in the fall, along with the third 735-kV line between Manicouagan and Lévis substations (234 miles). In addition, the route was cleared for the second 735-kV line between Jacques-Cartier substation near Québec City and Duvernay substation near Montréal. This line is scheduled for service in 1975.

A total of about 10,800 MVA** was added to transformer capacity in the form of new substations or additions to existing substations, including the new 735-kV Nicolet substation between Québec City and Montreal.

Growth of transmission system

	Net change in 1973	Total length at Dec. 31, 1973
Overhead lines	(miles of circuits)	
735 kV	509.72	2,530.90
345 kV	—	136.45
315 kV	94.88	3,212.41
230 kV	64.96	2,036.51
161 kV	−5.81***	633.48
120 kV	4.47	3,273.12
Total: Overhead lines	668.22	11,822.87
Underground cables		
120 kV or more	−2.70	71.30
Grand total:	665.52	11,894.17

*1 kV = 1 kilovolt = 1,000 volts

**1 MVA = 1 megavolt-ampere = 1,000,000 volt-amperes

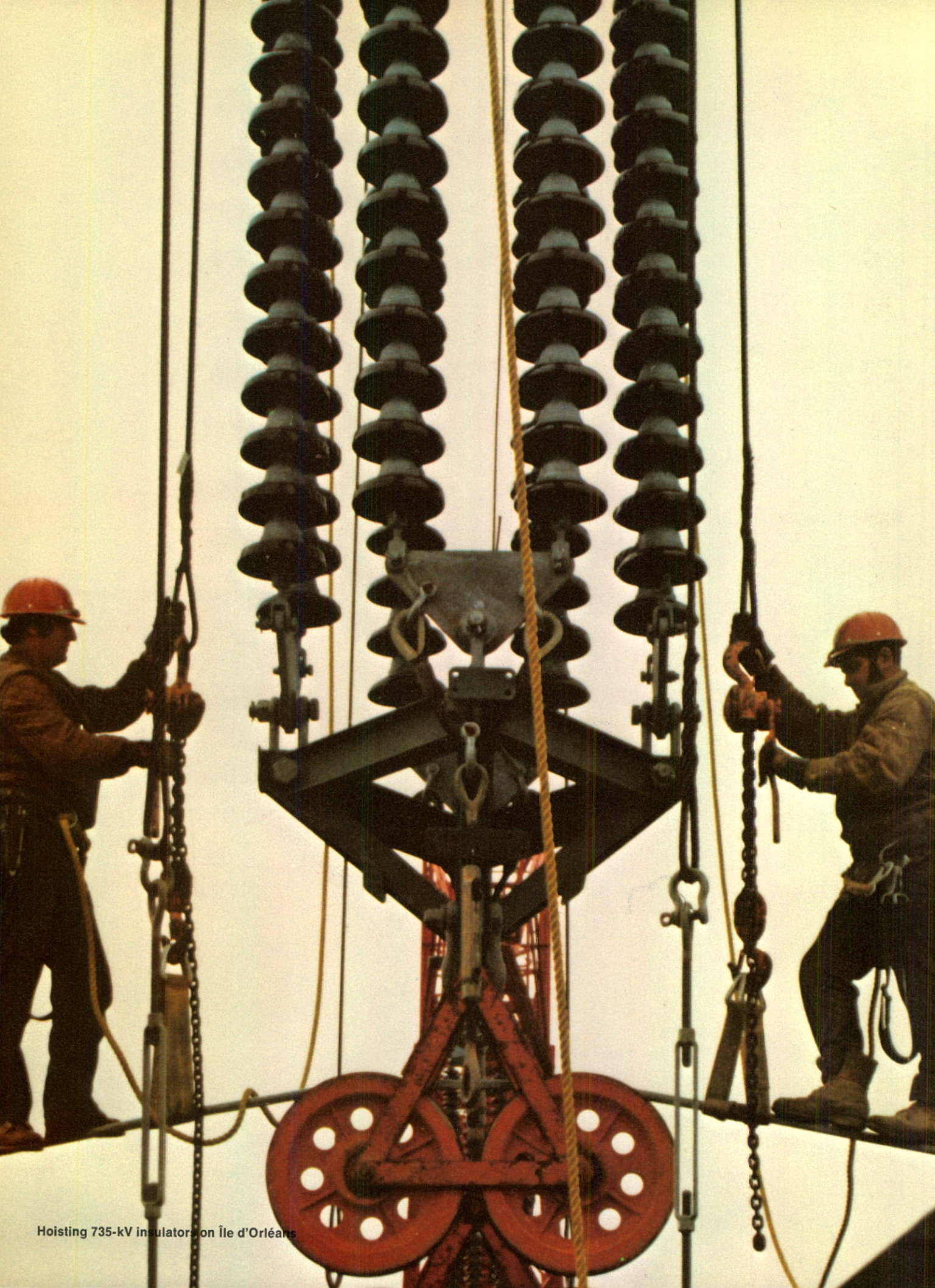
***This decrease applies to a line in Gaspé whose voltage was raised to 230 kV.

Automation and remote control

Rapide Blanc and La Trenche power stations, on the upper St. Maurice River, are now controlled from La Tuque, bringing to 12 the number of power stations operated by remote control. These 12 power stations have a combined capacity of 3,857 MW.

During the year, six substations were brought under remote control, and at year-end the number of substations operated by remote control stood at 149.

Hydro-Québec has begun to install locally-controlled automatic devices in its small hydroelectric powerhouses so as to improve their economic viability. With this type of automation, powerhouse start-up or shut-down is actuated by the reservoir water-level or a clock, depending on local operating conditions.



Hoisting 735-kV insulators on Île d'Orléans

Distribution system

During the year, Hydro-Québec acquired a larger number of new customers than ever before and was plagued by material shortages throughout the service area, which meant that a number of projects had to be postponed until 1974. The considerable increase in the cost of construction and maintenance work was another problem.

To provide service to new customers, maintain quality service and provide for the future, Hydro-Québec invested a total of $86,000,000 during the year in distribution facilities. This was an increase of $20,000,000 over 1972.

Taking into account removals from service, a total of 110 miles of new 44 and 69-kV circuits were placed in service. New 4 to 25-kV circuits placed in service totaled 1,000 miles compared with 905 miles in 1972. At December 31, Hydro-Québec's distribution circuits totaled 44,944 miles in length.

The Institute of Research

In 1973 the High Power Laboratory of Hydro-Québec's Institute of Research (IREQ) received three of a total of six 1200-MVA short-circuit transformers which will be used to test high-voltage and heavy-current apparatus. The final three transformers will be delivered in the spring of 1974.

The Institute, which is situated at Varennes some 20 miles from downtown Montreal, will then be the principal electrical research centre in North America.

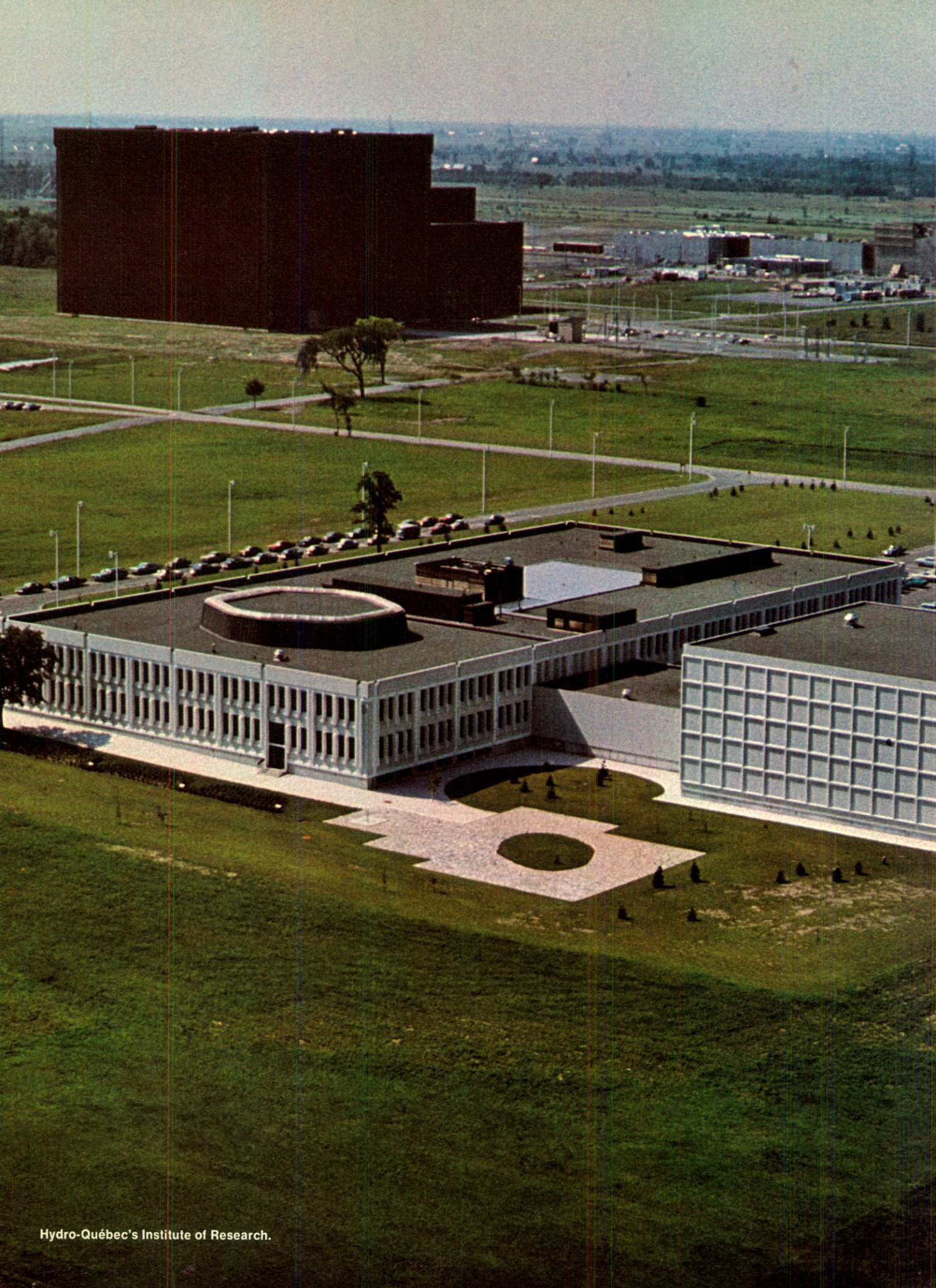
In 1973 more than 150 tests were carried out in the High Voltage Laboratory, not only on behalf of Hydro-Québec and other electric utilities, but also electrical-equipment manufacturers. Moreover, the Institute obtained many contracts from Canadian and American industry, particularly in the fields of power systems, materials and apparatus, and it was retained as consultant by government bodies and other organizations overseas, notably in Spain and Brazil.

During the year, the Institute applied for five patents. At December 31, the Institute's scientific, technical and administrative staff numbered 285 persons.

Personnel

Important collective agreements, which will terminate December 31, 1975, were signed on February 13, 1973, with three locals of the Canadian Union of Public Employees, representing more than 8,200 employees. These locals were *le Syndicat des techniciens, le Syndicat des employés de bureau,* and *le Syndicat des employés de métiers.* Hydro-Québec also signed an agreement covering the period March 16, 1973, to December 31, 1974, with *le Syndicat professionnel des ingénieurs de l'Hydro-Québec,* representing 527 staff engineers, and an agreement terminating May 26, 1976, with *le Syndicat national de la construction de Hauterive,* comprising 1,785 employees.

At December 31 the permanent employees of Hydro-Québec numbered 13,027, an increase of 3.2% over the preceding year. The number of temporary employees at construction sites averaged 1,942 over any two-week period. Wages and salaries paid during 1973 rose to $161,791,000, as against $144,283,000 in 1972. Wages paid to employees at construction sites amounted to $27,213,000, compared with $21,033,000 the previous year.



Hydro-Québec's Institute of Research.

Hydro-Québec Annual Report 1973

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Auditors' Report

We have examined the consolidated balance sheet of the Quebec Hydro-Electric Commission and its subsidiaries as at December 31, 1973, and the consolidated statements of revenue and expenditure, reserves, and source and application of funds for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, these consolidated financial statements present fairly the financial position of the Commission and its subsidiaries as at December 31, 1973, and the results of their operations and the source and application of their funds for the year then ended, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Montreal, Canada,
March 15, 1974.

Samson, Bélair, Côté, Lacroix
et Associés
Chartered Accountants

H. Marcel Caron, C.A.
of Clarkson, Gordon & Co.
Chartered Accountants

Consolidated Statement of Revenue and Expenditure

(in thousands of dollars)
for the year ended December 31

		1973	1972
Revenue	Sales of electricity: primary	$638,628	$552,768
	secondary	15,475	8,377
		654,103	561,145
	Increase in unbilled revenue	7,542	7,449
		661,645	568,594
	Other operating income (net)	12,785	11,554
		674,430	580,148
Expenditure	Operating, maintenance, administration and other expenses	201,641	172,300
	Power purchased	62,753	34,446
	Provision for renewals (depreciation)	75,439	70,030
	Provincial levy on energy generated (note 2)	8,222	29,882
	Provincial levy (note 2)	15,000	—
	School and municipal taxes	18,783	18,875
		381,838	325,533
Net operating income		**292,592**	254,615
Other income	Investment income (net)	10,748	10,573
	Net profit on repurchase of debentures	8,391	7,561
Income before interest charges		**311,731**	272,749
Interest charges	Interest on long-term debt	224,062	191,511
	Interest on bank indebtedness and notes payable	3,652	4,636
	Amortization of debenture discount and expenses	3,820	3,524
	Interest charged to construction work in progress	(40,412)	(25,825)
		191,122	173,846
Net income before interest on reserves		**120,609**	98,903
	Interest on reserves	77,274	68,487
Available for reserves		**$ 43,335**	$ 30,416
Provision for reserves	Contingencies	$ 3,019	—
	Stabilization of rates	13,233	$ 4,653
	Amortization of capital invested	27,083	25,763
		$ 43,335	$ 30,416

See accompanying notes

Consolidated Balance Sheet

(in thousands of dollars)
as at December 31

	Assets	1973	1972
Fixed assets	Property and plant, at cost:		
	In service	$4,834,478	$4,598,781
	Less reserve for renewals (accumulated depreciation)	940,478	877,832
		3,894,000	3,720,949
	Construction work in progress	752,011	465,021
		4,646,011	4,185,970
	Construction, operating and sundry equipment, at cost, less accumulated depreciation	34,130	28,884
		4,680,141	4,214,854
Current assets	Cash and short-term investments, at cost	2,246	39,201
	Accounts receivable	80,359	80,126
	Unbilled revenue	57,418	49,876
	Materials and supplies, at cost	31,259	30,748
	Prepaid expenses	5,870	4,730
		177,152	204,681
Other assets	Investments, at cost (note 3)	132,131	132,135
	Unamortized debenture discount and expenses	55,718	53,147
	Accounts receivable	8,527	9,133
	Unamortized deferred cost on purchase of energy	33,909	26,421
		230,285	220,836
		$5,087,578	$4,640,371

	Liabilities and Reserves	1973	1972
Long-term debt	Bonds and debentures — guaranteed by the Province of Quebec (notes 4 and 5)	$3,447,401	$3,172,013
	Less sinking funds (note 4)	44,400	51,254
		3,403,001	3,120,759
	Net exchange premium (note 5)	79,736	80,773
		3,482,737	3,201,532
	Other long-term debt (note 6)	30,421	27,217
		3,513,158	3,228,749
Notes payable	Notes payable within two years, of which $37,902 and $70,067 are due within one year	**52,402**	70,067
Current liabilities	Bank indebtedness	54,488	19,344
	Accounts payable and accrued liabilities	120,199	110,860
	Accrued interest	74,073	60,785
		248,760	190,989
Other liabilities	Workmen's compensation awards	2,479	2,523
	Customers' deposits and advances	10,434	8,307
		12,913	10,830
Reserves	Contingencies	488,120	454,300
	Stabilization of rates	230,444	203,419
	Amortization of capital invested	541,781	482,017
		1,260,345	1,139,736
		$5,087,578	$4,640,371

On behalf of the Commission:
(signed) Roland Giroux
(signed) Georges Gauvreau

Montreal, Canada,
March 15, 1974.

(signed) E.-A. Lemieux,
General Manager,
Finance and Accounting.

See accompanying notes

Consolidated Statement of Reserves

(in thousands of dollars)
for the year ended December 31

	1973				1972
	Contingencies	Stabilization of rates	Amortization of capital invested	Total	Total
Balance, January 1	$454,300	$203,419	$482,017	$1,139,736	$1,040,833
Add:					
Interest on reserves	30,801	13,792	32,681	77,274	68,487
Provisions from consolidated revenue	3,019	13,233	27,083	43,335	30,416
Balance, December 31	**$488,120**	**$230,444**	**$541,781**	**$1,260,345**	$1,139,736

See accompanying notes

Consolidated Statement of Source and Application of Funds

(in thousands of dollars)
for the year ended December 31

	1973	1972
Source of funds		
Operations		
Net income before interest on reserves	$120,609	$ 98,903
Less net profit on repurchase of debentures	8,391	7,561
	112,218	91,342
Plus:		
Provision for renewals (depreciation)	75,439	70,030
Depreciation of operating equipment	6,539	5,001
Amortization of debenture discount and expenses	3,820	3,524
Amortization of deferred cost on purchase of energy	6,241	1,783
Total funds from operations	**204,257**	171,680
Issue of debentures (less discount and expenses)	429,597	374,809
Sundry items (net)	6,284	5,884
Decrease (increase) in working capital	85,300	(15,113)
	$725,438	$537,260
Application of funds		
Additions to fixed assets	$550,726	$423,823
Less depreciation of construction equipment	605	223
	550,121	423,600
Maturities of long-term debt	95,686	33,591
Purchase of sinking fund investments (cost)	47,200	39,954
Decrease in notes payable	17,665	27,978
Increase in deferred cost on purchase of energy	13,729	11,546
Net exchange premium	1,037	591
	$725,438	$537,260

See accompanying notes

Notes to Consolidated Financial Statements

December 31, 1973

Note 1

Summary of significant accounting policies

A summary of the Commission's major accounting policies is presented below to assist the reader in analysing the consolidated financial statements.

a) Consolidation

The consolidated financial statements include the financial statements of the Commission and of all its subsidiary companies including the James Bay Energy Corporation.

b) Investments (see note 3)

The Commission carries its investments at cost.

c) Unamortized deferred cost on purchase of energy

In accordance with the terms of a contract with Churchill Falls (Labrador) Corporation Limited (see note 8), the Commission is obligated to pay to the Corporation an amount equal to a part of the interest charges on the First Mortgage Bonds, General Mortgage Bonds and other indebtedness of the Corporation. These payments are being amortized over the life of the contract by charges to the cost of power purchased.

d) Sinking funds

The Commission invests substantially all of its sinking funds in its own debentures and in bonds of its subsidiaries and follows the practice of carrying these investments at par, which may not be indicative of cost or current market value. The resulting profit, net of unamortized debenture or bond discount and other expenses, is credited to revenue and expenditure. Debentures or bonds of an issue purchased for the sinking fund of that issue have been cancelled.

e) Foreign exchange translation (see note 5)

Consolidated long-term debt payable in U.S. currency is carried in the accounts at the rate of $1 U.S. equals $1 Canadian, while consolidated long-term debt payable in Deutsche Marks and Swiss Francs is carried in the accounts at the Canadian dollar equivalent at the dates of borrowing.

The adjustment arising from the conversion of debt payable in U.S. funds into Canadian funds at the rates of exchange in effect at the time the debt was incurred or included in consolidation, less the exchange premium on debentures purchased for sinking funds, is carried on the consolidated balance sheet in a separate account called net exchange premium.

f) Reserves

The Hydro-Quebec Act requires the Commission to create reserves for contingencies, stabilization of rates and amortization of the capital invested. In addition to the amounts provided for the respective reserves at the end of each year, the Commission, as required by the Act, charged to revenue and expenditure and credited to reserves interest on the amounts of the reserves at the average cost of money to the Commission in each year as follows: 1973, 6.78% and 1972, 6.58%.

g) Provision for renewals (depreciation)

The Commission uses a uniform sinking fund method of providing for depreciation of its own and its subsidiaries' property and plant based on their respective service lives.

The expected service lives for the main categories of property and plant in service are as follows:

Class	Life
Hydraulic powerhouses	50 years
Hydraulic turbines and generators	40 years
Dams and reservoirs	50 years
Transmission towers (steel) and conductors	50 years
Distribution poles (wood)	25 years
Distribution conductors	40 years

h) Interest charged to construction work in progress

Interest is charged to construction work in progress at a rate equivalent to the weighted average of the effective interest rates on debentures of the Commission issued to finance such construction.

i) Unbilled revenue

Revenues are recorded on the basis of cycle billings and accrued in respect of energy delivered but not billed.

Note 2

Provincial levy

In 1973, the Provincial Government cancelled the provincial levy on energy generated. From April 1, 1973, the Commission is subject to an annual payment to the Provincial Government of $20 million out of its gross revenue.

		1973 ($'000')	1972 ($'000')
	Note 3		
Investments, at cost	Churchill Falls (Labrador) Corporation Limited (see note 8)		
	General Mortgage Bonds, 7½%, due 2010 (par value $100 million)	$ 90,500	$ 90,500
	Common shares	34,333	34,333
		124,833	124,833
	Gelco Enterprises Ltd., 4% unsecured note, due 1991	7,195	7,195
	Sundry investments	103	107
		$132,131	$132,135

The share of the Commission in the earnings of Churchill Falls (Labrador) Corporation Limited since the date of acquisition amounts to $6,799,000 at December 31, 1973, of which $4,473,000 was earned in 1973.

Bonds and debentures

Note 4

Series	Interest Rate	Year of Issue	Year of Maturity	Bonds and Debentures ($'000')	Sinking Fund Investments ($'000')
Debentures of Quebec Hydro-Electric Commission					
*"K"	3½%	1953	1978	$ 35,403 U.S.	$ 14,413
*"L"	3¼%	1954	1974	20,394	768
*"M"	3½%	1955	1975	26,904	1,584
*"N"	3½%	1956	1981	33,002 U.S.	10,311
*"O"	4¼%	1956	1976	17,705	300
*"P"	4¼%	1956	1981	23,527 U.S.	5,620
*"Q"	4⅜%	1957	1977	31,327 U.S.	868
*"S"	5%	1957	1975, 1982	20,753	5
*"T"	3¾%	1958	1983	29,238 U.S.	924
*"V"	5%	1958	1979	15,283	
*"W"	5%	1959	1980	21,919	
*"X"	5%	1959	1984	35,422 U.S.	
*"Y"	6%	1959	1979	19,170	
*"Z"	5½%	1960	1982	26,360	
*"AA"	5½%	1960	1983	19,912	
*"AB"	5½%	1961	1985	32,036	225
*"AC"	5½%	1961	1985	29,380	
*"AD"	5½%	1962	1982	33,206	
*"AF"	5¾%	1962	1984	43,097	
*"AG"	5%	1963	1988	252,252 U.S.	
*"AM"	5¼%	1963	1986	40,930	
*"AN"	5½%	1964	1984, 1994	34,013	
*"AO"	4½%	1964	1994	50,000 U.S.	9,206
*"AP"	4¾%	1964	1989	41,015 U.S.	
*"AQ"	5½%	1964	1988	51,241	
*"AR"	5½%, 5%	1965	1987, 1995	63,543	
*"AS"	4⅝%	1965	1985	46,497 U.S.	
*"AT"	5¼%	1966	1987	46,140 U.S.	
*"AU"	6%	1966	1991	45,357	
*"AV"	5⅜%	1966	1992	56,880 U.S.	
*"AW"	6%	1966	1980, 1990	44,878	176
*"AX"	6¼%	1966	1991	37,975 U.S.	
*"AY"	6¼%	1967	1993	57,100 U.S.	
*"AZ"	6½%	1967	1978, 1990	46,046	
*"BA"	6¼%	1967	1993	48,850 U.S.	
*"BB"	6½%	1967	1992	48,780 U.S.	
*"BC"	6¾%, 7%, 6%, 7%	1967	1974-1977, 1980, 1994	51,000	
*"BD"	6⅞%	1968	1989	58,795 U.S.	
*"BE"	7½%, 7½%, 7%	1968	1974-1978, 1980, 1994	44,000	
*"BF"	7¾%	1968	1986	24,490 U.S.	
*"BG"	7¼%	1968	1991	48,925 U.S.	

Note 4 — Bonds and debentures *(cont'd)*

Series	Interest Rate	Year of Issue	Year of Maturity	Bonds and Debentures ($'000')	Sinking Fund Investments ($'000')
"VA"	7¼%	1968	1974	10,000 U.S.	
* —	6¾%	1969	1984 (150 million Deutsche Marks)	40,216	
* —	7¼%	1969	1984 (100 million Deutsche Marks)	27,045	
*"BH"	7¾%	1969	1974, 1990	50,000	
*"BI"	8¾%	1969	1999	50,000 U.S.	
"BJ"	8%	1969	1979 (1974 at the option of the holders)	20,000 U.S.	
*"BK"	8½%	1969	1992	25,548	
*"BL"	9¾%	1969	1995	50,000 U.S.	
*"BM"	9½%	1970	1975 (1990 at the option of the holders)	50,000	
*"BN"	9¼%	1970	1995	60,000 U.S.	
*"BO"	9½%	1970	1990	29,200	
*"BP"	9½%	1970	1997	75,000 U.S.	
*"BQ"	9¼%	1970	1985	13,200 U.S.	
*"BR"	8¾%	1971	1999	75,000 U.S.	
*"BS"	8¼%	1971	1986	18,400 U.S.	
*"BT"	7¾%	1971	1996	48,960	
*"BU"	8¾%	1971	1996	49,003	
* —	8%	1971	1986 (100 million Deutsche Marks)	29,835	
*"BV"	8½%	1971	2001	75,000 U.S.	
*"BW"	8½%	1971	1986	25,000 U.S.	
*"BX"	7⅞%	1972	2002	100,000 U.S.	
* —	6½%	1972	1987 (100 million Deutsche Marks)	31,391	
*"BY"	8¼%	1972	1997	49,482	
*"BZ"	8¼%	1972	1993	59,390	
*"CA"	8%, 8⅜%	1972	1980 1997	64,446	
"CB"	8¼%	1972	1996	50,000	
* —	6¼%	1972	1987 (80 million Swiss Francs)	21,021	
*"CC"	7½%	1973	2003	125,000 U.S.	
"CD"	8%	1973	1998	50,000	
* —	6½%	1973	1988 (100 million Deutsche Marks)	35,234	
"CE"	8¼%	1973	1998	55,000	
*"CF"	8½%	1973	2003	67,500 U.S.	
"CG"	8¾%	1973	1998	50,000	
"CH"	8½%	1973	1998	50,000	
Total debentures of the Commission				**$3 382 616**	**$ 44 400**

*Sinking fund debentures

Bonds of subsidiary companies

The Shawinigan Water and Power Company

"Q"	3%	1950	1975	$ 14,650 U.S.
"R"	4¾%	1956	1976	10,104
"S"	5¾%	1961	1981	13,605

Southern Canada Power Company, Limited

"B"	3½%	1946	1976	5,220
"C"	3½%	1948	1976	2,400
"D"	3⅜%	1951	1981	2,500

Quebec Power Company

"G"	6¼%	1962	1982	11,762

Note 4 — Bonds and debentures *(cont'd)*

Series	Interest Rate	Year of Issue	Year of Maturity	Bonds and Debentures ($'000')	Sinking Fund Investments ($'000')
Lower St. Lawrence Power Company					
"F"	5⅞%	1959	1984	$ 865 U.S.	
Northern Quebec Power Company, Limited					
"B"	5⅛%	1954	1974	39	
Saguenay Electric Company					
"A"	5½%	1962	1982	3,640	
Total bonds of subsidiary companies				**64,785**	
Total bonds and debentures				**$3,447,401**	**$ 44,400**

The Commission issued on January 3, 1974, $115,750,000 (U.S.) of 8¼% Debentures, Series CI, dated January 1, 1974 and maturing January 1, 2004; on January 31, 1974, $32,500,000 (U.S.) of 8½% Debentures, Series CF, dated August 1, 1973 and maturing August 1, 2003; on February 1, 1974, $30,000,000 (U.S.) of 8½% Debentures, Series CJ, dated February 1, 1974 and maturing February 1, 1989 and will issue on April 18, 1974, $9,250,000 (U.S.) of 8¼% Debentures, Series CI, dated January 1, 1974 and maturing January 1, 2004.

Bonds and debentures of subsidiary companies are guaranteed by the Commission, which guarantee is in turn guaranteed by the Province of Quebec.

Consolidated long-term debt maturities and sinking fund requirements in each of the next five years are approximately as follows:

	Maximum maturities and requirements ($'000')	Maturities at the option of the holders ($'000')	Minimum maturities and requirements ($'000')
1974	$151,312	$20,000	$131,312
1975	155,218	50,000	105,218
1976	96,907		96,907
1977	95,582		95,582
1978	107,477		107,477

Note 5

Net exchange premium

Consolidated long-term debt at December 31, 1973 includes $1,756,595,000 U.S. dollars, 550 million Deutsche Marks and 80 million Swiss Francs.

If the net long-term debt payable in foreign currencies were converted into Canadian dollars at the rates of exchange prevailing at December 31, 1973 the premium required would be approximately $44,700,000 less than the net exchange premium shown on the consolidated balance sheet. As a result, if the total long-term debt payable in various currencies in the principal amount of $3,513,158,000 at December 31, 1973 were converted into Canadian dollars at the rates of exchange prevailing on this date, this principal amount would be $3,468,458,000.

Note 6

Other long-term debt

	1973 ($'000')	1972 ($'000')
Rural Electrification Bureau, 1974-1994*	$ 7,727	$ 8,427
Government of Canada**	18,747	17,584
Other long-term debt maturing from 1974 to 1984	3,947	1,206
	$ 30,421	$27,217

*Does not bear interest as long as there is no default under the provisions of the governing agreements.
**Guaranteed by the Province of Quebec, 7 3/16%, 7½%, 7 11/16% notes payable in 25 equal annual instalments of principal and interest starting not later than March 31, 1975.

Note 7

Pensions

The Hydro-Québec employees' retirement plan is a contributory, benefit-based plan, under which the benefits payable are guaranteed by the Commission, and applies to all Hydro-Québec employees including those who were employees of the subsidiaries prior to January 1, 1966 and who are covered by the pension funds of the subsidiaries for service prior to that date. The Commission amortizes the initial actuarial deficit of this plan, in respect of services prior to 1966, which amounted to approximately $30 million at December 31, 1971 as determined by an actuarial survey at that date, over a period ending December 31, 1995. It also amortizes the experience deficiency for current services, which amounted to approximately $11 million for the years 1969 to 1971, over a period of 5 years.

The total pension cost of $15,571,000 for 1973 ($13,422,000 for 1972) provides fully for the Commission's contribution to the Quebec Pension Plan and to the Retirement Fund in respect of current services, interest on the actuarial deficit in respect of past services and amortization of this deficit over a period ending December 31, 1995.

An additional past service obligation, which amounted to approximately $32 million at December 31, 1971 as determined by an actuarial study at that date, related to supplementary amounts that the Commission has decided to pay effective January 1, 1972 in order to assure a minimum pension of $1,200 per year and to adjust the pensions paid or to be paid to the pensioners of the subsidiaries acquired in 1963, is being substantially amortized over a period of 30 years by annual charges to operations. The Commission paid $1,701,000 in 1973 ($1,525,000 in 1972) in respect of these benefits.

Note 8

Churchill Falls

Commitments

In May 1969, the Commission executed a contract for the purchase, starting in 1972, of a very large amount of energy from a generating station at Churchill Falls in Labrador with a rated capacity of 5,225,000 kilowatts, in process of construction by Churchill Falls (Labrador) Corporation Limited ("CFLCo"). CFLCo has entered into long-term and interim financing contracts which, with internally generated funds, will, in its opinion, permit it to cover the cost of the project estimated originally at $950 million and now at $937 million. The Commission holds 34.2% of the common stock of CFLCo and $100 million of its General Mortgage Bonds at a total cost of approximately $124.8 million. If CFLCo is not able to obtain otherwise any further funds which may be necessary to complete the project, it can call upon the Commission to purchase units of Subordinated Debentures and shares of Common Stock.

The power contract provides for the purchase by the Commission for a period of 40 years from the completion of the project, scheduled for 1975, of all the power generated at Churchill Falls except for amounts required (not exceeding 12% of the energy generated) by Newfoundland. This contract will be automatically renewed for a further period of 25 years, upon already agreed terms. The price to be paid by the Commission for the energy will vary until the year 2016 and will depend upon the final cost of construction of the plant. It is estimated that the maximum total annual payments by the Commission for energy will range from $93 million to $80 million until the year 2016 and will be approximately $63 million during the remaining 25 years. In addition, the Commission is obligated to pay CFLCo an amount equal to a part of the interest charges on the First Mortgage Bonds, General Mortgage Bonds and other indebtedness of CFLCo. The Commission estimates that these payments will not exceed $15 million per annum, declining as the bonds and other indebtedness are retired. Subject to certain limitations and compensations, the contract requires the Commission to make payments for energy whether or not taken; the Commission can also be required to make additional advances, against the issue of units of Subordinated Debentures and shares of Common Stock, to service the debt of CFLCo and to cover its expenses if funds are not otherwise available.

Commercial delivery of power from the first two generating units, of a total of eleven units, began at the end of 1971 and seven units are in operation at December 31, 1973.

James Bay

In July 1971, the Quebec Government created the James Bay Development Corporation to undertake the development of the natural resources in northwestern Quebec and in December 1971, the James Bay Energy Corporation was created to develop the hydroelectric resources of the same area. The act incorporating the company provides for the majority of the shares of James Bay Energy Corporation to be subscribed for by the Commission. In February 1972, the directors of the James Bay Energy Corporation accepted from the Commission a subscription for 7,000,000 shares of capital stock, out of a total authorized capital of 10,000,000 shares, for a price of $700 million payable over a period of ten years. At December 31, 1973, the Commission had invested $100 million and had undertaken to invest a further $50 million for 1974.

Of the 1,000,005 shares of the James Bay Energy Corporation outstanding at December 31, 1973, 999,998 are owned by the Commission, 5 by members of the Commission, 1 by a director of the James Bay Energy Corporation and 1 by the James Bay Development Corporation.

Note 8 — Commitments *(cont'd)*

In 1972, a decision had been taken to start the James Bay project with the construction of four generating plants on the La Grande River, with a projected installed capacity of 8,300,000 kilowatts at an estimated cost of $5.8 billion. Completion of this initial stage was expected in 1984. The James Bay Energy Corporation continues to study the extent of the La Grande complex and new estimates of capacity and cost will be determined in 1974. At December 31, 1973, $377 million had been invested in the project.

With the exception of the subscription for shares mentioned above, the extent of the financial involvement of the Commission in connection with the project cannot yet be determined.

Other commitments

Commitments in respect of construction contracts and for the purchase of equipment amounted to approximately $276 million at December 31, 1973, including $79 million for James Bay Energy Corporation.

Note 9

Litigation

In May 1972, certain Indian chiefs and Eskimos instituted proceedings in the Superior Court for the District of Montreal to have the James Bay Region Development Act declared unconstitutional and ultra vires of the jurisdiction of the legislature of Quebec and, in addition, to obtain a permanent order of injunction to prevent the carrying out of all works in the James Bay territory related to this Act. Hearings on these proceedings have not yet commenced.

In November 1972, procedures for an interlocutory injunction were instituted to stop the carrying out of these works until a final judgment is obtained on the permanent injunction. On November 15, 1973, the Superior Court granted the requested interlocutory injunction. The defendants appealed to the Court of Appeal of the Province of Quebec from the decision granting the interlocutory injunction and petitioned the Court of Appeal for an order suspending the interlocutory injunction pending the decision of the Court of Appeal on the interlocutory injunction. On November 22, 1973, the Court of Appeal granted the petition for suspension of the interlocutory injunction.

On December 21, 1973, the Supreme Court of Canada dismissed the petition presented by the attorneys for the plaintiffs for leave to appeal to that Court from the decision of the judges of the Court of Appeal suspending the interlocutory injunction.

Summary of Consolidated Revenue and Expenditure

(in thousands of dollars)

		1973	1972	1971	1970	1969
Revenue	Sales of Electricity: primary	$638,628	$552,768	$503,139	$466,543	$411,211
	secondary	15,475	8,377	15,175	11,703	4,801
		654,103	561,145	518,314	478,246	416,012
	Increase in unbilled revenue	7,542	7,449	5,963	4,820	4,315
		661,645	568,594	524,277	483,066	420,327
	Other operating income (net)	12,785	11,554	11,282	11,253	10,781
		674,430	580,148	535,559	494,319	431,108
Expenditure	Operating, maintenance, administration and other expenses (1)	201,641	172,300	149,897	144,344	143,704
	Power purchased (2)	62,753	34,446	15,738	15,647	17,536
	Provision for renewals (depreciation)	75,439	70,030	64,103	58,805	51,488
	Provincial levy on energy generated	8,222	29,882	29,057	27,784	23,744
	Provincial levy	15,000	—	—	—	—
	School and municipal taxes	18,783	18,875	19,070	18,182	18,091
		381,838	325,533	277,865	264,762	254,563
Net operating income		**292,592**	254,615	257,694	229,557	176,545
Other income	Investment income (net)	10,748	10,573	10,094	10,564	9,114
	Net profit on repurchase of debentures	8,391	7,561	9,547	8,796	6,736
Income before interest charges		**311,731**	272,749	277,335	248,917	192,395
Interest charges	Interest on long-term debt	224,062	191,511	167,800	148,443	130,654
	Interest on bank indebtedness and notes payable	3,652	4,636	8,007	12,721	17,962
	Amortization of debenture discount and expenses	3,820	3,524	3,311	3,190	2,899
	Interest charged to construction work in progress	(40,412)	(25,825)	(29,535)	(32,079)	(43,885)
		191,122	173,846	149,583	132,275	107,630
Net income before interest on reserves		**120,609**	98,903	127,752	116,642	84,765
	Interest on reserves	77,274	68,487	57,250	46,910	39,284
Available for reserves		**$43,335**	$ 30,416	$ 70,502	$ 69,732	$ 45,481
Provisions for reserves	Contingencies	$ 3,019	—	$ 36,203	$ 38,227	$ 18,002
	Stabilization of rates	13,233	$ 4,653	10,485	9,661	8,407
	Amortization of capital invested	27,083	25,763	23,814	21,844	19,072
		$43,335	$ 30,416	$ 70,502	$ 69,732	$ 45,481

(1) Including fuel $312 – 1973; $848 – 1972; $1,669 – 1971; $3,827 – 1970; $12,641 – 1969.
(2) Including amortization of deferred cost on purchase of energy $6,241 – 1973; $1,783 – 1972.

Five-Year Consolidated Sales and Revenue

		1973	1972	1971	1970	1969
Electric Energy Generated and Purchased (in millions of kWh)	Generated (net)	57,514	55,660	54,134	52,165	46,760
	Purchased	18,390	11,560	4,200	4,001	4,298
		75,904	67,220	58,334	56,166	51,058
	Losses and internal use	5,605	5,272	4,640	4,422	3,829
	Delivered as per agreement (net)	1,038	665	625	858	458
	Increase in unbilled sales	581	887	570	274	458
	Total electric energy sold	**68,680**	60,396	52,499	50,612	46,313
Electric Sales (in millions of kWh)	Domestic and farm	15,215	13,703	12,503	11,696	10,883
	Commercial (including Municipal)	11,149	10,629	9,096	6,684	5,505
	Industrial: Primary	24,566	22,766	22,369	24,032	23,334
	Secondary	2,171	1,573	439	574	819
	Street lighting and luminaires	512	457	453	429	413
	Transportation	160	164	164	161	164
	Wholesale: Primary	10,965	9,194	5,008	3,784	3,710
	Secondary	3,863	1,848	2,395	2,569	826
	Interdepartmental	79	62	72	683	659
	Total electric sales	**68,680**	60,396	52,499	50,612	46,313
Sales Revenue (in thousands of dollars)	Domestic and farm	$235,615	$203,038	$189,293	$174,231	$148,661
	Commercial (including Municipal)	164,842	152,299	134,539	103,303	83,912
	Industrial: Primary	171,760	147,949	144,903	159,122	150,602
	Secondary	5,228	3,655	1,665	2,115	2,957
	Street lighting and luminaires	15,196	13,437	12,720	11,586	10,346
	Transportation	1,482	1,371	1,402	1,306	1,318
	Wholesale: Primary	49,472	34,469	20,046	14,921	14,383
	Secondary	10,247	4,722	13,510	9,588	1,844
	Interdepartmental	261	205	236	2,074	1,989
	Total sales revenue	**$654,103**	$561,145	$518,314	$478,246	$416,012
Average Revenue (cents per kWh)	Domestic and farm	1.549¢	1.482¢	1.514¢	1.490¢	1.366¢
	Commercial (including Municipal)	1.479¢	1.433¢	1.479¢	1.545¢	1.524¢
	Industrial: Primary	0.699¢	0.650¢	0.648¢	0.662¢	0.645¢
	Secondary	0.241¢	0.232¢	0.379¢	0.368¢	0.361¢
	Wholesale: Primary	0.451¢	0.375¢	0.400¢	0.394¢	0.388¢
	Secondary	0.265¢	0.256¢	0.564¢	0.373¢	0.223¢
	Other	2.256¢	2.198¢	2.084¢	1.176¢	1.105¢
Total Customer Accounts	(year-end)	**2,017,079**	1,943,119	1,895,082	1,852,292	1,772,878
Domestic and Farm Accounts	(year-end)	**1,783,871**	1,716,529	1,669,523	1,632,393	1,568,689

Statistics of Electricity Generated and Purchased and its Disposal in 1973

Gross Generation		The consolidated system (in millions of kWh)
Hydro-Electric Stations		
Upper Ottawa	(5 plants)	2,566
Gatineau	Paugan	1,342
	Others (3 plants)	1,580
		2,922
Lower Ottawa	Carillon	3,114
	Others (9 plants until the end of May, 8 plants until the end of July and 7 plants thereafter)	952
		4,066
Upper Saint Lawrence	Beauharnois	12,409
	Other (1 plant)	1,009
		13,418
Saint Maurice	La Trenche	1,445
	Beaumont	1,311
	La Tuque	1,202
	Shawinigan 3	940
	Others (4 plants)	3,758
		8,656
Bersimis	Bersimis 1	4,679
	Bersimis 2	2,517
		7,196
Outardes	Outardes 3	4,323
	Outardes 4	3,446
		7,769
Manicouagan	Manic 5	5,327
	Manic 2	4,576
	Manic 1	448
		10,351
Other rivers	(14 plants)	694
Total	(50 hydro-electric stations, then 48)	57,638
Thermal-Electric Stations	Tracy	36
	Others (15 plants)	76
		112
Total gross generation	(66 plants, then 64)	57,750
Less: station use		236
Total generation (net)		57,514
Purchased from	Alcan	3,170
	Maclaren-Quebec Power Co.	795
	Churchill Falls (Labrador) Corporation Limited	13,814
	Sundry Purchases	611
Total		18,390
Less: delivered as per agreement (net)		1,038
Energy supplied		17,352
Net system total output		74,866
Total sales		68,680
Increase in unbilled sales		581
Losses		5,605
System peaks (MW)	Primary	12,620
	Secondary	140
	Foreign network support	174

Hydro-Québec Employees' Retirement Fund

Auditors' Report

We have examined the statement of assets and reserve of the Hydro-Québec Employees' Retirement Fund as at December 31, 1973 and the statement of revenue and expenditure for the year ended on that date. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the assets of the Fund as at December 31, 1973 and its revenue and expenditure for the year ended on that date, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Montreal, Canada,
March 15, 1974.

Samson, Bélair, Côté, Lacroix
et Associés
Chartered Accountants

H. Marcel Caron, C.A.
of Clarkson, Gordon & Co.
Chartered Accountants

Hydro-Québec Employees' Retirement Fund

Statement of Revenue and Expenditure

(in thousands of dollars)
for the year ended December 31

		1973	1972
Revenue	Current contributions:		
	Employees	$ 5,752	$ 5,020
	Hydro-Quebec	11,301	9,884
		17,053	14,904
	Special contribution by Hydro-Quebec (note)	8,426	—
		25,479	14,904
	Additional past service contributions less cancellations	191	24
		25,670	14,928
	Less refunded to employees leaving service	451	286
		25,219	14,642
	Revenue from investments	9,584	7,234
		34,803	21,876
Expenditure	Pensions paid	3,380	3,129
Net revenue transferred to reserve		**$ 31,423**	$ 18,747

See accompanying note

Hydro-Québec Employees' Retirement Fund

Statement of Assets and Reserve

(in thousands of dollars)
as at December 31

		1973	1972
Assets (note)	Investments, at cost:		
	Bonds of, or guaranteed by the Province of Quebec	$115,014	$ 88,476
	Municipal and School Commission bonds	19,907	17,529
	Government of Canada bonds	336	336
	Other bonds	150	150
	(Par value $141,720, market value $129,500)	**135,407**	106,491
	Common stocks (market value $1,018)	1,486	1,497
	Short-term investment, guaranteed by the Province of Quebec	6,000	3,500
		142,893	111,488
	Accrued interest on investments	2,858	1,960
	Past service contributions receivable from employees	86	36
	Amount receivable from (payable to) Hydro-Quebec	(145)	785
		$145,692	$114,269
Reserve	Balance as at January 1	$114,269	$ 95,522
	Net revenue for the year	31,423	18,747
	Balance as at December 31	**$145,692**	$114,269

See accompanying note

On behalf of the Commission:
(signed) Roland Giroux
(signed) Georges Gauvreau

(signed) E.-A. Lemieux,
General Manager,
Finance and Accounting.

Montreal, Canada,
March 15, 1974.

Hydro-Québec Employees' Retirement Fund

Note to Financial Statements

December 31, 1973

These statements show only the position of the assets of the Hydro-Quebec Employees' Retirement Fund, but do not purport to show the adequacy of the fund to meet the obligations of the Hydro-Quebec retirement plan which are guaranteed by the Commission. An actuarial survey of the obligations of the plan as of December 31, 1971 shows an actuarial deficit in respect of services prior to 1966 of approximately $30 million, and an experience deficiency at December 31, 1971 in respect of current services of approximately $9 million.

The Commission assumes the annual amortization ($2,107,000) of the initial actuarial deficit over a period ending December 31, 1995 and made a special contribution of $8,426,000 to the fund in 1973 with regard to this amortization, for the years 1970 to 1973 inclusive. The experience deficiency at December 31, 1971 for current services is being amortized over a period of 5 years, from 1972 to 1976 inclusive. As a result, contributions to the fund are sufficient to cover obligations in respect of current services, interest on the above actuarial deficit in respect of past services and the amortization of this deficit over a period ending December 31, 1995.

HYDRO-QUEBEC GENERATING STATIONS

in service or under construction at December 31, 1973

Generating Stations in Service

Hydroelectric

	(kilowatts)
1 — Beauharnois	1 574 260
2 — Manic 5	1 292 000
3 — Manic 2	1 015 200
4 — Bersimis 1	912 000
5 — Outardes 3	756 200
6 — Bersimis 2	655 000
7 — Carillon	654 500
8 — Outardes 4	632 000
9 — La Trenche	286 200
10 — Beaumont	243 000
11 — La Tuque	216 000
12 — Paugan	201 975
13 — Manic 1	184 410
14 — Rapide-Blanc	183 600
15 — Shawinigan 2	163 000
16 — Les Cèdres	162 000
17 — Shawinigan 3	150 000
18 — Grand'Mère	148 075
19 — Chelsea	144 000
20 — La Gabelle	123 750
21 — Rapide-des-Iles	146 520
22 — Rapides-Farmers	98 250
23 — Première-Chute	93 150
24 — Rapides-des-Quinze	89 600
25 — Rapide 7	57 000
26 — Bryson	56 000
27 — Rapide 2	48 000
28 — Rivière-des-Prairies	45 000
29 — Chute-Hemmings	28 800
30 — Hull 2	27 280
31 — Sept-Chutes	18 720
32 — Saint-Narcisse	15 000
33 — Drummondville	14 600
34 — Métis 1	6 400
35 — Pont-Arnault	5 450
36 — Chute-Bell	4 800
37 — Métis 2	4 250
38 — Saint-Alban	3 000
39 — Saint-Raphaël	2 550
40 — Sherbrooke	2 256
41 — Chute-Garneau	2 240
42 — Corbeau	2 000
43 — Magpie	1 800
44 — Rawdon	1 720
45 — Chute-Burroughs	1 600
46 — Chute Wilson	840
47 — Anse-Saint-Jean	400
48 — High-Falls	340

Thermal

	(kilowatts)
49 — Tracy	600 000
50 — Les Boules	36 000
51 — Cap-aux-Meules	17 021
52 — Havre-Saint-Pierre	6 000
53 — Blanc-Sablon	2 350
54 — Natashquan	2 200
55 — Fort George	1 900
56 — La Baleine	1 800
57 — Harrington-Harbour	1 050
58 — La Tabatière	1 100
59 — Saint-Augustin	1 000
60 — La Romaine	775
61 — Parent	700
62 — Ile-aux-Grues	425
63 — Johan-Beetz	355
64 — Ile-d'Entrée	295

Total installed capacity of hydroelectric generating stations (48)	10 474 736
Total installed capacity of thermal electric generating stations (16)	672 971
Total capacity in service at December 31, 1973	11 147 707

Nuclear power station

65 — Gentilly 1*	266,000

Generating stations under construction

	In service	Power
Hydroelectric		
66 — Manic 3	1975-76	1,183,000
67 — Outardes 2	1978	454,000
68 — La Grande 2**	1980-82	5,328,000
Nuclear		
69 — Gentilly 2	1978	600,000

*Gentilly 1 does not at present belong to Hydro-Québec and therefore is excluded from the total.

**The James Bay Energy Corporation, a subsidiary of Hydro-Québec, is responsible for the development of the la Grande River.

Legend
Hydraulic generating stations
Thermal generating stations
Hydraulic generating stations under construction
Major substations
Nuclear generating station
735 kV
735 kV future
345 & 315 kV
230 kV
161 kV
120 kV
QUÉBEC
ONTARIO
ST. LAWRENCE RIVER
ANTICOSTI
NEWFOUNDLAND
NEW BRUNSWICK
PRINCE EDWARD ISLAND
NOVA SCOTIA
U.S.A.
Îles-de-la-Madeleine
Normand
Towards Churchill Falls
Montagnais
Arnaud
Vers Havre St-Pierre
Sept-Îles
Matagami
Chibougamau
Chapais
Quévillon
Normétal
Amos
Senneterre
Rouyn
Pandora
Provencher
Noranda
Cadillac
Val d'Or
Louvicourt
Micoua
Manicouagan
Baie-Comeau
Hauterive
Alcan property
Lac Saint-Jean
Gaspé
Copper Mountain
Les Boules
Micmac
Chandler
Rimouski
Cascapédia
Matapédia
Rivière-du-Loup
Kipawa
Campeau
Maniwaki
Mont-Laurier
High-Falls
Ste-Agathe
Ouimet
Kildare
Joliette
Riv.-Noire
Trois-Rivières
Becancours
Laurentides
Jacques-Cartier
Québec
Chaudière
Parisville
Lévis
Nicolet
Victoriaville
Thetford
Beauceville
Sorel
Île Varennes
Bout-de-l'Île
Boucherville
St-Césaire
Magog
Kingsey
Weedon
Brompton
Sherbrooke
Paquin
Lafontaine
Duvernay
Lachute
Vignan
Chomedey
Montréal
Laprairie
UNGAVA BAY
HUDSON BAY
JAMES BAY
LA GRANDE BALEINE RIVER BASIN
CANAPISCAU RIVER BASIN
LA GRANDE RIVIERE BASIN
EASTMAIN RIVER BASIN
RUPERT RIVER BASIN
BROADBACK RIVER BASIN
NOTTAWAY RIVER BASIN
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