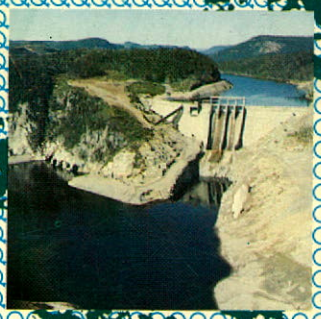
Hydro-Québec Annual Report 1976



Hydro-Québec
Annual Report
1976

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Direction des Relations publiques
Hydro-Québec, 19e étage
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Montréal (Québec) H2Z 1A4

Le ministre délégué à l'Énergie
Province de Québec

L'honorable Lieutenant-colonel
Hugues Lapointe, c.r.
Lieutenant-gouverneur de
la province de Québec

May it please Your Honour,

The undersigned has the honour to present the report of Hydro-Québec for the year ended December 31, 1976.

Respectfully submitted,

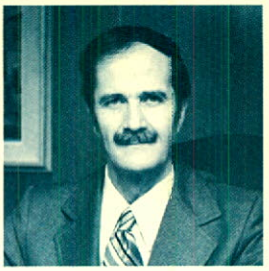
Le ministre délégué à l'Énergie

Québec, April 28, 1977

The Commission

President
Roland Giroux

Vice-President
Robert-A. Boyd, Eng.



Commissioners
Paul Dozois
Georges Gauvreau, N.P.
Guy Monty, Eng.

Assistant to the President
Rita Dionne-Marsolais

Secretary
Michel-André Demers

General Auditor
Marcel Jean, C.A.

Director of Special Projects
Jan-G. Charuk

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
Paul Amyot, Eng.

Control and Accounting
Roger Girard, C.A.

Distribution and Sales
Maurice Saint-Jacques, Eng.

Engineering
Lionel Cahill, Eng.

Finance
Edmond-A. Lemieux, C.A.
Treasurer
Georges Lafond, C.A.

Personnel
Alexandre Beauvais, Eng.

Production and Transmission
Jean-J. Villeneuve, Eng.

Supply
Roger-A. Labrie

Directors of Consulting Directorates

Corporate Planning
Joseph Bourbeau, Eng.

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
Pierre Fiset

Programming and Control
Louis-Georges Boivin, Eng.

Projects
Gaston Turenne, Eng.

Public Relations
Marcel Couture

Regional Directors

Abitibi
Maurice Huppé, Eng.

James Bay — Commissioning and Operation
Robert Brunette, Eng.

Laurentides
Marcel Lapierre, Eng.

Maisonneuve
Georges-A. Lauzon, Eng.

Manicouagan
Gérard-R. Labossière, Eng.

Matapédia
Gilles Béliveau, Eng.

Mauricie
Jacques Durocher

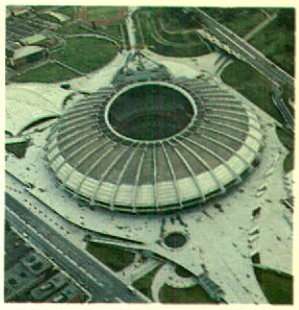
Montmorency
Pierre Godin, Eng.

Richelieu
Pierre Simard, Eng.

Saguenay
Jean-Claude Grégoire, Eng.

Saint-Laurent
Jean Lespérance

President's foreword



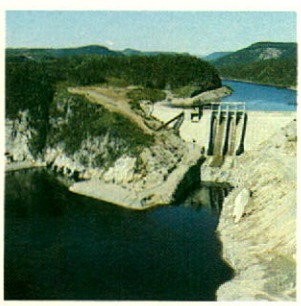
While offering the lowest average price per kilowatthour among Canada's electric utilities, Hydro-Québec has emerged remarkably successful from the two most difficult years the Canadian economy has experienced since the end of World War II.

In 1975 and 1976, while escalating costs and the slowdown in economic activity inflicted deficits on other utilities with higher electricity rates, Hydro-Québec managed to realize substantial net profits and to finance from internally generated funds a significant part of the huge investments necessitated by the growth in Québec's electrical energy needs.

During those two years, Hydro-Québec's investment in new plant totaled $2,408,744,000, and funds derived from operations provided $469,463,000 of this amount, after the payment of $259,711,000 for debt maturities and sinking fund purchases. We thereby succeeded during that time in financing 19.5% of our capital expenditures from internal sources and continued to protect Hydro-Québec and its customers against still greater indebtedness.

The reasons for this success are outlined in subsequent pages. In part they reside in modest rate increases and in new and increased consumption by customers in the residential and commercial categories. But the fundamental reason is the fact that most of our generating plant is hydroelectric, built over the years at low initial cost and functioning now with operating costs that have remained low because there are virtually no fuel purchases.

Hydro-Québec's success is also attributable to a rate policy that has been supported with consistency by all governments since the creation of Hydro-Québec in 1944. As a result of this policy, Hydro-Québec has accumulated a substantial net worth, which at December 31, 1976 amounted to $1,977,358,000 and constituted 22.9% of invested capital. This has enabled us to maintain a lower level of borrowing to finance construction work, and has resulted in appreciable savings in interest charges.

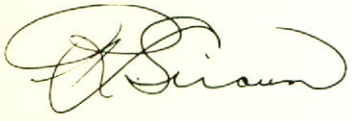


Our excellent financial position, combined with favorable conditions on world capital markets, enabled Hydro-Québec to borrow $1,765,220,000 during the year, including a private placement of one billion dollars in the United States. At year-end, short-term investments exceeded one billion dollars, allowing us to delay new borrowings for several months.

Hydro-Québec's financial soundness was recently underlined by two extensive analyses by major U.S. investment dealers. In the words of one of these reports: *"Our analysis shows that Hydro-Québec's record of performance is one of the strongest of all government and investor owned utilities in North America. It ranks with the highest quality AAA rated electric utilities in the United States and is without equal among Canadian provincial utilities. Its position with respect to present and future hydroelectric energy sources and projected domestic and export market demand, coupled with constructive regulatory and governmental support, indicates that Hydro-Québec will continue its impressive performance in the future."*

In concluding a period of eleven years as a member of the Commission, eight of them as president, the undersigned read this appraisal with a certain pride, fully aware nevertheless that Hydro-Québec's tradition of good management has made the enterprise what it is today. I have tried to perpetuate this tradition, benefiting from the generous collaboration of my fellow commissioners and all of the firm's personnel.

On the eve of my retirement, I wish to thank all of my co-workers for their cooperation. I also take this opportunity to offer my successor every success in the exercise of his duties, assured that he too will benefit from the same degree of dedication by the entire staff. I hope that he will derive as much satisfaction as I have in directing the destinies of Hydro-Québec.



Roland Giroux
Montreal, April 21, 1977

Ten Years' Progress

Financial situation (in millions of dollars)	**1976**	**1975**	**1974**	**1973**	**1972**	**1971**	**1970**	**1969**	**1968**	**1967**
Property and plant in service	**$ 5,880**	5,307	4,973	4,834	4,599	4,251	3,899	3,404	2,992	2,842
Construction work in progress	**$ 2,634**	1,970	1,197	752	465	411	389	608	791	686
Long-term debt*	**$ 6,649**	5,001	4,062	3,513	3,229	2,928	2,676	2,554	2,347	2,213
Reserves or net worth	**$ 1,977**	1,667	1,437	1,260	1,140	1,041	913	796	712	634
Total sales revenue	**$ 1,071**	904	783	662	569	524	483	420	390	359
Total operating and interest charges	**$ 781**	692	621	554	481	408	378	346	320	290

*Including amounts payable within one year (see Note 10 to the Consolidated Financial Statements)

Effects of growth

Installed capacity at December 31 (megawatts*)	**12,409**	11,356	11,123	11,148	11,107	11,107	10,617	9,809	8,365	8,179
Maximum firm-power demand in service area (megawatts*)	**14,426**	12,478	11,131	11,135	9,747	9,173	8,873	8,100	7,664	6,930
Billed sales of electricity in billions of kilowatthours	**84.0**	76.9	77.7	68.7	60.4	52.5	50.6	46.3	43.1	41.2
Total number of customer accounts (thousands)	**2,188**	2,136	2,081	2,017	1,943	1,895	1,852	1,773	1,720	1,656
Number of permanent employees of Hydro-Québec**	**14,969**	14,543	13,679	13,027	12,627	12,245	12,012	11,890	11,723	11,637

*1 megawatt (or 1 MW) = 1,000 kilowatts = 1,000,000 watts
**Excluding employees seconded to the *Société d'énergie de la Baie James*

Financial results*

*In this section, words in italics are terms used in the *Financial Statements and Statistics*.

Despite the slow pace of the economic recovery and despite strikes which again reduced consumption by industrial customers, the year 1976 produced excellent financial results for Hydro-Québec.

Net income before allocations to reserves amounted to $310,640,000, which was $80,890,000 or 35.2% more than in the preceding year.

This improvement was due mainly to the rate increase applied on January 1, 1976, and to new and increased consumption by residential and commercial customers.

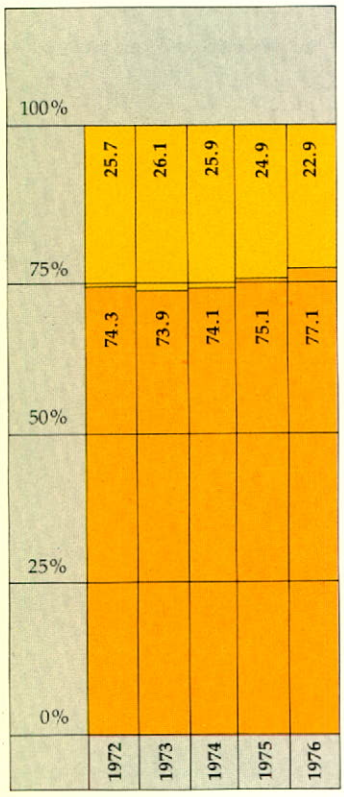
The kilowatthour consumption by these two categories of customers, which together account for more than 40% of Hydro-Québec's total sales volume, showed an increase of 13.9% over the 1975 sales which in turn had been 9.0% higher than those of 1974.

Hydro-Québec's capital expenditures, including those of the *Société d'énergie de la Baie James*, totaled $1,266,978,000, against $1,141,766,000 in 1975. The 1976 financial results enabled Hydro-Québec to fund 24.2% of this amount from its own resources. As a result, only 75.8% of the year's capital expenditures had to be financed through borrowing, compared with 85.8% in 1975.

The *Consolidated Statement of Revenue and Expenditure*, whose presentation has been simplified this year (see Note 6 to the *Consolidated Financial Statements)*, shows that revenue totaled $1,091,813,000, an increase of $169,724,000 or 18.4% over 1975. Total expenses (*expenditure* and *interest)* were $781,173,000, against $692,339,000 in 1975, an increase of 12.8%.

Composition of capital*

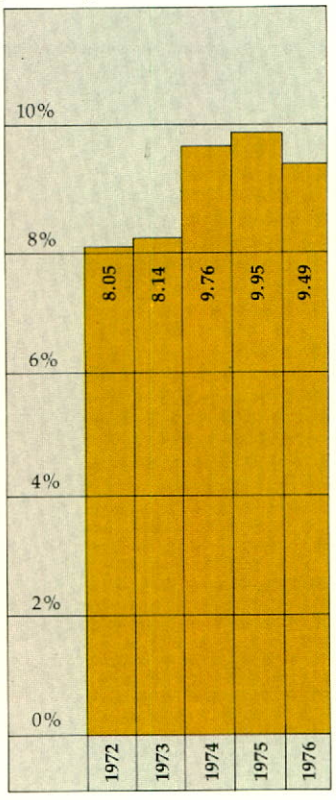
- Borrowed capital
- Net worth (reserves)



*At year-end

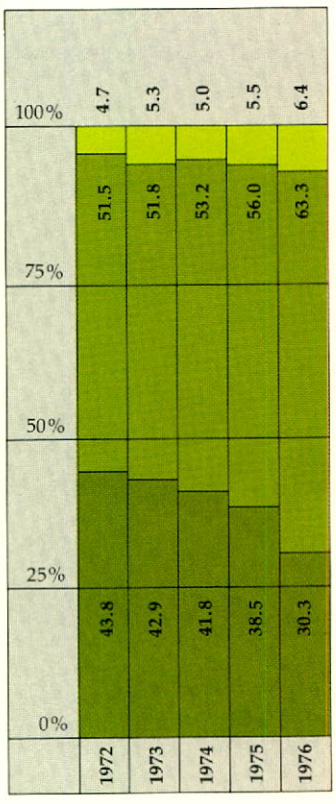
Interest rates

Average annual effective interest rate on long-term borrowings for each year since 1972



Composition of funded debt*

- Canadian currency
- U.S. currency
- Other



*Excluding sinking funds.

Revenue

Sales of electricity, both *primary* and *secondary*, produced $1,046,235,000, compared with $892,611,000 in 1975, an increase of $153,624,000 or 17.2%. About $88,600,000 or 57.7% of this increase was attributable to a rate increase (on sales subject to rate bylaws) which became effective on January 1, 1976 and averaged 10.3%.

The *increase in unbilled revenue* was more than twice that of 1975, being $24,963,000 against $11,599,000. This was due to the rate increase, the growth in demand, and delays in meter reading caused by a strike of some unionized employees.

Expenditure

Under *expenditure* items, *operating, maintenance, administration and other expenses* increased 23.5% to $328,874,000, compared with $266,392,000 in 1975. Most of this increase was attributable to the higher salaries payable under new collective agreements. Excluding construction projects, wages and salaries paid in 1976, which were mainly charged to operations, rose by $47,954,000 or 20.8%.

The cost of *power purchased* amounted to $113,660,000 for the year, an increase of 6.6% over the 1975 cost of $106,633,000. Neighboring systems and Québec's independent producers delivered a total of 34.4 billion kWh to Hydro-Québec, compared with 31.7 billion kWh in 1975. Churchill Falls power station accounted for 32.0 billion kWh of these deliveries, against 29.5 billion kWh in 1975.

Provision for renewals (depreciation) rose from $84,394,000 to $92,786,000, an increase of 9.9% largely attributable to the commissioning of the last five generating units at Manic-3 power station.

The *provincial levy* and *school and municipal taxes* together absorbed $39,209,000 compared with $38,806,000 the previous year.

Gross interest for 1976 amounted to $495,140,000, which was $142,476,000 or 40.4% more than in 1975, reflecting the unusually high level of borrowing in 1976. Capitalized interest, that is *interest charged to construction work in progress*, totaled $186,178,000, against $118,826,000 in 1975, an increase of 56.7%

Net *investment income* increased from $27,222,000 in 1975 to $93,475,000 in 1976. This increase resulted from the greater amount of short-term investments maintained during the year with the proceeds of long-term borrowings. The $93,475,000 figure also includes an amount of $2,545,000 received as initial dividends (Note 2) from Churchill Falls Labrador Corporation Limited, in which Hydro-Québec holds a 34.2% interest.

As the net result of the table in Note 6 shows, *interest* charged to operations totaled $206,644,000, an increase of $10,530,000 or 5.4% over 1975.

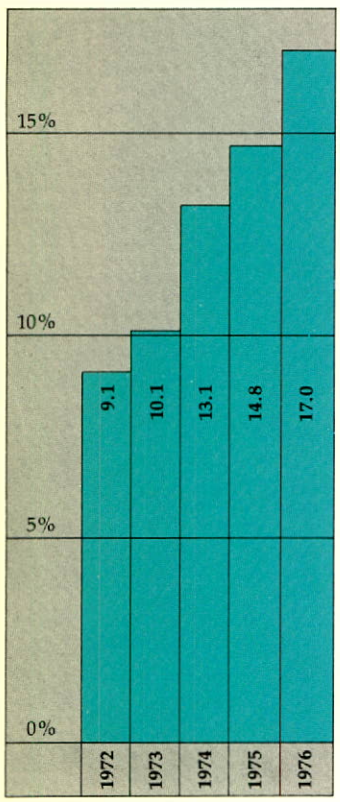
Financial Position

The *Consolidated Statement of Changes in Financial Position* shows that *total funds from operations* amounted to $412,052,000, compared with $317,122,000 in 1975.

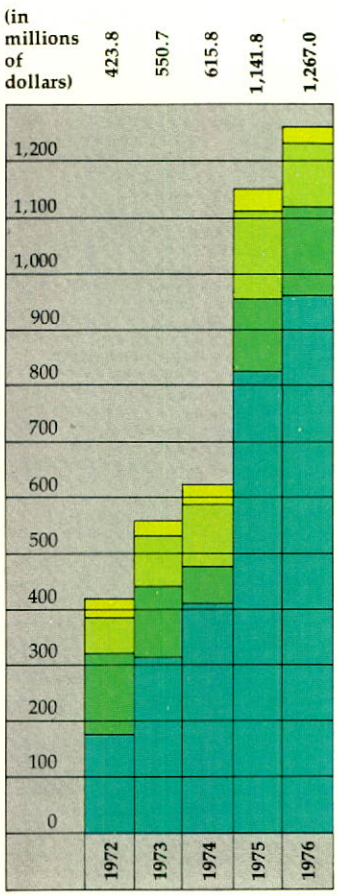
In 1976, internally generated funds included *net income before allocations to reserves* ($310,640,000), less *net profit on repurchase of debentures* ($8,542,000), which does not involve a cash inflow, plus a total of $109,954,000 for charges not requiring current cash outlays, the most important one being *provision for renewals (depreciation)* which was $92,786,000.

Some $42,024,000 of the *total funds from operations* were used to redeem maturing debt (with interest rates ranging from 3½ to 7½%), and $63,264,000 went to meet sinking fund requirements (Note 1-f). The balance of $306,764,000 served to cover 24.2% of the year's plant investments. In 1975, the corresponding amount had been $162,699,000, which covered 14.2% of plant investments.

Return on net worth*



**Breakdown of capital expenditures since 1972*



	1972	1973	1974	1975	1976
Production:					
SEBJ*	107.0	229.2	263.2	583.0	676.7
Other power stations	80.8	86.8	148.4	234.1	281.5
Subtotal	187.8	316.0	411.6	817.1	958.2
Transmission	142.5	125.2	66.2	135.0	153.8
Distribution	66.0	86.0	105.2	150.8	126.5
Other	27.5	23.5	32.8	38.9	28.5
Total	423.8	550.7	615.8	1,141.8	1,267.0

Net income before allocations to reserves divided by the average of reserves at the beginning and end of each year.

**Société d'énergie de la Baie James.*

Industrial consumption

In 1976, industrial consumption of primary energy stood at 27.05 billion kWh, against 24.51 in 1975 and 27.10 in 1974. This was an increase of 10.4% over 1975 but a slight decrease from 1974. Since 1974, the number of industrial customer accounts went from 10,425 to 10,668, an increase of 243.

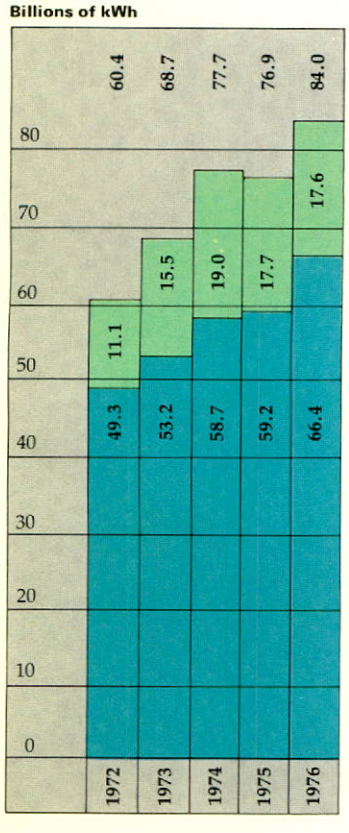
Sales to industrial customers produced $260,736,000 in revenue, compared with $218,308,000 in 1975, or 19.4% more.

The pulp and paper industry, Hydro-Québec's main industrial consumer, registered a slight decrease in consumption compared with 1974 and an increase of 12.1% compared with 1975. Consumption by the electrometallurgical sector, Hydro-Québec's second largest industrial customer, increased 13.2% over 1975, but was 2.4% lower than in 1974.

Consumption by the chemical and electrochemical industry showed a gain of 32.2% compared with 1975 and a gain of 30.3% over 1974. Finally, the mining industry (metal and nonmetal ores) increased its consumption by 7.5% compared with 1974 and 37.2% compared with 1975, when a strike closed the asbestos mines for seven months.

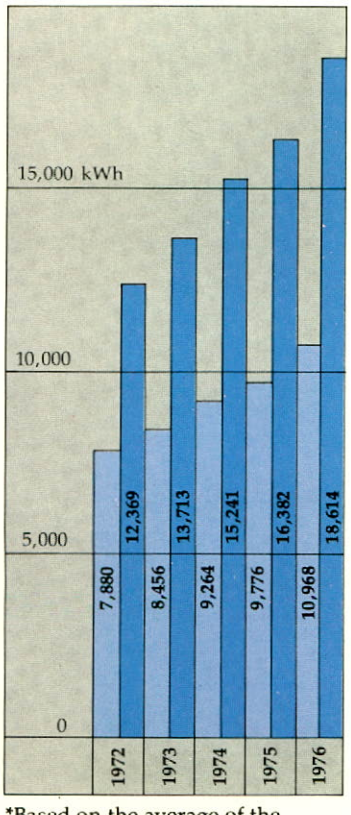
Breakdown of sales

- Sales of primary energy in Québec
- Sales of secondary energy and sales outside Québec



Average annual consumption per residential account and residential-farm account*

- Residential
- Residential-farm



*Based on the average of the number of accounts at the beginning and end of each year.

Deliveries outside Québec

Deliveries of primary energy outside Québec totaled 11.12 billion kWh, a decrease of 9.6% compared with 1975. This reduction was mainly due to the expiration of a 320-megawatt contract with the New Brunswick Electric Power Commission. Sales of primary energy outside Québec brought in $53,997,000, against $58,449,000 in 1975.

Surplus energy

Sales of secondary or surplus energy in Québec, where the main customer is the pulp and paper industry, increased as a result of the ending of strikes in this sector, reaching a total of 2.01 billion kWh, compared with 1.87 billion in 1975, an increase of 7.6%. These sales produced $8,992,000 in revenue, compared with $8,668,000 the preceding year. In 1974 secondary energy sales had totaled 4.12 billion kWh in volume and $13,395,000 in revenue.

Sales of secondary energy outside Québec totaled 4.48 billion kWh, an increase of 27.8% from the previous year, and brought in revenue amounting to $34,609,000, against $33,861,000 in 1975. Sales of secondary energy to the United States totaled 497 million kWh in volume and $9,750,000 in revenue, a decrease of 44.9% in volume and 38.9% in revenue.

New loads

During the year a ferro-alloy plant with a connected load of 70 MW went into operation at Bécancour on the south shore of the St. Lawrence River near Trois-Rivières.

Moreover, during the year 73 contracts with large enterprises were renewed or modified for a total 74 MW of new firm demand, including 38 MW in the pulp and paper industry.

Negotiations continued in 1976 concerning several projects totaling 160 MW, including 70 MW for the La Prade heavy-water plant, 55 MW for Sidbec-Normines at Port-Cartier and Fire Lake on the north shore of the St. Lawrence, and 20 MW for a paper mill at Saint-Félicien in the Saguenay region.

Residential construction

Residential construction was particularly active in 1976. Estimated housing starts were up 25.6% over 1975, from 54,741 to 68,748, thus exceeding the peak of 59,550 attained in 1973. The 1976 increase should be seen against the average annual increase of 6.7% for the 10-year period commencing 1966.

The proportion of new dwelling units using electrical heating continued to increase in 1976 when it was 64.3% of housing starts, against 59.2% in 1975 and 43.3% in 1971. During the year 12,023 existing dwelling units were converted to electrical heating, compared with 9,987 in 1975.

At year-end the number of rented electric water heaters was 213,607, an increase of 8,959 or 4.4% over the preceding year.

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Auditors' Report

We have examined the consolidated balance sheet of Hydro-Québec as at December 31, 1976, and the consolidated statements of revenue and expenditure, reserves, and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these consolidated financial statements present fairly the financial position of Hydro-Québec as at December 31, 1976, 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 applied on a basis consistent with that of the preceding year.

Montreal, Canada,
April 7, 1977.

Samson, Bélair & Associés
Chartered Accountants

H. Marcel Caron & Associés
affiliated with Clarkson, Gordon & Co.
Chartered Accountants

Consolidated Statement of Revenue and Expenditure

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

		1976	1975
Revenue	Sales of electricity: primary	$ 1,002,634	$ 850,082
	secondary	43,601	42,529
		1,046,235	892,611
	Increase in unbilled revenue	24,963	11,599
		1,071,198	904,210
	Other operating income (net)	20,615	17,879
		1,091,813	922,089
Expenditure	Operating, maintenance, administration and other expenses	328,874	266,392
	Power purchased	113,660	106,633
	Provision for renewals (depreciation)	92,786	84,394
	Provincial levy	20,000	20,000
	School and municipal taxes	19,209	18,806
		574,529	496,225
Net operating income		**517,284**	425,864
	Interest (Note 6)	206,644	196,114
Net income before allocations to reserves		**$ 310,640**	$ 229,750
Allocations to reserves	Interest	**$ 134,671**	$ 107,773
	Provisions:		
	Contingencies	121,602	74,163
	Rate stabilization	21,424	18,084
	Amortization of capital invested	32,943	29,730
		175,969	121,977
		$ 310,640	$ 229,750

See accompanying notes

Consolidated Balance Sheet

(in thousands of dollars)
as at December 31

	Assets	1976	1975
Fixed assets	Property and plant:		
	In service	$ 5,880,406	$ 5,306,976
	Less reserve for renewals (accumulated depreciation)	1,177,461	1,092,022
		4,702,945	4,214,954
	Construction work in progress	2,633,599	1,970,380
		7,336,544	6,185,334
	Construction, operating and research equipment, at cost less accumulated depreciation	70,799	63,658
		7,407,343	6,248,992
Current assets	Cash and short-term investments	1,085,853	295,668
	Accounts receivable and accrued interest	203,700	121,288
	Unbilled revenue	101,744	76,781
	Materials and supplies	73,083	68,020
	Prepaid expenses	6,340	5,972
		1,470,720	567,729
Other assets	Investments (Note 2)	131,819	131,925
	Unamortized debenture discount and expenses	80,910	73,062
	Accounts receivable	4,316	7,998
	Unamortized deferred cost on purchase of energy	37,615	38,579
		254,660	251,564
		$9,132,723	$ 7,068,285

	Liabilities and Reserves	1976	1975
Long-term debt	Bonds and debentures less sinking funds (Notes 3 and 4)	$ 6,497,660	$ 4,864,179
	Net exchange premium (Note 4)	59,659	77,266
		6,557,319	4,941,445
	Other long-term debt (Note 5)	91,917	59,649
		6,649,236	5,001,094
	Less payable within one year	82,919	91,301
		6,566,317	4,909,793
Notes payable	Notes payable within two years, of which $21,472 (1976) and $20,637 (1975) are due within one year	**21,472**	25,137
Current liabilities	Bank indebtedness	8,437	16,762
	Accounts payable and accrued liabilities	288,481	219,962
	Accrued interest	175,563	126,339
	Long-term debt payable within one year	82,919	91,301
		555,400	454,364
Other liabilities	Workmen's compensation awards	2,481	2,208
	Customers' deposits and advances	9,695	10,065
		12,176	12,273
Reserves	Contingencies	860,544	683,699
	Rate stabilization	345,707	300,040
	Amortization of capital invested	771,107	682,979
		1,977,358	1,666,718
		$9,132,723	$ 7,068,285

See accompanying notes

On behalf of Hydro-Québec:
(signed) Roland Giroux
(signed) Robert Boyd

Montreal, Canada,
April 7, 1977.

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

Consolidated Statement of Reserves

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

	1976				1975
	Contingencies	Rate stabilization	Amortization of capital invested	Total	Total
Balance, beginning of year	$ 683,699	$ 300,040	$ 682,979	$ 1,666,718	$ 1,436,968
Add:					
Interest	55,243	24,243	55,185	134,671	107,773
Provisions	121,602	21,424	32,943	175,969	121,977
Balance, end of year	**$860,544**	**$345,707**	**$771,107**	**$1,977,358**	$ 1,666,718

See accompanying notes

Consolidated Statement of Changes in Financial Position

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

		1976	1975
Source of funds	Operations		
	Net income before allocations to reserves	$ 310,640	$ 229,750
	Add (deduct) items not requiring a movement of funds:		
	Provision for renewals (depreciation)	92,786	84,394
	Depreciation of operating and research equipment	10,774	8,703
	Amortization of debenture discount and expenses	5,430	4,602
	Amortization of deferred cost on purchase of energy	964	367
	Net profit on repurchase of debentures	(8,542)	(10,694)
	Total funds from operations	**412,052**	317,122
	Issue of debentures and other long-term debt (less discount and expenses)	1,765,220	1,080,008
	Increase of accounts payable and accrued liabilities, accrued interest and other liabilities	117,646	101,637
	Sundry items	6,254	5,756
		$2,301,172	$ 1,504,523
Application of funds	Additions to fixed assets	$ 1,266,978	$ 1,141,766
	Maturities of bonds and debentures and other long-term debt	42,024	99,085
	Purchase of sinking fund investments (cost)	63,264	55,338
	Decrease in notes payable	3,665	20,004
	Increase in cash and short-term investments less bank indebtedness	798,510	150,004
	Increase in accounts receivable and accrued interest and unbilled revenue	103,693	29,905
	Increase in materials and supplies and prepaid expenses	5,431	14,537
	Decrease (increase) in net exchange premium	17,607	(6,116)
		$2,301,172	$ 1,504,523

See accompanying notes

Notes to Consolidated Financial Statements
December 31, 1976

Note 1

Summary of significant accounting policies

A summary of the major accounting policies of Hydro-Québec is presented below to assist the reader in analyzing the consolidated financial statements.

a) Consolidation

The consolidated financial statements include the financial statements of Hydro-Québec and of all its subsidiary companies including Société d'énergie de la Baie James.

b) Rates and Reserves

Under the provisions of its Act the object of Hydro-Québec is to supply power in the Province of Quebec at the lowest rates consistent with sound financial administration. More specifically, the Hydro-Quebec Act provides that the rates should be maintained at a level sufficient to defray all costs and to accumulate three reserves: Contingencies, Rate stabilization and Amortization of capital invested. Rates are fixed by Hydro-Québec and are subject to the approval of the Lieutenant-Governor in Council.

Each year, Hydro-Québec must credit to these three reserves, from its net income, interest calculated at a rate equivalent to the weighted average of the effective interest rates on its outstanding long-term debt (8.08% in 1976 and 7.5% in 1975). The balance of net income is allocated to the reserves and contributes to an adequate coverage of interest charges and to the financing of part of the construction program.

The three reserves constitute the net worth of Hydro-Québec.

c) Investments

All of the short-term investments mature within seven months and are shown at cost, which approximates market value. The long-term investments are carried at cost (see Note 2).

d) Materials and supplies

Hydro-Québec values its inventories of materials and supplies on the basis of average cost. These materials and supplies are primarily those required for the construction and maintenance of its distribution system.

e) Unamortized deferred cost on purchase of energy

In accordance with the terms of a contract with Churchill Falls (Labrador) Corporation Limited ("CFLCo") (see Note 8), Hydro-Québec absorbs the part of the interest charges attributable to the excess of the effective interest rate on the First Mortgage Bonds of CFLCo over 5½% and on the General Mortgage Bonds and other indebtedness over 6%. The portion of these payments, which has been deferred before the plant reached full production in 1975, is amortized over the life of the contract (40 years) by charges to the cost of power purchased. Annual payments which Hydro-Québec has to make under this agreement are also charged to the cost of power purchased.

f) Sinking funds

Hydro-Québec 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 included with interest expense in the consolidated statement of revenue and expenditure. Debentures or bonds of an issue purchased for the sinking fund of that issue are cancelled.

g) Foreign exchange translation (see Note 4)

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, 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".

Current assets and liabilities, including long-term debt payable within one year, are adjusted to Canadian currency at year-end rates of exchange and the resulting unrealized exchange gains or losses are included with interest expense in the consolidated statement of revenue and expenditure.

Exchange gains and losses at maturities of debentures and at purchases for sinking funds are included with interest expense in the consolidated statement of revenue and expenditure.

h) Property and plant and Reserve for renewals (accumulated depreciation)

Property and plant are carried at cost which includes material, direct labor and overhead costs such as engineering and administration that are applicable to the capital construction program. The cost also includes interest charged to Construction work in progress as explained under i) below. Expenditures for additions, improvements and renewals are capitalized and expenditures for maintenance and repairs are charged against income. When assets are sold or retired, their cost and accumulated depreciation are removed from the accounts and any gain or loss resulting from their disposal is amortized over a period of 10 years using a sinking fund method.

Preliminary engineering, investigation work and survey costs incurred on projects before their authorization for construction are included in Construction work in progress and no interest is charged on these costs until such authorization. When a project is abandoned its costs are charged to operations.

The costs of generating facilities are transferred to Property and plant in service by instalments proportionate to the number of generating units completed and in service in relation to the total number of units of the project. The costs of transmission, distribution and other facilities are transferred to Property and plant in service when completed and in commercial operation.

Hydro-Québec uses a uniform sinking fund method of providing for depreciation of its own and its subsidiaries' property and plant, including intangible assets, based on their respective service lives. The rate of interest used in the sinking fund method is 3%.

Note 1 — Summary of significant accounting policies *(cont'd)*

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

Category	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
Intangible assets	25 years

i) 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 Hydro-Québec issued to finance such construction. This rate was 9.47% in 1976 and 8.96% in 1975.

j) Construction, operating and research equipment

This equipment is carried at cost. Hydro-Québec uses the straight-line method of providing for depreciation of these assets based on their respective service lives. The cost of equipment used for the construction of major generating facilities is included in Construction work in progress.

k) Unbilled revenue

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

Note 2

Investments, at cost

	1976 ($'000')	1975 ($'000')
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	6,895	7,000
Sundry investments	91	92
	$131,819	$ 131,925

On November 16, 1976, Churchill Falls (Labrador) Corporation Limited ("CFLCo") qualified for exemption from income taxes, and accumulated deferred income taxes of $28,084,000 since the beginning of its operations to that date have been added during the year to its retained earnings. The share of Hydro-Québec in the retained earnings of CFLCo amounted to $37,295,000 at December 31, 1976, including its share of the above adjustment, of which $7,280,000 was earned in 1976 (after deduction of income taxes to November 16, 1976) and $9,135,000 in 1975. Dividends of $2,545,000 from CFLCo are included in investment income in 1976 (see Note 6).

The shareholders have agreed in principle that CFLCo will make payments to the Province of Newfoundland in future years equivalent to Newfoundland's share in the income taxes that would have been paid if CFLCo had remained subject to such taxes. As the Province of Newfoundland would have received substantially all of the income taxes paid by CFLCo, Hydro-Québec's share in the earnings of CFLCo and its payment of part of CFLCo's interest costs should not change significantly.

Note 3

Bonds and debentures

Series	Interest rate	Year of issue	Year of maturity	Bonds and debentures ($'000')	Sinking fund investments ($'000')
Debentures of Hydro-Québec — Guaranteed by the Province of Quebec					
*"K"	3½%	1953	1978	$ 32,548 U.S.	$ 19,744
*"N"	3½%	1956	1981	20,702 U.S.	3,712
*"P"	4¼%	1956	1981	15,187 U.S.	2,152
*"Q"	4⅜%	1957	1977	28,145 U.S.	
*"S"	5%	1957	1982	13,734	
*"T"	3¾%	1958	1983	26,116 U.S.	290
*"V"	5%	1958	1979	14,176	
*"W"	5%	1959	1980	19,755	
*"X"	5%	1959	1984	32,810 U.S.	
*"Y"	6%	1959	1979	17,280	
*"Z"	5½%	1960	1982	23,889	
*"AA"	5½%	1960	1983	18,182	
*"AB"	5½%	1961	1985	28,559	
*"AC"	5½%	1961	1985	26,316	
*"AD"	5½%	1962	1982	30,216	
*"AF"	5¾%	1962	1984	39,534	
*"AG"	5%	1963	1988	228,962 U.S.	688
*"AM"	5¼%	1963	1986	36,752	
*"AN"	5½%	1964	1984, 1994	30,903	

Note 3 — Bonds and debentures *(cont'd)*

Series	Interest rate	Year of issue	Year of maturity	Bonds and debentures ($'000')	Sinking fund investments ('000')
*"AO"	4½%	1964	1994	$ 50,000 U.S.	$ 2,655
*"AP"	4¾%	1964	1989	37,595 U.S.	
*"AQ"	5½%	1964	1988	46,182	
*"AR"	5½%, 5%	1965	1987, 1995	56,607	
*"AS"	4⅝%	1965	1985	42,898 U.S.	
*"AT"	5¼%	1966	1987	42,641 U.S.	
*"AU"	6%	1966	1991	41,866	
*"AV"	5⅜%	1966	1992	52,075 U.S.	
*"AW"	6%	1966	1980, 1990	40,973	272
*"AX"	6¼%	1966	1991	32,507 U.S.	
*"AY"	6¼%	1967	1993	50,385 U.S.	
*"AZ"	6½%	1967	1978, 1990	42,330	
*"BA"	6¼%	1967	1993	43,999 U.S.	
*"BB"	6½%	1967	1992	42,525 U.S.	
*"BC"	6¾%, 7%, 6%, 7%	1967	1977, 1980, 1994	46,500	
*"BD"	6⅞%	1968	1989	54,603 U.S.	
*"BE"	7½%, 7½%, 7%	1968	1977-78, 1980, 1994	40,400	
*"BF"	7¾%	1968	1986	23,258 U.S.	500
*"BG"	7¼%	1968	1991	43,620 U.S.	
* —	6¾%	1969	1984 (120 million Deutsche marks)	32,173	4,082
* —	7¼%	1969	1984 (80 million Deutsche marks)	21,636	
*"BH"	7¾%	1969	1990	206	7
*"BI"	8¾%	1969	1999	47,485 U.S.	
"BJ"	8%	1969	1979	5,861 U.S.	
*"BK"	8½%	1969	1992	24,728	
*"BL"	9¾%	1969	1995	47,407 U.S	815
*"BM"	9½%	1970	1990	5,635	
*"BN"	9¼%	1970	1995	58,038 U.S.	600
*"BO"	9½%	1970	1990	28,085	
*"BP"	9½%	1970	1997	72,368 U.S.	
*"BQ"	9¼%	1970	1985	11,100 U.S.	
*"BR"	8¾%	1971	1999	72,913 U.S.	
*"BS"	8¼%	1971	1986	16,000 U.S.	
*"BT"	7¾%	1971	1996	47,350	
*"BU"	8¾%	1971	1996	47,549	
* —	8%	1971	1986 (100 million Deutsche marks)	29,835	
*"BV"	8½%	1971	2001	75,000 U.S.	
*"BW"	8½%	1971	1986	22,888 U.S.	19
*"BX"	7⅞%	1972	2002	100,000 U.S.	
* —	6½%	1972	1987 (100 million Deutsche marks)	31,391	
*"BY"	8¼%	1972	1997	47,894	
*"BZ"	8¼%	1972	1993	57,500	
*"CA"	8%, 8⅜%	1972	1980, 1997	62,689	
"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	100,000 U.S.	
"CG"	8¾%	1973	1998	50,000	
"CH"	8½%	1973	1998	50,000	
*"CI"	8¼%	1974	2004	125,000 U.S.	
*"CJ"	8½%	1974	1989	30,000 U.S.	100
"CK"	9%	1974	1999	60,000	
"CL"	9⅞%	1974	1996	80,000	
*"CM"	10⅞%	1974	1999	150,000 U.S.	
—	9%	1974	1979 (40 million Swiss francs)	13,200	
"CN"	10%	1974	1980	50,000	
"CO"	10%	1974	1982	100,000	
"CP"	10%	1974	1982	100,000 U.S.	
*"CQ"	10¼%	1975	2005	200,000 U.S.	
"CR"	9%, 9¾%	1975	1985, 2000	120,000	
"CS"	10%	1975	2000	80,000	
*"CT"	9¾%	1975	2005	200,000 U.S.	
"CU"	10¼%	1975	1997	65,000	

Note 3 — Bonds and debentures *(cont'd)*

Series	Interest rate	Year of issue	Year of maturity	Bonds and debentures ($'000')	Sinking fund investments ($'000')
—	8%	1975	1980 (100 million Swiss francs)	$ 38,400	
"CV"	9½%	1975	1981	50,000	
*"CW"	10%	1975	2005	250,000 U.S.	
—	7¾%	1975	1980 (100 million Swiss francs)	38,500	
*"CX"	10¼%	1976	1996	1,000,000 U.S.	
*"CY"	10¾%	1976	1996	35,000	
* —	6%	1976	1991 (80 million Swiss francs)	31,900	
*"CZ"	8⁹⁄₁₀%	1976	2006	250,000 U.S.	
"DA"	10%	1976	2001	120,000	
"DB"	8½%	1976	1986	125,000 U.S.	
*"DC"	8¾%	1976	1996	50,000 U.S.	
—	5⅜%	1976	1981 (100 million Swiss francs)	41,400	
—	5⅜%	1976	1981 (100 million Swiss francs)	41,400	
—	5⅜%	1976	1981 (100 million Swiss francs)	41,400	
Total debentures of Hydro-Québec				**$6,502,916**	**$ 35,636**

*Sinking fund debentures

Bonds of subsidiaries

The Shawinigan Water and Power Company					
"S"	5¾%	1961	1981	$ 12,642	
Southern Canada Power Company, Limited					
"D"	3⅜%	1951	1981	2,475	
Quebec Power Company					
"G"	6¼%	1962	1982	10,983	
Lower St. Lawrence Power Company					
"F"	5⅞%	1959	1984	820 U.S.	
Saguenay Electric Company					
"A"	5½%	1962	1982	3,460	
Total bonds of subsidiaries				**$ 30,380**	
Total bonds and debentures				**$6,533,296**	**$ 35,636**

Bonds of subsidiaries are guaranteed by Hydro-Québec, 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:

	($'000')
1977	$ 82,919
1978	$ 110,680
1979	$ 186,060
1980	$ 326,015
1981	$ 377,506

Note 4

Net exchange premium

Consolidated long-term debt at December 31, 1976 includes $4,073,874,000 U.S., 465 million Deutsche marks and 700 million Swiss francs.

If the long-term debt payable in foreign currencies were converted into Canadian dollars at the rates of exchange prevailing at December 31, 1976, the premium required would be approximately $59,166,000 more than the net exchange premium shown on the consolidated balance sheet. As a result, if the long-term debt payable in various currencies in the principal amount of $6,566,317,000 at December 31, 1976 were converted into Canadian dollars at the rates of exchange prevailing on this date, this principal amount would be $6,625,483,000.

Note 5

Other long-term debt

	1976 ($'000')	1975 ($'000')
Rural Electrification Bureau, 1977 — 1994*	$ 5,628	$ 6,327
Government of Canada, 1977 — 1999**	19,975	20,308
Atomic Energy of Canada Limited**	66,000	32,000
Other long-term debt maturing from 1977 to 1984	314	1,014
	$91,917	$ 59,649

*Does not bear interest as long as there is no default under the provisions of the governing agreements.

**Notes guaranteed by the Province of Quebec at various rates from 7 3/16% to 10% payable in 25 equal annual instalments following completion of the project involved. On March 18, 1977, Hydro-Québec issued to Atomic Energy of Canada Limited a note for $44 million, bearing interest at the rate of 8 3/4%.

Note 6

Interest

	1976 ($'000')	1975 ($'000')
Interest on long-term debt	$ 485,567	$ 344,330
Interest on bank indebtedness and notes payable	4,143	3,732
Amortization of debenture discount and expenses	5,430	4,602
	495,140	352,664
Less:		
Interest charged to construction work in progress	186,178	118,826
Investment income	93,475	27,222
Net profit on repurchase of debentures	8,542	10,694
Foreign exchange gain (loss) on repurchase of debentures and translation of foreign current assets and liabilities	301	(192)
	288,496	156,550
	$206,644	$ 196,114

Note 7

Pensions

The Hydro-Québec employees' retirement plan is a contributory, benefit-based plan, under which the benefits payable are guaranteed by Hydro-Québec. The initial actuarial deficit in respect of services prior to 1966 and the experience deficiency for current services amounted to approximately $28 million and $5 million, respectively, at December 31, 1974 as determined by an actuarial survey at that date.

The total pension cost of $23,833,000 for 1976 ($19,915,000 for 1975) provides fully for Hydro-Québec's contribution to the Quebec Pension Plan and to the Retirement Fund in respect of current services, amortization of the experience deficiency over a five-year period and amortization of the initial actuarial deficit over a period ending December 31, 1995.

An additional past service obligation, which amounted to approximately $34 million at December 31, 1974 as determined by an actuarial study at that date, related to supplementary amounts that Hydro-Québec 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 thirty years by annual charges to operations. Hydro-Québec paid $2,168,000 in 1976 ($1,902,000 in 1975) in respect of these benefits.

In addition to the preceding, effective January 1, 1976, Hydro-Québec has decided to raise all full pensions by $600 per year and all half pensions by $300 per year and to increase the minimum pension from $1,200 to $1,500 per year for all its pensioners, as well as those subject to pension before December 31, 1976. This additional past service obligation is estimated to cost approximately $10.8 million according to an actuarial study as at December 31, 1975 and will be substantially amortized over a period of 30 years by annual charges to operations. Hydro-Québec paid $1,111,000 in 1976 in respect of these benefits.

Note 8

Commitments and projected capital expenditures

Churchill Falls

In May 1969, Hydro-Québec executed a contract with Churchill Falls (Labrador) Corporation Limited ("CFLCo") for the purchase, starting in 1972, of energy from a generating station at Churchill Falls in Labrador with a rated capacity of 5,225,000 kilowatts. At December 31, 1976, Hydro-Québec held 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.

The power contract provides for the purchase by Hydro-Québec for a period of 40 years from the Effective Date as defined in the power contract (September 1, 1976) 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 Hydro-Québec for the energy, which should be finalized in 1977, 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 Hydro-Québec 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.

Note 8 — Commitments and projected capital expenditures *(cont'd)*

In addition, Hydro-Québec 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. Hydro-Québec 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 Hydro-Québec to make payments for energy whether or not taken; Hydro-Québec 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.

On September 14, 1976, CFLCo and Hydro-Québec were served with concurrent Writs of Summons and a Statement of Claim in an action brought by the Attorney General of Newfoundland before the Supreme Court of Newfoundland, seeking a judgment declaring that Newfoundland is entitled under the CFLCo lease to make a request to CFLCo for 800 megawatts of power generated from the waters of the Upper Churchill River watershed commencing October 1, 1983, that CFLCo is obliged to comply with such request, and that such compliance would not constitute a default under the power contract or the financing agreements of CFLCo. Under the terms of the Writ of Summons served upon it, Hydro-Québec will cause an Appearance and Defense to be entered in the action. Hydro-Québec has been advised by its counsel, Geoffrion, Prud'homme, Chevrier, Cardinal, Marchessault, Mercier & Greenstein, that the validity of the power contract with CLFCo and the enforceability thereof according to its terms cannot be successfully challenged before the courts, and in particular that the above action, insofar as it claims a declaration which would affect the existing rights of Hydro-Québec under the power contract, is unfounded.

James Bay

In 1971, the Quebec Government created Société de développement de la Baie James to undertake the development of the natural resources in northwestern Quebec and Société d'énergie de la Baie James to develop the hydro-electric resources of the same area.

At December 31, 1976, all the shares of the authorized capital stock of Société d'énergie de la Baie James were either owned or subscribed for by Hydro-Québec.

The James Bay project currently consists of the construction of four generating plants on the La Grande River with a projected capacity of 10,190,000 kilowatts at an estimated cost in 1974 of $11.9 billion, revised to $16.2 billion in 1976, with completion expected in 1985. At December 31, 1976, $2 billion has been invested in the project.

In May 1972, the James Bay Crees and Inuit of Quebec 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.

Following various interlocutory proceedings, an agreement in principle was entered into on November 15, 1974 by the James Bay Crees and Inuit of Quebec and the Province of Quebec, Société d'énergie de la Baie James, Société de développement de la Baie James, Hydro-Québec and the Government of Canada whereby the parties undertook to execute a final agreement, providing, among other things, for the extinguishment of all claims of the James Bay Crees and Inuit of Quebec in and to the territory on which the project is located.

The final agreement, signed on November 11, 1975, was subsequently confirmed by the James Bay Crees and Inuit of Quebec. The agreement is subject to enactment within two years of implementing legislation by the Quebec National Assembly and the Government of Canada approving, giving effect to and declaring valid the said agreement.

The final agreement provides for the termination of all current legal proceedings and the undertaking not to institute any future legal proceedings affecting the project and the claims of the James Bay Crees and Inuit of Quebec with respect thereto. It also provides for a final basic monetary compensation of $225 million. Of this amount, $75 million is to be paid by Société d'énergie de la Baie James or Hydro-Québec, in instalments to be determined with reference to the future installation of hydro-electric generating capacity within the territory. Such instalments, which have not been provided for in the accounts, will commence one year after each turbine generator has been in commercial operation, will then be charged to operations and will extend to December 31, 1996, at which date the balance, if any, is payable. Another $75 million is to be paid over a period of ten years from March 31, 1976 to January 1, 1985 to the extent of 57% by the Province (and/or a corporation designated by the Province) and to the extent of 43% by the Government of Canada. The balance of $75 million is to be paid by the Province.

Projected capital expenditures

Hydro-Québec carries on a continuous construction program in anticipation of future demand for electrical power in the Province. The capital expenditures projected for the calendar year 1977 amount to $2,173 million, including $1,413 million for the James Bay project.

Note 9

Anti-inflation Program

On December 19, 1975, the Government of the Province of Quebec sanctioned An Act Respecting Anti-Inflation Measures. On March 16, 1977, the Act was abrogated. According to the regulations adopted in virtue of this Act, Hydro-Québec was not subject to the Inflation Control Commission in respect of its prices and profit margins but was expressly subject to it in respect of compensation control.

Note 10

Reclassification and comparative figures

At December 31, 1976, Hydro-Québec has shown the current portion of its long-term debt under current liabilities and has regrouped under interest certain items in the consolidated statement of revenue and expenditure. The comparative figures for 1975 have been reclassified accordingly.

Five-Year Summary of Consolidated Revenue and Expenditure
(in thousands of dollars)

		1976	1975	1974	1973	1972
Revenue	Sales of electricity: primary	$ 1,002,634	$ 850,082	$ 738,866	$ 638,628	$ 552,768
	secondary	43,601	42,529	36,542	15,475	8,377
		1,046,235	892,611	775,408	654,103	561,145
	Increase in unbilled revenue	24,963	11,599	7,764	7,542	7,449
		1,071,198	904,210	783,172	661,645	568,594
	Other operating income (net)	20,615	17,879	14,709	12,785	11,554
		1,091,813	922,089	797,881	674,430	580,148
Expenditure	Operating, maintenance, administration and other expenses	328,874	266,392	236,853	201,641	172,300
	Power purchased	113,660	106,633	86,930	62,753	34,446
	Provision for renewals (depreciation)	92,786	84,394	78,447	75,439	70,030
	Provincial levy on energy generated	—	—	—	8,222	29,882
	Provincial levy	20,000	20,000	20,000	15,000	—
	School and municipal taxes	19,209	18,806	18,379	18,783	18,875
		574,529	496,225	440,609	381,838	325,533
Net operating income		**517,284**	425,864	357,272	292,592	254,615
Interest	Interest on long-term debt	485,567	344,330	259,472	224,062	191,511
	Interest on bank indebtedness and notes payable	4,143	3,732	4,085	3,652	4,636
	Amortization of debenture discount and expenses	5,430	4,602	3,990	3,820	3,524
	Interest charged to construction work in progress	(186,178)	(118,826)	(62,757)	(40,412)	(25,825)
	Investment income	(93,475)	(27,222)	(15,150)	(10,449)	(10,775)
	Net profit on repurchase of debentures	(8,542)	(10,694)	(6,740)	(7,632)	(6,405)
	Foreign exchange (gain) or loss on repurchase of debentures and translation of foreign current assets and liabilities	(301)	192	(2,251)	(1,058)	(954)
		206,644	196,114	180,649	171,983	155,712
Net income before allocations to reserves		**$ 310,640**	$ 229,750	$ 176,623	$ 120,609	$ 98,903
Allocations to reserves	Interest	**$ 134,671**	$ 107,773	$ 88,476	$ 77,274	$ 68,487
	Provisions:					
	Contingencies	121,602	74,163	44,625	3,019	—
	Rate stabilization	21,424	18,084	15,663	13,233	4,653
	Amortization of capital invested	32,943	29,730	27,859	27,083	25,763
		175,969	121,977	88,147	43,335	30,416
		$ 310,640	$ 229,750	$ 176,623	$ 120,609	$ 98,903

Five-Year Consolidated Sales and Revenue

		1976	1975	1974	1973	1972
Electrical Energy Generated and Purchased (in millions of kWh)	Generated (net)	60,882	54,392	59,893	57,514	55,660
	Purchased	34,381	31,687	25,938	18,390	11,560
	Received as per agreement	1,972	2,629	133	61	101
		97,235	88,708	85,964	75,965	67,321
	Less:					
	Losses and internal use	9,218	7,974	6,956	5,715	5,565
	Delivered as per agreement	2,794	3,212	1,130	1,099	766
	Increase in unbilled sales	1,206	585	183	471	594
	Total electrical energy sold	**84,017**	76,937	77,695	68,680	60,396
Electricity Sales (in millions of kWh)	Residential and farm	21,611	18,768	17,260	15,215	13,703
	Commercial (including Municipal)	14,673	13,113	12,033	11,149	10,629
	Industrial: Primary	27,055	24,506	27,100	24,566	22,766
	Secondary	1,816	1,778	2,710	2,171	1,573
	Street lighting and luminaires	599	576	539	512	457
	Transportation	157	151	142	160	164
	Wholesale: Primary	13,325	14,324	13,123	10,965	9,194
	Secondary	4,677	3,598	4,654	3,863	1,848
	Interdepartmental	104	123	134	79	62
	Total electricity sales	**84,017**	76,937	77,695	68,680	60,396
Sales Revenue (in thousands of dollars)	Residential and farm	$ 376,990	$ 315,358	$ 269,075	$ 235,615	$ 203,038
	Commercial (including Municipal)	260,939	218,218	182,761	164,842	152,299
	Industrial: Primary	260,736	218,308	201,068	171,760	147,949
	Secondary	8,171	8,188	9,042	5,228	3,655
	Street lighting and luminaires	23,618	20,188	17,083	15,196	13,437
	Transportation	2,094	1,700	1,420	1,482	1,371
	Wholesale: Primary	77,912	75,940	67,053	49,472	34,469
	Secondary	35,430	34,341	27,500	10,247	4,722
	Interdepartmental	345	370	406	261	205
	Total sales revenue	**$1,046,235**	$ 892,611	$ 775,408	$ 654,103	$ 561,145
Average Revenue (cents per kWh)	Residential and farm	1.744¢	1.680¢	1.559¢	1.549¢	1.482¢
	Commercial (including Municipal)	1.778¢	1.664¢	1.519¢	1.479¢	1.433¢
	Industrial: Primary	0.964¢	0.891¢	0.742¢	0.699¢	0.650¢
	Secondary	0.450¢	0.460¢	0.334¢	0.241¢	0.232¢
	Wholesale: Primary	0.585¢	0.530¢	0.511¢	0.451¢	0.375¢
	Secondary	0.757¢	0.954¢	0.591¢	0.265¢	0.256¢
	Other	3.029¢	2.619¢	2.320¢	2.256¢	2.198¢
Total Customer Accounts	(year-end)	**2,188,222**	2,135,724	2,080,650	2,017,079	1,943,119
Residential and Farm Accounts	(year-end)	**1,941,604**	1,893,969	1,841,671	1,783,871	1,716,529

Statistics of Electricity Generated and Purchased and its Disposal in 1976

Gross Generation			The consolidated system (in millions of kWh)
Hydro-Electric Stations			
Upper Ottawa	(5 plants)		2,550
Gatineau	Paugan	1,055	
	Others (3 plants)	1,155	2,210
Lower Ottawa	Carillon	2,448	
	Others (7 plants)	920	3,368
Upper Saint Lawrence	Beauharnois	11,555	
	Other (1 plant)	934	12,489
Saint Maurice	La Trenche	1,658	
	Beaumont	1,455	
	La Tuque	1,244	
	Shawinigan 3	1,105	
	Others (4 plants)	3,813	9,275
Bersimis	Bersimis 1	5,589	
	Bersimis 2	2,865	8,454
Outardes	Outardes 3	3,597	
	Outardes 4	4,342	7,939
Manicouagan	Manic 5	5,848	
	Manic 2	4,898	
	Manic 1	565	
	Manic 3	2,845	14,156
Other rivers	(14 plants)		546
Total	(49 hydro-electric plants)		60,987
Thermal-Electric Stations	(15 plants until mid-December, then 16 plants thereafter)		219
Total gross generation	(64 plants, then 65)		61,206
Less: station use			324
Total generation (net)			60,882
	Alcan		1,166
	Maclaren-Quebec Power Co.		625
	Churchill Falls (Labrador) Corporation Limited		32,025
	Sundry purchases		565
Total purchases			34,381
Plus: received as per agreement			1,972
Energy available			97,235
Less: delivered as per agreement			2,794
Energy available (net)			94,441
Total sales			84,017
Increase in unbilled sales			1,206
Losses and internal use			9,218
System peaks (MW)	Primary		15,412
	Secondary		271

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, 1976, and the statement of revenue and expenditure for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the assets of the Fund as at December 31, 1976, and its revenue and expenditure 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,
April 7, 1977.

Samson, Bélair & Associés
Chartered Accountants

H. Marcel Caron & Associés
affiliated with 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

		1976	1975
Revenue	Current contributions:		
	Employees	$ 9,328	$ 7,618
	Hydro-Québec	18,920	15,047
		28,248	22,665
	Contribution by Hydro-Québec for initial actuarial deficit (Note)	2,108	2,108
		30,356	24,773
	Additional past service contributions less cancellations	63	91
		30,419	24,864
	Less refunded to employees leaving service	529	528
		29,890	24,336
	Revenue from investments	19,319	15,840
		49,209	40,176
Expenditure	Pensions paid	4,417	3,947
Net revenue transferred to reserve		**$ 44,792**	$ 36,229

See accompanying note

Hydro-Québec Employees' Retirement Fund

Statement of Assets and Reserve

(in thousands of dollars)
as at December 31

		1976	1975
Assets			
(note)	Investments, at cost		
	Bonds of, or guaranteed by the Province of Quebec	$ 215, 869	$ 165,462
	Municipal and School Commission bonds	24,907	24,806
	Government of Canada bonds	3,280	833
	(Par value $251,759, market value $234,833)	**244,056**	191,101
	Common stocks (market value $1,240)	1,180	1,868
	Short-term investments	4,000	10,000
		249,236	202,969
	Accrued interest on investments	5,474	4,460
	Past service contributions receivable from employees	61	79
	Amount receivable from Hydro-Québec	1,385	3,856
		$256,156	$ 211,364
Reserve	Balance, beginning of year	$ 211,364	$ 175,135
	Net revenue for the year	44,792	36,229
	Balance, end of year	**$256,156**	$ 211,364

See accompanying note

On behalf of Hydro-Québec:
(signed) Roland Giroux
(signed) Robert Boyd

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

Montreal, Canada,
April 7, 1977.

Hydro-Québec Employees' Retirement Fund

Note to Financial Statements
December 31, 1976

These statements show only the position of the assets of the Hydro-Québec Employees' Retirement Fund, but do not purport to show the adequacy of the fund to meet the obligations of the Hydro-Québec retirement plan which are guaranteed by Hydro-Québec. An actuarial survey of the obligations of the plan as of December 31,1974 shows an actuarial deficit in respect of services prior to 1966 of approximately $28 million, and an experience deficiency at December 31, 1974 in respect of current services of approximately $5 million.

Hydro-Québec assumes the annual amortization ($2,108,000) of the initial actuarial deficit over a period ending December 31, 1995. The experience deficiency at December 31,1974 for current services is being amortized over a period of 5 years, from 1975 to 1979 inclusive. As a result, contributions to the fund are sufficient to cover obligations in respect of current services and the amortization of the above actuarial deficit in respect of past services over a period ending December 31, 1995.

In 1976, the peak demand for primary power by Québec customers reached 14,426 MW. This peak, which occurred at 5 o'clock the evening of December 13, was 1,948 MW or 15.6% higher than the previous year's peak and the largest percentage increase in at least 10 years. As the temperatures in Montreal were very low and roughly the same when the peak occurred in 1975 (−24°C) and in 1976 (−23°C), this increase is explained mainly by greater use of electrical heating.

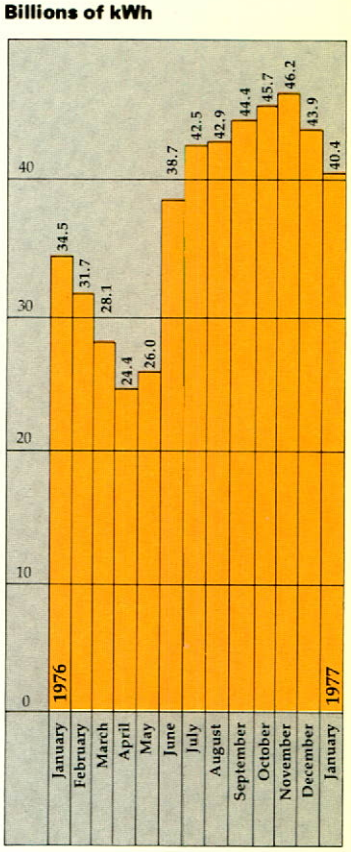
During the December 13 peak, the Hydro-Québec system was without nearly 1,800 MW of its normal capacity because some units of the Churchill Falls power station were not operating, and the production of Beauharnois power station was reduced owing to early formation of the upstream ice cover.

Thanks to the cooperation of its customers and aid received from Alcan, Hydro-Québec succeeded in meeting the Québec demand while continuing to honor its export contracts. An appeal to customers reduced the maximum demand by at least 200 MW. In addition, Alcan supplied more than 500 MW to the main system and Ontario supplied 25 MW to the Abitibi system.

Of the 14,426 MW of power required to meet the December 13 peak, Hydro-Québec power stations supplied a net of 10,151 MW, including 300 MW from the Tracy thermal station. Some 5,532 MW of additional power was received through purchase contracts, the main one being the Churchill Falls contract. Deliveries outside the system, chiefly to Ontario, totaled 1,257 MW, which left a net import balance of 4,275 MW.

Water reserves in 1976

Monthly variations in usable reserves, expressed in billions of kWh, in all regulating reservoirs during the year. With the commissioning of Manic-3 power station the maximum energy potential of all reservoirs is 49.4 billion kWh.



Hydraulic conditions

In the various river basins exploited by Hydro-Québec, precipitation was close to the average of the preceding 10 years. Two events occurred during the year, however, which gave a new dimension to the management of water resources.

First, the placing in service of Manic-3 power station raised the maximum energy potential of all the reservoirs operated by Hydro-Québec from 41.6 to 49.4 billion kWh. And second, September 1, 1976 was the effective date on which our 65-year contract with Churchill Falls (Labrador) Corporation Limited came into force. This meant that our electricity imports from Churchill Falls entered a new phase which allows more flexibility in the operation of Hydro-Québec's overall water resources.

At January 1, 1977, Hydro-Québec's reservoirs contained the equivalent of 40.4 billion kWh, which was 81.8% of their capacity and 5.9 billion kWh more than one year before.

Installed capacity

At December 31, 1976, the system's installed capacity was 12,409,489 kW, which was 1,053,630 kW more than one year earlier. The last five units of the Manic-3 power station alone furnished an additional 986,000 kW of capacity. The remainder of the increase resulted from the commissioning of the first gas-turbine unit of the Cadillac thermal station in Abitibi (54,000 kW), the addition of a third unit (800 kW) at the Parent thermal station and a 12,830-kW increase in the capacity of the La Gabelle hydroelectric station on the St. Maurice River.

Construction of generating stations

Construction of generating stations absorbed a total of $958,160,000 in 1976, which was 75.6% of the year's total investments.

The year's major works were carried out in the James Bay area, where the *Société d'énergie de la Baie James* (SEBJ) spent $676,681,000, compared with $583,033,000 in 1975. SEBJ is the Hydro-Québec subsidiary responsible for development of the La Grande River and diversion of the upper reaches of two neighboring rivers into the La Grande.

The financial requirements of SEBJ will increase substantially in the next few years (see Note 8).

The La Grande River flows east to west in a region located about 1,000 km (650 miles) north of Montreal. In its natural state, the average flow at the mouth is 1,700 metres^3/second (60,000 cubic feet/second). Diversion of two neighboring rivers, the Caniapiscau to the northeast and the Eastmain to the south, will increase the average flow to 3,300 metres^3/second (117,000 cubic feet/second).

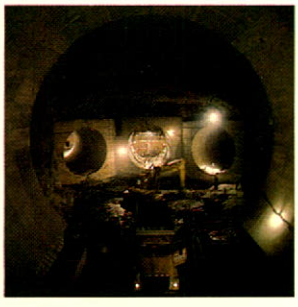
The four powerhouses of the La Grande complex will be placed in service between 1980 and 1985. Although still subject to change, the four generating stations as now planned will provide an installed capacity of 10,190 MW and produce 67.8 billion kWh a year.

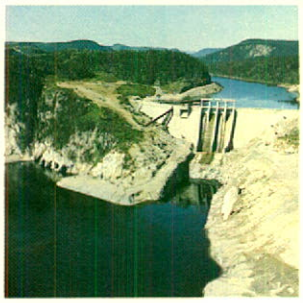
LG-1

The LG-1 plant was to have been built 71 km (44 miles) from the river mouth, with an installed capacity of 910 MW and a commissioning date of October 1983 for the first unit. But at year-end, studies were under way on the possibility of selecting a site that had previously been considered.

LG-2

Construction of the 5,328-MW LG-2 generating station, which will be the largest hydroelectric station in North America in 1982, was delayed briefly in 1976 by the strike that paralyzed the Québec construction industry in August. In 1977, to make up for the lost time, work will be accelerated, especially on construction of the main dam and the dikes.





The LG-2 site is located 117 km (73 miles) from the river mouth. The main dam, constructed of earth and rockfill, will be 2,835 metres (9,300 ft) long at the crest and will have a total volume of 23 million metres^3 (30 million cubic yards). At year-end, work was completed on six of the 26 dikes required to form the retaining works upstream from the main dam.

The LG-2 powerhouse will be built 137 metres (450 ft) underground and the machine hall, which will house the sixteen 333-MW generating units, will be 483 metres (1,584 ft) long. Excavation for the various installations began in 1975 and will be completed in late summer 1977.

LG-2 will operate under a gross head of about 142 metres (467 ft) and produce 35.8 billion kWh annually. Commissioning of the 16 generating units is scheduled to start in February 1980.

LG-3

The LG-3 site, 238 km (148 miles) from the mouth of the river, was opened in 1976 with Hydro-Québec acting as prime contractor. At this location, the La Grande River divides into two arms, flowing around an island on which the spillway will be built. The powerhouse will be built above ground on the south bank and will have an installed capacity of 1,920 MW provided by 10 generating units, the first of which will be placed in service in August 1982.

The year 1976 was devoted to the construction of the cofferdams and to the start of work on the diversion tunnels.

LG-4

Initially, an underground powerhouse was planned for LG-4 on the north bank some 463 km (288 miles) from the river mouth. However, in 1976, as a result of studies on the hydrological and geological conditions of this site, it appeared preferable to locate the powerhouse on the surface on the south bank. Construction work will start in 1979.

The LG-4 powerhouse will have an installed capacity of 2,032 MW from eight generating units and will operate under a gross head of 119.5 metres (392 ft). It will produce 14.1 billion kWh a year. The first unit is scheduled to come on line in February 1984.

Work on diverting the Eastmain and Caniapiscau rivers will start in 1977. Diversion of the Eastmain will be effected in the fall of 1980 and of the Caniapiscau in the fall of 1983.

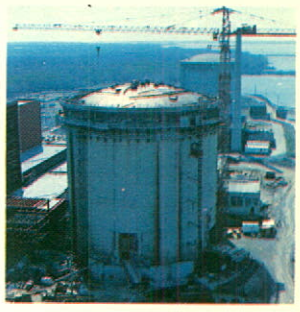
Manic-Outardes

Development of the Manicouagan River, which along with development of the neighboring Outardes River was started in the fall of 1959, was completed with the placing in service of the sixth and final unit of the Manic-3 generating station on October 29, 1976.

These two rivers flow down the Laurentian Plateau and discharge into the St. Lawrence River near Baie-Comeau, 410 km (255 miles) downstream from Québec City.

The Manic-3 generating station added 1,183.2 MW to system capacity. Located 93 km (58 miles) north of Baie-Comeau, it operates under a head of 91 metres (298 ft) and, in an average year, will be able to produce 5.4 billion kWh.

The entire Manic-Outardes complex will be completed in 1978, when the three units of the 454-MW powerhouse under construction at Outardes 2 will be placed in service. The seven powerhouses of the complex will then have a combined installed capacity of 5,517 MW and their average annual production will total 28.3 billion kWh.



Abitibi

In the Abitibi region, where the electrical system will be linked to the provincial grid in 1979, the first of three units planned for the Cadillac thermal station, mid-way between Rouyn and Val d'Or, was placed in service on December 17, adding 54 MW to the region's production capacity. The two other units are scheduled to start operating in 1977. The three generating units of this 162-MW power station will be driven by six gas turbines, two per unit.

Nuclear energy

The year 1976 marked completion of the major civil engineering works required for the 685-MW Gentilly-2 nuclear power station under construction on the south shore of the St. Lawrence River, mid-way between Montreal and Québec City.

Initial commissioning tests are scheduled for 1977, with commercial production of electricity planned for November 1979.

Training of the team of about 200 people who will be responsible for the commissioning continued during 1976.

The 266-MW Gentilly-1 plant, a prototype owned by Atomic Energy of Canada Limited, went critical again on December 29 after having undergone major repairs. The production of electricity will be resumed early in 1977. Gentilly 1 will supply the Hydro-Québec system until the commissioning of the La Prade heavy water plant being built by AECL 2.4 km (1.5 miles) from Gentilly. It is expected that the production of heavy water will begin in 1982, using steam from Gentilly 1.

Transmission system

Expenditures for Hydro-Québec's transmission system totaled $153,797,000 in 1976, compared with $135,044,000 in 1975, an increase of $18,753,000 or 13.9%.

Few major additions were made to the system in 1976, but many large projects are planned for the next few years. These include the James Bay transmission system, the 735-kV loop around Montreal Island and a 765-kV interconnecting line to the State of New York.

During the year, about 4,800 megavoltamperes (MVA) were added to the system's transformer capacity in the form of new substations and additions to existing substations, including new transformers placed in service at Manic 3 and at Micoua substation to receive power produced by the Manic-3 generating station.

In the six-year period between 1979 and 1984, the transmission and transformation of energy produced on the La Grande River will require the commissioning of 5,370 km (3,337 miles) of 735-kV circuits and 16 major substations. During 1976, this work was still at the state of site selection and land clearing. In 1977, actual construction work will start on the first section of one of the James Bay lines and on the loop around Montreal.

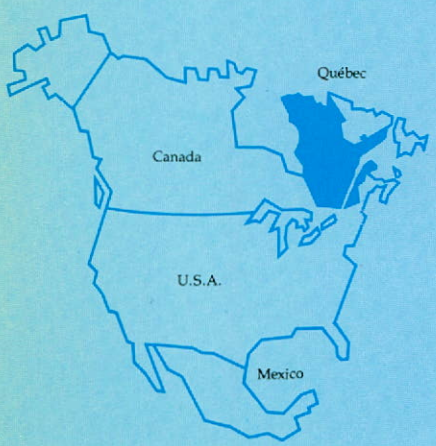
In 1965, Hydro-Québec had innovated with the placing in service of the first 735-kV transmission line, the highest voltage commercially employed at that time, and during 1976 it was well on its way to introducing other innovations in the construction and operation of extra-high-voltage transmission systems.

The lines and substations of the future James Bay system will probably incorporate a new type of tower (the chainette or cross-rope tower), a new type of insulator (made of plastic materials instead of porcelain) and a new type of voltage regulator (with static instead of rotating condensers).

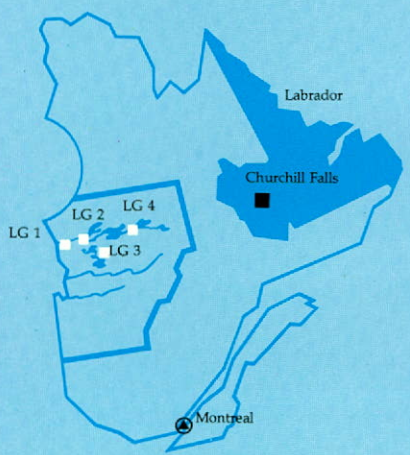
At December 31, 1976, the transmission system comprised 23,608 km (14,672 miles) of circuits rated between 69 kV and 735 kV, of which 4,269 km (2,654 miles) were 735-kV circuits. The 1976 additions were limited to 302 km (187 miles) of 120, 161 or 315-kV circuits.

Hydro-Québec's main generating stations and 735-kV transmission system

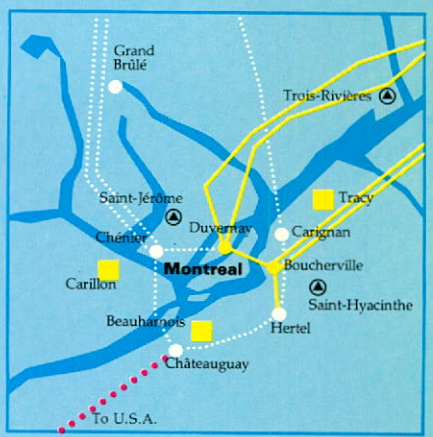
Canada



Province of Québec



Montreal Area



Hydro-Québec Generating Stations

In service or under construction at December 31, 1976

Generating stations in service

Hydroelectric

	(kilowatts)
Beauharnois	1,574,260
Manic 5	1,292,000
Manic 3	1,183,200
Manic 2	1,015,200
Bersimis 1	912,000
Outardes 3	756,200
Bersimis 2	655,000
Carillon	654,500
Outardes 4	632,000
La Trenche	286,200
Beaumont	243,000
La Tuque	216,000
Paugan	201,975
Manic 1	184,410
Rapide-Blanc	183,600
Shawinigan 2	163,000
Les Cèdres	162,000
Shawinigan 3	150,000
Grand'Mère	148,075
Rapide-des-Îles	146,520
Chelsea	144,000
La Gabelle	136,580
Première-Chute	124,200
Rapides-Farmers	98,250
Rapides-des-Quinze	89,600
Rapide 7	57,000
Bryson	56,000
Rapide 2	48,000
Rivière-des-Prairies	45,000
Chute-Hemmings	28,800
Hull 2	27,280
Sept-Chutes	18,720
Saint-Narcisse	15,000
Drummondville	14,600
Métis 1	6,400
Pont-Arnault	5,450
Chute-Bell	4,800
Métis 2	4,250
Saint-Alban	3,000
Saint-Raphaël	2,550
Sherbrooke	2,256
Chute-Garneau	2,240
Corbeau	2,000
Magpie	1,800
Rawdon	1,720
Chute-Burroughs	1,600
Chute-Wilson	840
Anse-Saint-Jean	400
High-Falls	340

Thermal

	(kilowatts)
Conventional thermal	
Tracy	600,000
Internal combustion	
Îles-de-la-Madeleine	27,003
Havre-Saint-Pierre	7,400
Blanc-Sablon	3,150
Fort George	2,700
La Baleine	2,350
Natashquan	2,200
La Tabatière	1,900
Parent	1,500
Harrington-Harbour	1,400
Saint-Augustin	1,400
La Romaine	1,200
Johan-Beetz	605
Île-d'Entrée	440
Île-aux-Grues	425
Gas turbine	
Cadillac	54,000
Nuclear	
Gentilly 1*	266,400

Summary

	(kilowatts)
Total installed capacity of hydroelectric generating stations (49)	11,701,816
Total installed capacity of thermal-electric generating stations (16)*	707,673
Total capacity in service at December 31, 1976	12,409,489

Generating stations under construction

	In service	(kilowatts)
Hydroelectric		
Outardes 2	1978	453,900
La Grande 2**	1980-82	5,328,000
La Grande 3**	1982-83	1,920,000
Thermal		
Gas turbine		
Cadillac	1977	108,000
Nuclear		
Gentilly 2	1979	685,000

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

**_La Société d'énergie de la Baie James_, a subsidiary of Hydro-Québec, is responsible for the development of the La Grande River.

Distribution system

Despite a further, marked increase in the demand for electricity by residential and commercial customers, capital expenditures for the distribution system dropped considerably in 1976. They totaled $126,465,000, against $150,769,000 in 1975, a decrease of 16.1%.

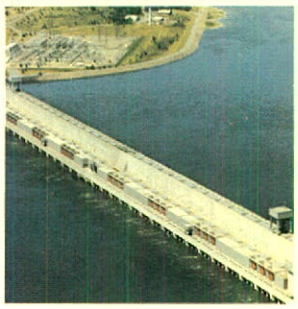
This reduction reflects the delays caused by the strike of Hydro-Québec's unionized employees and by the strike in the construction industry. Despite the considerable effort expended throughout the territory after the employees' strike ended in mid-November, the construction and maintenance programs remained uncompleted at year-end. Although the cause of some concern, this situation did not have any significant impact at the time of the December peak.

The catching-up required in 1977 will have the effect of abnormally swelling the year's capital expenditures for the distribution system as well as operating and maintenance costs.

A total of 1,390 km (864 miles) of new distribution circuits were installed in 1976, compared with 1,686 km (1,048 miles) the previous year. Only 84% of the year's scheduled program was completed, but most of the delays affected country cottages.

At December 31, 1976, the distribution system comprised 76,879 km (47,781 miles) of circuits.

765-kV line to New York State



In 1976, Hydro-Québec obtained the final approvals needed for the construction of an extra-high-voltage link between its power grid and the State of New York's grid. This 765-kV interconnection will open up the U.S. market for Hydro-Québec and enable the utility to export some of the surplus energy it has available during the summer months.

The Canadian portion of the new line will be built in 1977 and the entire line put in service on June 1, 1978. During the first four years of the contract between Hydro-Québec and the Power Authority of the State of New York (PASNY), it will be possible to export 12 billion kWh, worth some $105,000,000.

Hydro-Québec will make a capacity of 800 MW available to PASNY during the summer months, but it reserves all the withholding rights needed to protect energy supplies to its Québec customers.

The National Energy Board granted Hydro-Québec a 13-year export permit instead of the 20-year one requested, and reserved approval rights on the price or prices charged for energy sold after the first period of the contract ends in 1981. The contract already provides for new sale conditions after that date. From 1982 on, PASNY must, at Hydro-Québec's request, deliver to the Québec system during the winter months all or part of the energy it received the previous summer. Moreover, the contract offers no firm guarantee that the power and energy will be available for export during the final years of the agreement, owing to uncertainty about the future development of Québec's electricity needs.

The interconnecting line will be 306 km long (190 miles). The Canadian portion of the line will start at the Châteauguay substation near Beauharnois power station, which will generate the energy delivered to PASNY. From there, the new line will carry energy 56 km (35 miles) to a point on the border near the American village of Fort Covington, then a further 34 km (21 miles) to the Robert Moses power station at Massena, New York. From Massena, the line will continue southward for 216 km (134 miles), terminating at PASNY's Marcy substation in the heart of New York State. The Robert Moses power station will produce the energy that PASNY will eventually deliver to Hydro-Québec during the winter months. This power station is the American half of the hydroelectric plant spanning the St. Lawrence River between Massena, New York, and Cornwall, Ontario.

Expiry of contracts

As the 11 generating units of the Churchill Falls power station came on line earlier than scheduled in the original construction program, Hydro-Québec had a large amount of surplus capacity for several years and was able to conclude mutually advantageous export contracts with the New Brunswick and Ontario systems.

The contract with the New Brunswick Electric Power Commission became effective on November 1, 1971 and expired on October 31, 1976, when it provided for 320 MW. The Ontario Hydro contract, which went into effect on June 1, 1971, and is presently for 1,000 MW of firm power, is due to expire on May 31, 1977. Another contract with Ontario Hydro, dating back to November 29, 1929, for 186.5 MW, expired on November 1, 1976.

Since 1971 the two major sales contracts with the New Brunswick and Ontario systems, plus the related agreements, have brought Hydro-Québec a total additionnal revenue of approximately $303,000,000 and provided the two neighboring provinces with 66.6 billion kWh, allowing them to make significant exports to the United States.

In 1969, Hydro-Québec had planned the expiry dates of these contracts so that the power and energy would become available in time to meet a major part of Québec's increased needs between 1977 and 1980, when the first James Bay generating units come on line.

Within the province, Hydro-Québec has concluded two contracts with the Aluminum Company of Canada Limited (Alcan). The more important of these will enable Hydro-Québec to obtain 300 MW of firm power in 1979. Alcan operates power stations with a total capacity of 2,350 MW in the Saguenay region.

Institute of Research

During the year, the Hydro-Québec Institute of Research (IREQ) continued work within the framework of various research and development programs on new forms of energy production and storage.

In the field of wind energy, a research program undertaken in 1975 was continued in 1976 with the assembly and testing of two installations for the production of electricity from wind power, one at Varennes and the other on the Magdalen Islands in the Gulf of St. Lawrence. At Varennes, the installation comprises a windmill 10 metres (33 feet) in diameter, a compressed-air tank and a compressed-air turbo-generator with a capacity of about 100 kW. The installation on the Magdalen Islands, carried out in collaboration with the National Research Council of Canada, has a vertical-axis windmill 28 metres (92 feet) in diameter.

In the area of solar energy, IREQ is collaborating with McGill University's School of Architecture in evaluating the efficiency of a solar-powered house built in the Laurentian village of La Macaza. In addition, the Institute's scientists are working on development of a prototype solar collector employing heat ducts and a heat pump. They have also begun a study on heat storage with the aid of molten salts.

In addition to carrying out numerous research and test programs for Hydro-Québec, IREQ is increasingly called upon to collaborate on the solution of research and test problems faced by the electrical industry, Canadian and foreign public utilities, and a number of foreign organizations. For example, IREQ has signed two contracts with Japan's Central Research Institute of the Electric Power Industry. These contracts, worth a total of more than $150,000, are for research on the behavior of insulators in a polluted atmosphere.

Other contracts totaling more than $400,000 have been concluded with a similar American organization, the Electric Power Research Institute (EPRI), for studies and research. In addition, EPRI and IREQ have signed a 10-year agreement on IREQ's participation in EPRI's annual research and test programs.

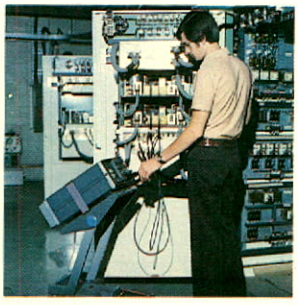
In December 1976, Hydro-Québec authorized expenditures of $8,000,000 to complete IREQ's installations, which today represent a total investment of $79,571,000. At year-end, IREQ had 379 permanent employees, including 105 scientists, 119 technicians and 155 administrative and support personnel.

IREQ's laboratories are located at Varennes on the south shore of the St. Lawrence River 32 km (20 miles) from the centre of Montreal.

In November, Hydro-Québec and three locals of the Canadian Union of Public Employees which represent 9,900 employees (4,600 trades workers, 4,100 office employees and 1,200 technicians) renewed collective agreements that had expired on December 31, 1975.

The new agreements, concluded following negotiations that resulted in a series of rotating and general strikes during the year, will expire on December 31, 1978.

Hydro-Québec also renewed collective agreements with unions affiliated with the Confederation of National Trade Unions which represent 1,165 employees. These new contracts will expire on May 23, 1979. At year-end, negotiations were continuing with other unions representing 344 employees.

At December 31, Hydro-Québec's permanent staff, excluding 141 employees seconded to the *Société d'énergie de la Baie James* (SEBJ), numbered 14,969, which was 426 more than one year before. Excluding SEBJ sites, the number of temporary employees at construction sites averaged 3,329 per two-week period.

Wages and salaries paid to operating personnel during the year amounted to $278,472,000, an increase of $47,954,000 or 20.8% over the preceding year. Wages and salaries paid to construction personnel, excluding SEBJ, totaled $68,825,000, compared with $64,843,000 in 1975.