Electric Utilities across Canada

By Fred Kee

Newfoundland

In Newfoundland many small companies sprang up to serve urban centres. Electric power for lighting came to St. John’s as early as 1885 when the St. John’s Electric Light Company installed a steam generator. Fifteen years later, in 1900, the St. John’s Street Railway Company installed Newfoundland’s first hydroelectric plant to operate the electric street railcar system. The power station was built at Petty Harbour, 71/2 miles from St. John’s. Its original capacity consisted of an 1868 hp Victor type turbine driving two generators to transmit 1200 kW of power to the city at 15,000 volts. These two companies combined in 1920 to form the St. John’s Light and Power Company which, four years later, became the Newfoundland Light and Power Company, as it is known today.

Meanwhile, the United Towns Electrical Company Limited was formed in 1902. It installed an 80 hp hydro unit on the Victoria River near Carbonear. As the company expanded it extended service into other areas on the southern side of the Avalon Peninsula, Bell Island and Marystown on Burin Peninsula-buying out several small companies in the process. Then many years later, it expanded further to pick up small industrial plants, the U.S. Naval Base and widely spread customers in the Stephenville and Port Aux Basques areas. In 1966 the company merged with the Newfoundland Light and Power Co.

A preponderance of Newfoundland’s generating capacity was installed by pulp and paper companies which, by 1948, consumed 93% of all the electrical energy on the island. These companies responded to the surrounding communities by also supplying their domestic, commercial and industrial electric power needs. One of these was the Anglo-Newfoundland and Development Company which is now owned by Abitibi Price Co.

Another such company was the Newfoundland Pulp and Paper Company Ltd., later purchased by the International Pulp and Paper Company and then Bowater’s. The Company is now operated by Kruger International. In return for its contribution to Newfoundland’s industrial development this organization, in its early years, was granted water power, land and timber rights along the Humber River. Construction of its Deer
Lake Power Station required excavation of a seven-mile canal leading to the station’s generators. Six huge steam powered draglines were brought in. The largest of these had earlier been used in building the Panama Canal and was later used in Ontario during the building of the Welland Canal.

Other new companies and amalgamations characterized the history of the electrical industry in Newfoundland until, in 1954, the Provincial Government established a public power authority, The Newfoundland Power Commission, to operate in isolated areas and assist in the development of rural electrification. By 1964 the Power Commission began construction of the Baie D’Espoir power development on the south coast. Then it was renamed the Newfoundland and Labrador Power Commission and was assigned the development of all new hydroelectric sites of the province. Its purpose was to supply power at low rates to large power-using industries and at uniform rates to the various private utilities already in operation.

The Baie d’Espoir hydroelectric development was an ambitious project by any standard. By means of seven major dams and five canals the watersheds of four large rivers were combined to utilize the runoff from 2,279 square miles of drainage area. A head of 593 feet exists between the last reservoir and sea level. The water is carried in three pressure conduits to the underground powerhouse where it is fed to six Francis turbines, each rated at 100,000 hp. The matching generators are three-phase, 60 hertz, rated at 75,000 kilowatts. The tallest surge tanks in the world, at 371 feet, absorb the kinetic energy of the flowing water when wicket gates are closed. The generating station was expanded in 1977 by the addition of another 150,000 kilowatt unit. This is a far cry indeed from the 1200 kilowatt installation at Petty Harbour in 1900.

Now we turn to the special story of Churchill Falls in Labrador. Here we find a high plateau, 1700 feet above sea level, covered with muskeg and countless interconnected lakes, many of which drain into the mighty Churchill River. To develop the available power at this site and find a way of economically using it at distant points was a project so huge and so daring as to require the combined effort, and capabilities, of the British Newfoundland Corporation (BRINCO-A consortium of private companies) and the provincial governments of Newfoundland and Québec acting through their respective electrical utilities. These three parties united in 1958 to form the Churchill Falls (Labrador) Corporation to accomplish this tremendous task. The new corporation was backed up by the assets and strengths of the three co-founders. These assets and strengths consisted of water-resource rights, financial resources, technical capabilities,
construction capacity and, above all, a daring conception of a gigantic scheme, far flung and bold, which was expected to provide power to the Island, to the Province of Québec and for export to the United States. Many major engineering feats were accomplished within this project. The highest levels of transmission were utilized-735 kilovolts. Its eleven generators are housed in a gigantic underground gallery blasted out of solid rock, one thousand feet below the surface, and they provide over 5,000 megawatts of power capacity. It was the largest hydro-electric power installation of its kind in the world at the time of its inauguration in 1972.

World Wide Web Resources as of March 2000:
Newfoundland Power – www.newfoundlandpower.com
Newfoundland and Labrador Hydro - www.nlh.nf.ca

Prince Edward Island
The first power plant on the island was built around 1886 by Maritime Electric Company Ltd. It was steam-driven using coal with a 150 kW generator. The same company has continued to serve the province over the years making additions to its generating capacity and distribution system as growing demand for electricity required. In recent years, the Island’s grid has been interconnected with that of the New Brunswick Electric Power Commission.

World Wide Web Resources as of March 2000:
Maritime Electric - www.maritimeelectric.com

Nova Scotia
In various parts of Canada many of the electric utilities had their origins in gas and water companies who correctly perceived the threat of electricity to their continuing vitality and accordingly diversified or merged. For example, the Halifax Gas Light and Water Company, formed in 1843, was followed by the Halifax Electric Light Company in 1881. The Haligonians of Nova Scotia had their first electricity supplied by this company in 1884 to some 75 street lights and 50 stores. By 1895 this company further merged with Halifax Electric Railway
Company and, in 1896, electric streetcars were put into service. This new amalgamation formed the basis for the Nova Scotia Light and Power Company in 1928.

The Nova Scotia Power Commission was created by the provincial government in 1919. The Commission undertook a number of developments, notably at St. Margaret’s Bay to provide hydroelectric power to Halifax and vicinity, on the East River at Sheet Harbour, at Mersey, and at the Tusket plant near Yarmouth. The Commission brought power to areas which private enterprise did not find financially attractive and, following the Rural Electrification Act of 1937, greatly extended this type of service.

In 1972 the two major electric utilities in Nova Scotia, Nova Scotia Light and Power Co. Limited and the Nova Scotia Power Commission, were merged to create a single crown corporation, Nova Scotia Power Corporation, to provide the electrical power and energy for the Province.

In the years following World War II, Nova Scotia, in common with many other areas of the world, turned to oil to fire its steam-powered generating stations to the extent that 70% of its electricity was then generated from oil. Formation of the OPEC cartel in 1973 signalled the end of low-priced oil and the price of electricity produced from burning oil sky-rocketted. At Lingan, on Cape Breton Island, the Provincial Utility turned again to coal. The first 150 MW generating unit, part of Nova Scotia’s solution to the international oil crisis, began feeding power into the provincial grid. By 1984, the fourth unit at the plant was brought into service at the $400,000,000 plant. With a capability of 600 MW, the plant will burn about 1.5 million tonnes of Cape Breton coal a year.

A recent notable first for Nova Scotia has been the commissioning by Nova Scotia Tidal Power Corporation of the first Tidal generating station in North America. This 20 megawatt Straflo Turbine, with a rim-mounted generator, was commissioned at Annapolis Royal on August 25, 1984.

World Wide Web Resources as of March 2000:
Nova Scotia Power - www.nspower.ca

New Brunswick

In New Brunswick, the first power plant was built in 1884 by the Saint John Electric Light Company and it was capable of supplying 2000 sixteen candle power lights. This plant was powered by steam. So were subsequent plants at Campbellton (1898), Moncton and Sackville (1902), Fredericton, Newcastle and Loggieville (1903) and three additional plants in Saint John (1889 and 1905). The first hydraulic plant was installed in 1905 near Woodstock on the Meduxnekeag River.

Maritime Electric Co. Ltd. was incorporated in 1917 to operate both as an electric light and domestic gas utility and in the mining, processing and sale of coal. It acquired the Charlottetown Light & Power Co. Ltd. in Prince Edward Island, the Bridgetown Electric Light, Heat and Power Co. Ltd. in Nova Scotia and the small electric utility at St. Stephen, N.B. In 1925 management of company operations and finances became the responsibility of the Associated Gas and Electric Co. of New York. Two years later, in 1927, power supply to the City of Fredericton and some adjacent municipalities was added to the system. In the early thirties, ownership was transferred to the New England Gas and Electric Association, headquartered in Cambridge, Mass. In 1932 the Town of St. Andrews, N.B. was added. In October 1936, ownership was sold to Canadian interests. At the time the Company held franchises in many areas within New Brunswick and Prince Edward Island.
Prior to 1918 there were some twenty organizations, both public and private, supplying electricity in New Brunswick. Their operations were confined largely to urban centres and there was a pressing demand for electricity in rural areas. Power that was available was both costly and unreliable while rates varied from one location to another.

The provincial government bowed to public pressure and set up the New Brunswick Electric Power Commission in 1920. The Commission immediately launched a program of construction of both hydraulic generating stations and an extensive distribution system covering much of the southern part of the province. A 6,960 kilowatt hydro plant was built at Musquash in 1922 and a 6,000 hp steam generating station, burning bituminous coal, was built at Newcastle Creek in 1931. The capacity of the plant was extended by a further 7,500 hp in 1936.

With a burgeoning demand for electricity over the years, the Commission added diesel generating stations, further fossil-fired generation at Chatham, Courtney Bay and Dalhousie, hydraulic installations at Tobique, Beechwood and Mactaquac and a large oil-fired thermal generating station at Coleson Cove.

In 1947 the New Brunswick Power Commission purchased several portions of the Maritime Electric Company’s system and twenty-two years later, in 1969, purchased the remaining portions within New Brunswick. Then, in 1983, it swept into nuclear power with commissioning of the 630,000 kW CANDU generating unit at Point Lepreau.

**World Wide Web Resources as of March 2000:**

NB Power - www.nbpower.com

**Québec**

In 1878 some Jesuits in Montreal received a gift from their counterparts in France. It was the first arc light in Montreal. They called in a tradesman by name of J.A.I. Craig to test the lamp. This little event in 1878 not only lit the surrounding area but it cast a light into the future. Over the 100 year period since, electricity has been a pivot point in the history of Québec. The early days saw the emergence of private electricity companies in various parts of the province followed much later by the creation and development of Hydro-Québec on a province-wide base. It is a fascinating story.

During the early days of electricity the industry developed much differently in rural areas as compared to urban areas.

Rural installations of power plants, centered at natural power sites, attracted energy-intensive industries. Thus, metallurgical and pulp and paper industries were drawn to the water power of the St. Maurice Valley. International Paper developed the Gatineau's power for sawmills and pulp and paper mills. The Aluminum industry moved into the Saguenay and Péribonka regions of the Lac-Saint-Jean area and tapped most of the available hydroelectric resources there.

The cities and towns, however, presented a ready market that challenged enterprising, separately owned electricity companies. In Montreal and Québec City the first obstacle for these electricity companies was competition with the previously entrenched gas companies which already enjoyed lucrative contracts with the authorities in both cities to supply street lighting. The Montreal Gas Company had held exclusive control of street lighting there since 1837 while the Québec Gas Company had enjoyed a similar monopoly in Québec City since 1848.

The electricity companies had to obtain street lighting franchises to have any chance of profitably entering the residential lighting market-also against the competition of the gas
companies. So, it has been said, "the battle between gas and electricity literally took to the streets".

Electricity companies in Québec City and Montreal were numerous at the beginning of the 1880s. They were forceful in their sales campaigns and some, it must be admitted, were "fly-by-night" operators.

At first, unable to break the municipally awarded contract for major street lighting the electricity companies pursued smaller customers and succeeded in introducing electricity in some stores, banks, and hotels. Then they organized groups of merchants and businesses to cooperatively provide electric street lights in some blocks. Gradually electricity gained a foothold. Early in 1886 the City of Montreal, responding to public pressure, adopted electric street lights for downtown.

The gas monopoly had been broken but another struggle immediately arose. Three different electric companies submitted tenders for the same business. After months of deliberation the City awarded a contract to the Royal Electric Company. Soon after this success the Royal Electric Company managed to establish a network to virtually monopolize the supply of electricity over the whole city.

In Québec City a similar battle took place and the contract was awarded to a company which became known as the Québec Railway, Light and Power Company.

In both cities, it was not long before the electricity companies merged with their counterparts in the gas business. The Royal Electric and Montreal Gas companies, plus two other electricity companies in the area, merged to become "Montreal Light, Heat and Power Consolidated". Nine years later, in Québec City, the “Québec Railway, Light, Heat and Power Company” was formed and later became known as “Québec Power”.

Distribution of electrical energy within the confines of Montreal and Québec City thus developed into well guarded monopolies. But it was through the efforts of several private business enterprises that, during the last five years of the 19th century, electrification gathered momentum throughout the province.

In all corners of Québec, groups were taking steps to bring electricity to their local villages and surrounding areas. Companies were small and means were limited, but contractors were legion. Sometimes, the owner of a small industrial concern would try to reduce the costs of producing electricity for himself by supplying the local community. Other people may have turned to electricity as a sign of progress that they considered beneficial for their area. Doctors, notaries and even a few members of religious orders allowed themselves to be tempted by this new product.

And thus a maze of small local networks sprang up which were not really equipped to produce the electricity they wanted to sell, and they quickly fell prey to companies anxious to expand.

The closing years of the 19th century also saw the construction of Québec’s first hydroelectric plants. In the 1880s, electricity had been produced by steam turbines while power transmission technology was barely at the teething stage. Even the Chambly hydro site was too far away! The consumption of electricity at the time did not really warrant large-scale construction of
hydroelectric plants and it was not until 1895 that Québec’s rivers began to arouse serious interest.

Strangely enough, most of the hydroelectric developments at the turn of the century were undertaken not so much by the existing electricity companies as by entrepreneurs keen to take advantage of the opportunity to tap a new energy source. It was they, therefore, that formed the companies that went on to develop the huge watersheds in southern Québec such as the St. Maurice River.

For the Shawinigan Water and Power Company, founded in 1897, it was not all plain sailing. When a handful of young Americans, excited by the potential of the St. Maurice River, decided to go ahead and develop it, they discovered enthusiasm was not enough. They needed funds just as they needed clients in order to convince money lenders of the economic viability of the project.

Under the driving force of the young American financier J.E. Aldred, the young company managed to gain the confidence of industrialists and consumers alike and on the strength of this went on to build the Shawinigan 1 power station.

From 1910 until the end of the 1930s, Québec witnessed the expansion of the most dynamic of the electricity companies and the consolidation of their territories.

In the metropolises, Montreal Light, Heat and Power bought all its suburban rivals while Québec Power made the same move in Québec City. In the Saguenay a branch of the Aluminum Company of Canada, Saguenay Electric, gradually monopolized electricity distribution throughout the area. Electricity sales in the Ottawa and Gatineau valleys were in the hands of the International Paper Company operating through Gatineau Power, its wholly-owned subsidiary, at least until the antitrust legislation of the 1930s. Among the many small companies on the south shore, Southern Canada Power established itself firmly in its territory.

Similar regional monopolies were set up, in the northwest by Northern Québec Power, and in the Gaspé by the Lower St. Lawrence Power Company.
But an outstanding case was Shawinigan Water and Power Company. From the outset, it sought tirelessly to increase its territory and became one of the major suppliers to Montreal Light Heat and Power, as well as one of its largest shareholders. Eventually it also dominated Québec Power and, during the 1950s, acquired almost all the shares in Southern Canada Power. Three main factors contributed to the breathtaking expansion of this company.

Firstly, it was astute enough to attract energy-intensive industry to the Shawinigan area through a series of advertising campaigns in the United States and Europe in which it emphasized the abundance, the reliability and the cheapness both of the Québec work-force and of the energy potential of the St. Maurice. Secondly, it tapped all its major transmission lines to carry electricity to the houses and villages scattered throughout its territory. And thirdly, it took every opportunity to buy out neighboring companies.

Starting in the early 1930s a lot of attention was given to the rates being charged and, in some cases, the poor service being given by several of the privately-owned electricity companies. Although the rates were somewhat below those of the early years of the century they were still high compared to those in Ontario where electrical production had been largely “nationalized” since 1906. In Québec a number of community spokesmen, such as Philippe Hamel, a Québec dentist, T.D. Bouchard, a journalist in St. Hyacinthe and other prominent citizens started a campaign for nationalization of power production in the province. The government consequently set up the Lapointe Commission to study nationalization of the electricity companies, municipal control of urban distribution networks and the potential for rate-
reductions. The direct result of the study by Commissioners Ernest Lapointe, Augustin Frigon and George C. McDonald was creation of the Québec Electricity Commission in 1935 and the Québec Hydro-electric Commission (Hydro Québec) in 1944. Immediately after the act establishing Hydro Québec was passed the Commission took initial possession of a portion of Montreal Light Heat and Power.

The subsequent development of Hydro-Québec was in three major phases. From 1944 until 1960 the Utility took broad measures to build up its technical capabilities. Then, during the 1960s, the Commission consolidated its position as the backbone of further hydroelectric development in Québec. The third phase, from 1970 to the present day, has been characterized by a rapidly changing environment which has forced Hydro-Québec to come to terms with a new reality.

Almost as soon as it was founded in 1944, it reduced electricity rates. Then, to ensure that it could meet the growing energy demand, it undertook Stage II of the Beauharnois power station. In view of the increasing demand, in 1953 it began to develop two power plants on the Bersimis River and here, for the first time, came up against the problem of carrying large quantities of energy over long distances. The voltage level chosen for the transmission lines to Montreal was very high at the time: 315,000 volts. The technical know-how it gained from these projects was invaluable a few years later for the Manicouagan-Outardes and James Bay power developments.

As the 1950s drew to a close, Hydro-Québec put the finishing touches to Stage III at Beauharnois and began work on the new Carillon powerhouse on the Ottawa River. Also, in
response to the government’s request, it took the necessary steps to supply electricity to two areas of the province notably lacking in hydroelectric resources, namely the northwest, and the Gaspé peninsula.

With all the experience it had acquired since 1944, Hydro-Québec naturally became the backbone of further hydroelectric development in Québec.

In the early 1960s, Jean Lesage’s government introduced a policy aimed to give the utility all river rights not already granted to private companies.

A probing government analysis revealed wide regional disparities in rates and quality of service. The fact that the province was split up into many regional networks meant that it was impossible to achieve optimum generation and transmission. The coordination of capital investments was far from adequate. The government’s conclusion was that the entire province would benefit from integration of the distribution networks into Hydro-Québec’s main grid.

Maintaining electric service in wintry weather. Photo courtesy of Hydro-Québec.
This decision sparked off months of controversial discussion. The government, therefore, appealed to the public. Nationalization of electricity became the theme of one of the most colorful election campaigns ever seen in Québec and Nationalization won the day.

In 1963 Hydro-Québec committed $600 million to cover the purchase of shares and assumption of long term debts of all the privately-owned suppliers of electricity in the province. With eight additional companies and forty-five local cooperatives, Hydro-Québec was doubled in size overnight. Its territory then stretched from one side of the province to the other.

During the same year Hydro-Québec reduced electricity rates for most of its new customers. It gradually reduced some 85 residential and 80 general rates to a single consistent rate structure. It converted the frequency of the northwest network from 25 to 60 Hz, and renovated and standardized its transmission and distribution lines. Integrated power station management led to savings of up to $50 million for the period 1963 to 1969.

735 kV transmission lines carrying bulk power from distant power sites across Québec. Photo courtesy of Hydro-Québec.
However, the sudden expansion led to years beset with financial and technical difficulties. Hydro-Québec had to win the respect of the “major league” financial markets, to cover the cost of its recent acquisitions and to raise the capital needed to implement an ambitious construction program aimed to meet the electricity demand of almost the entire province.

The Utility was not long in establishing its good standing on financial markets and now ranks among the leading public utilities in North America.

From the technical point of view, Hydro-Québec quickly established an enviable reputation throughout the world and its achievements in the 1960s knew no bounds. The Manic-Îtardes project scored several world breakthroughs, one of which was to transmit energy at the daringly high voltage of 735,000 volts. The new research center, IREQ, earned a renown that soon extended beyond Canada’s borders.

As described earlier in the section on Newfoundland, Hydro-Québec also took an active part in the Churchill Falls hydroelectric development project in Labrador for which it assumed a large portion of the financing.

To sum up, the 1960s were an outstanding period in Hydro-Québec’s short history. Its success in every field of activity won it unqualified confidence and respect among businessmen, governments and the general public.

Nevertheless, the James Bay development scheme had a controversial and stormy birth, and a few years were to elapse before it would really become “the project of the century” amid unanimous approval within Québec and elsewhere. This megaproject, while subject to unprecedented environmental protection standards, will be completed under budget and several months ahead of schedule. It will add some 10,280 megawatts to Hydro-Québec’s installed capacity, whose annual production is almost entirely hydroelectric. The LG 2 generating station, with its 5,325 megawatts, is the largest hydroelectric generating station in Canada.

The several convulsive events that rocked the energy scene in the 1970s led the government, in November 1978, to change the administrative structure of Hydro-Québec. It is now administered by a board of directors, like other corporations. The new Act allowed Hydro-Québec to create a subsidiary-Hydro-Québec International-whose role is to export, worldwide, Hydro-Québec’s expertise in the domain of electric power.

In 1983, Hydro-Québec’s mandate was enlarged to include “endeavors in energy-related research and promotion, energy conversion and conservation, and in any field connected with or related to power or energy”. Moreover, the Act specified that utility must meet the energy needs of Québec in particular, while also allowing it all the required latitude to explore possibilities for sales to markets outside of Québec.

Hydro-Québec today is one of Québec’s main economic forces. Its permanent employees number 18,500. By the end of 1984 it had reached a total installed capacity level of 23.5 million kilowatts without counting the power available under the Churchill Falls (Labrador) Contract. Its assets are valued at $27.1 billion and its annual sales are $4.1 billion. It ranks among the ten largest public utilities in North America, including electricity, communication, transportation and gas companies or commissions.

World Wide Web Resources as of March 2000:
Hydro Québec - www.hydro.qc.ca