

*A History of
Electric Power
in Manitoba*

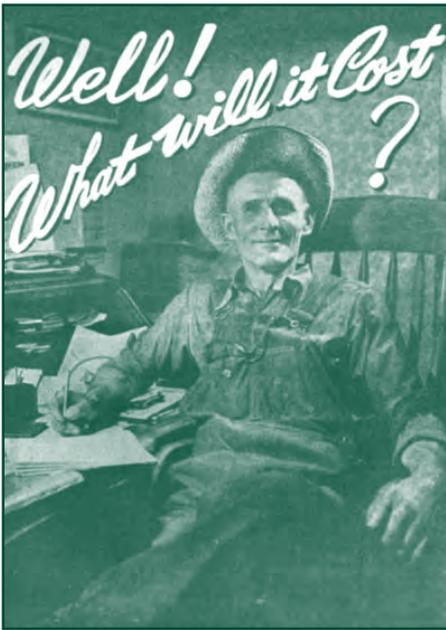


COVER PHOTO

Great Falls Generating Station on the Winnipeg River was completed in 1923. Workers' families lived in the small townsite built next to the generating station, which at the time was isolated and inaccessible by road.

Introduction

The history of the electrical industry in Manitoba tells the story of expediency, foresight and public responsibility. It began over a century ago during the pioneer days of street lighting and street railway transportation in Winnipeg. Before long, as the novelty of the new energy source gave way to necessity, other large communities in the province wanted the benefits that electricity would bring. They received electrical service, but often at very high costs.



A few farsighted individuals saw the enormous advantages of large-scale generating facilities. Among them were a number of public spirited citizens who felt that electricity should be made available at the lowest possible cost to the consumer.

There followed over the years a successive series of amalgamations, purchases, and government appointed bodies until finally, by the 1940s, the myriad of companies and municipal utilities evolved into essentially three major electrical utilities: the Winnipeg Electric

Company (WECO.), which was originally the Winnipeg Electric Street Railway Company and the Winnipeg Electric Railway Company; the City of Winnipeg Hydro Electric System (known as City Hydro); and the Manitoba Power Commission (MPC).

By the end of World War II, it had become evident that the future power requirements of Manitoba would be best served by a single utility for developing and supplying electrical energy. The result was the formation of the Manitoba Hydro-Electric Board (MHEB) in 1949 by the Government of Manitoba.

During the next decade, the generation and distribution facilities in Manitoba were consolidated. In 1952, the provincial government authorized MHEB to acquire WECO. In 1955, an agreement was reached between MHEB, MPC, and City Hydro, whereby:

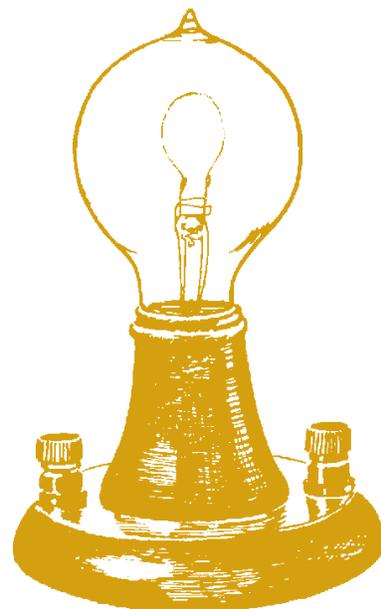
1) all distribution properties in the suburbs owned by City Hydro were sold to MPC.

2) all distribution properties in the City of Winnipeg owned by the former WECO. were sold to City Hydro — which became Winnipeg Hydro in 1964. (Winnipeg Hydro was the sole distributor of electrical energy in the central portion of the City of Winnipeg until it was acquired by Manitoba Hydro in 2002.)

In 1961, the Government of Manitoba united the two provincial utilities through the establishment of the Manitoba Hydro Act. MHEB and MPC formed a single Crown Agency to supply the electricity needs of the province.

In 1973, 100 years after the first utility was incorporated in the province, the last of the small independent systems joined Manitoba Hydro. At this time, Manitoba Hydro assumed responsibility for the communities of Flin Flon and Snow Lake by acquiring the distribution facilities of the Northern Manitoba Power Company Limited from Hudson Bay Mining and Smelting.

The History of Electric Power in Manitoba highlights some of the milestones in the electrical industry in Manitoba, as well as the development of Manitoba Hydro and some of the significant events in the utility's history.



Early Beginnings

1873 WINNIPEG GAS COMPANY was incorporated on March 8 to provide the City of Winnipeg with gas lighting. The company, which materialized as no more than a holding company, amalgamated with Manitoba Electric & Gas Light Company in 1881. One of the founders of Winnipeg Gas Company was Mr. Donald A. Smith, who later became Lord Strathcona.

1880 MANITOBA ELECTRIC & GAS LIGHT COMPANY was incorporated February 14 by an Act of the Manitoba legislature. The company was granted wide powers to “supply light and heat in Manitoba by gas, electricity or other means”.

1881 WINNIPEG GAS COMPANY and Manitoba Electric & Gas Light Company merged.

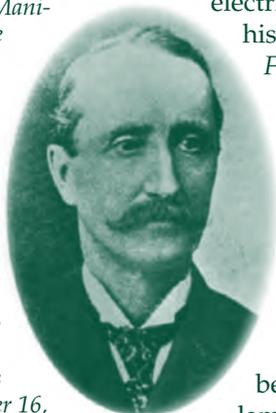
1882 WINNIPEG STREET RAILWAY COMPANY was incorporated May 27 under the management of Mr. Albert W. Austin who obtained a charter from the City of Winnipeg to operate horse-drawn streetcars on Main Street. The City granted Austin’s company the rights to construct and operate street railways in the City, as well as in the parishes of St. Boniface, St. John’s, St. James, and Kildonan. The first horse-drawn streetcar went into operation October 21.

THE FIRST ELECTRIC LIGHT WAS TURNED ON IN WINNIPEG on March 12. The Honourable Robert A. Davis, proprietor of Davis House, a hotel on Main Street, used an electric arc light to illuminate the front of his building. At the time, the *Manitoba Free Press* reported “The (electric) lamp in front of the Davis Hotel is quite an institution. It looks well and guides the weary traveller to a haven of rest, billiards and hot drinks, and lights up the streets probably more than the lamp of the newly incorporated gas company will for centuries to come.”

This event took place six years before Edison’s first incandescent lamp was invented, four years before hard-drawn copper was invented, and three years before the first complete sentence was spoken over the telephone by Alexander Graham Bell.

A DEMONSTRATION OF THE ELECTRIC LIGHT IN ARC FORM was given on June 14 and 15 for about two hours each evening at the Canadian Pacific Railway (CPR) crossing on Main Street in Winnipeg. For the demonstration, three lamps outside and one inside the engine house of the Patterson & McComb

The Honourable Robert Atkinson Davis moved to the village of Winnipeg in 1870 and built Davis House. In 1874, he was elected to the Manitoba legislative assembly and in December of that year he became premier of Manitoba. Best known for negotiating a good financial deal with Ottawa for the new province, he resigned his post on October 16, 1878 and moved to Chicago, where he became a wealthy businessman. He died in Phoenix, Arizona, in 1903.



Mr. Donald A. Smith, co-founder of the Winnipeg Gas Company, is shown in one of the most famous Canadian photographs ever published. As president of the Bank of Montreal, he is driving the last spike on the Canadian Pacific Railroad at Craigellachie, B.C. on November 7, 1885.

Lumber Company were used. The lumber company's steam engine was used to drive a small dynamo that a Mr. P.V. Carroll of New York had brought to Winnipeg for the purpose of "exhibiting the electric light with which he hopes to obtain a contract for illuminating the streets of the city".

By October 16, four lamps had been placed along Main Street, from Broadway Avenue to the CPR crossing. That evening, they were turned on for the first time. Another nine were strung around the engine house of the Hudson's Bay Company's grist mill. They were in the process of adjustment prior to going out on the street. The mill engine had been engaged to drive the small dynamo each evening for the time being, and this electrical enterprise was known as the Manitoba Electric Light & Power Company. Although the organization applied for a charter in June 1882, one was never granted. The Manitoba Electric Light & Power Company was also referred to as the Electric Light Company.

1883

THE NORTH WEST ELECTRIC LIGHT AND POWER COMPANY (LTD.) (NWEL & P. Co.)

was incorporated August 25 under the Manitoba Joint Stock Companies Act "to provide electric supply and lighting to any city or town in Manitoba". Principal shareholders were Mr. Charles J. Bridges, the Honourable Corydon P. Brown, Mr. Horace McDougall, Mr. James F. Munsie, and Mr. Frank G. Walsh. On the evening of June 23, the power from NWEL & P.Co. was used for the first time to light the streets of Winnipeg.

The NWEL & P.Co. power plant was located "on Wesley Street—near Water Avenue" by directory identification—where it remained until about 1889. By that time, street lighting had been taken over by the Manitoba Electric & Gas Light Company, leaving only a few services of uncertain amount and extent for NWEL & P.Co. to provide.

Winnipeg in 1880, looking northwards on Main Street from Graham Avenue.



1889 NORTH WEST ELECTRIC COMPANY LTD. was incorporated under the Manitoba Joint Stock Companies Act to

build and operate electric lighting systems, and electric street railways, in various cities, towns and villages in Manitoba. Although the company apparently provided indoor incandescent lighting for some businesses in Winnipeg, there was only a record of four of them, one being the company's own building at 33 Water Avenue.

BRANDON ELECTRIC LIGHT COMPANY LTD. built a steam generating station in the City of Brandon to supply the residents of the city with electricity for heat and light. The year in which the company was founded is unknown. It would be taken over by Canada Gas & Electric Corporation of Brandon in 1921.

1891 FIRST EDISON ELECTRIC STREETCAR TO BE MANUFACTURED IN CANADA made

its maiden run on January 28 along River Avenue in what was then referred to as south Winnipeg. A demonstration run,

it was the attempt of Albert Austin of Winnipeg Street Railway Company to convince Winnipeg City Council to grant the company the franchise for operating electric streetcars in Winnipeg.

During the next three years, Austin had at least four streetcars operating from the south end of the Main Street bridge, along River Avenue and down Osborne Street to Elm Park. They were powered from a small steam plant — with a 22-kilowatt (kW) generator (one kilowatt is 1,000 watts) — that Austin built on Assiniboine Avenue near Main Street.

1892 WINNIPEG ELECTRIC STREET RAILWAY COMPANY (WESR.Co.) was incorporated

by an Act of the Manitoba legislature on April 20 to “construct and operate an electric street railway on the streets of the City of Winnipeg, St. Boniface, and in adjacent municipalities; to sell electric heat, light or power”. A by-law that had been passed on December 31, 1891 provided WESR.Co. with an exclusive franchise to operate the street railway for a period of 35 years. On July 26, 1892 the company operated its first electric

An early WESR. Co. aerial ladder crew working on an electric trolley line in 1905. During the late 19th and early 20th centuries, electricity was primarily used for transportation and street lighting. The device on the front of the streetcar is a “people catcher” not a “cow catcher”, such as those used on the front of railway locomotives. The catcher prevented hapless pedestrians from falling under the wheels of streetcars should they be struck by streetcars. The device reportedly saved many lives.



streetcar on Main Street. Regular service began on September 5. Power for the company was supplied by Manitoba Electric & Gas Light Company.

1894

WESR.Co. PURCHASED THE ASSETS AND PROPERTIES of Austin's Winnipeg Street Railway Company for \$175,000.

Austin, having lost out on the electric streetcar franchise when WESR.Co. took it over in 1892, continued to operate horse-drawn streetcars for another two years before finally selling out to his competitor. The last horse-drawn streetcar made its final run on May 11.

1895

THE ASSINIBOINE STEAM PLANT was built. WESR.Co. built the new plant at, or near, the site of Austin's plant on Assiniboine Avenue. The plant was officially

opened on November 12 with an initial generating capacity of 559 kW. Built at a cost of \$65,000, it consisted of four boilers, each rated at 186 kW. The plant, located at the site of what would become Bonnycastle Park, was dismantled in 1916.

1898

WESR.Co. GOT ALL FRANCHISES, rights and properties of the Manitoba Electric & Gas Light Company for \$400,000.



The Assiniboine steam plant's capacity was originally measured in horsepower, a unit of power in the Imperial system equal to 550 foot-pounds per second, which is approximately 746 watts (W). A watt is a unit of power in the metric system. The Assiniboine steam plant's capacity in 1895 was rated at 750 horsepower. The term horsepower was initially used to describe the power of pumps, beginning in about 1806. As time passed, horsepower was used to describe the power of a variety of mechanical devices, such as steam engines.

19th Century Winnipeg — the wildest place in Canada

From 1670 to 1870, fur trappers and traders managed to keep the area at the junction of the Red and Assiniboine rivers to themselves. Original settlements in the area were solely for the benefit of the fur trade. The first construction in the area took place when Sieur Pierre de la Vérendrye, fur



Winnipeg in 1873, looking northwards on Main Street from the corner of Portage Avenue. Highlighted in the middle of the photo is Davis House.

trader and explorer, built Fort Rouge at the river junction in 1738. In 1822, near the location of Fort Rouge, Fort Garry was built as the headquarters for the trading company, Hudson's Bay Company, which had amalgamated in 1821 with another trading company, the North West Company.

Although the trappers knew that the rich soil of the area would be an excellent agricultural resource, they kept this fact a secret from eastern Canadians and Europeans so as to protect their valuable hunting grounds from being turned into

farm land. Even when Lord Selkirk's settlers arrived in the Red River Valley in 1812, they were able to make little progress in expanding the size of their predominantly agricultural settlement because the fur traders maintained control of the area. No doubt the settlers were also a little afraid of the fiercely independent traders and trappers.

As Manitoba's inclusion in the Confederation of Canada drew nearer, the predominantly Métis inhabitants of the area around the junction of the Red and Assiniboine rivers became increasingly concerned about preserving their rights. As a result, the area gained a reputation as a rebellious outpost and this reputation was reinforced by events such as the Riel Rebellion.

During all of this turmoil, Henry McKenney built a general store in 1862 at the point where the fur runners' trail along the Assiniboine River to Fort Garry crossed over the fur runners' trail along the Red River. A small settlement started beside the store, and this area was named Winnipeg, after Lake Winnipeg, located 65 km to the north. The name was derived from the Cree word win-nipi, which means murky water.

After Confederation, word about the agricultural potential of the Red River Valley finally reached the rest of the world, and Winnipeg became a real boom town during this period. With a population of 215 in 1870, Winnipeg's population had grown to 1,869 by 1873 when it was incorporated as a City. By 1912, the population had soared to 136,035, according to the Government of Manitoba's Department of Industry and Commerce in its booklet *Winnipeg 1874-1974: Progress and Prospects*. The spectacular growth ended at the outset of World War I in 1914. The war stopped the flow of European immigrants and also resulted in many young men from Winnipeg being sent off to fight. In addition, in 1914, Winnipeg entered a recession from which it would not recover until after the end of World War II.

In eastern Canada, the Winnipeg of the late 19th century was viewed as "one of the two most violent places in Canada." This perception was partly due to the way in which Winnipeggers

fully participated in the democratic process. When the citizens felt government was acting unfairly, they reacted with mass protests, angry mobs, and sometimes violence. For example, when the Manitoba legislature radically altered a bill to incorporate Winnipeg as a City in 1873, the Speaker of the House, Mr. C. J. Bird, was abducted and tarred. With incidents like this taking place, it is easy to understand why the easterners prayed for the salvation of Winnipeg at the YMCA convention in 1876.

Winnipeggers of the time demanded the best, biggest, and newest of everything. Thus it was a typical Winnipeg business move in 1873 when Mr. R. A. Davis invited Mr. P. V. Carroll to demonstrate the arc light — four years before the first advertised arc light demonstration took place in Newark, New Jersey.

Davis' light illuminated the way for the establishment of the electrical industry, which in turn played a role in the development of a city and a province. He was typical of the farsighted businessmen of Winnipeg, who realized what an important energy source electricity would become, and who wanted the tremendous potential profits to be gained from producing and distributing electricity.

By 1882, two different groups realized that the new City had developed enough so that a contract for supplying its electricity and street lighting could be very profitable. They began taking steps to try to secure the city contract.

One group was led by Mr. P.V. Carroll, who initially worked with the Manitoba Electric Light & Power Company. Carroll and the company had installed demonstration streetlights on Main Street between Broadway Avenue and the Canadian Pacific Railway crossing with the specific hope of obtaining a city contract. However, the Manitoba Electric Light & Power Company failed to obtain a charter, and subsequently Carroll allied himself with Mr. Albert Austin's Winnipeg Street Railway Company.

The second group, led by Mr. James Munsie, was the North West Electric Light and Power Company (Ltd.) (NWEL & P.Co.). Munsie had been quietly working on a plan for winning the city contract for his group of shareholders since November 1882. When Carroll made his intentions known to Council, Munsie was prepared. He surprised many people when he stepped forward to offer, as he put it, "to supply electric street lighting in a more satisfactory manner than had been the case until then if his group were to be given the contract". Munsie's bid was successful and a contract was granted. It was at this point that Munsie and his group registered the NWEL & P.Co. Subsequently, NWEL & P.Co. lost the contract six years later to the Manitoba Electric & Gas Light Company.



Most of the electricity produced in the late 19th century was used for street lighting, business lighting, and public transportation. Very little of the electricity produced in Winnipeg went for residential use. Those residences with electricity were using it almost exclusively for lighting, while coal and wood were used for heating. Homes without electricity used kerosene lamps for lighting.

Main Street in Winnipeg in 1894 — looking northwards from Portage Avenue — two years after the Winnipeg Electric Street Railway Company (WESR.Co.) ran its first electric streetcar down the street.

An Era of Growth

1900 THE MINNEDOSA RIVER PLANT was the first hydroelectric generating station in Manitoba. It went into operation on the Minnedosa River (now known as the Little Saskatchewan River) approximately 2.4 km to the north of its junction with the Assiniboine River. Operated by the Brandon Electric Light Company Ltd., the plant served the City of Brandon, located about 14 km to the east via an 11,000-volt (V) wood pole line. The plant operated for only eight months of the year. Its average operating head (waterfall) was 7.9 metres (m).

Construction of the Minnedosa River Plant was financed by Judge David Walker of Winnipeg, and Messrs. George Patterson and E. L. Christie of Brandon. The plant would be dismantled in 1924, following the purchase of the company three years earlier by the Canada Gas & Electric Corporation of Brandon.

WINNIPEG SELKIRK & LAKE WINNIPEG RAILWAY COMPANY was formed by a special Act of the Manitoba legislature to provide rail transportation northwards from Winnipeg to West Selkirk, and to the western shore of Lake Winnipeg. The municipalities of Kildonan, St. Paul, St. Andrews, and Gimli were included.

WINNIPEGELECTRICSTREETRAILWAY COMPANY (WESR.Co.) purchased the North West Electric Company Ltd. on June 9.

1902 THE SUBURBAN RAPID TRANSIT COMPANY was incorporated by a special Act of the Manitoba legislature to run streetcars from the western boundary of the City of Winnipeg (on both sides of the Assiniboine River) to Headingley. Service on the north side of the river extended to Headingley in 1903, but on the south side the line only reached as far as Charleswood.

WINNIPEG GENERAL POWER COMPANY was incorporated on March 1 by a special Act of the Manitoba legislature. The company was given the fullest powers to develop, transmit, and distribute electricity in the province, and to develop a hydroelectric generating station at Pinawa.

1904 THE WINNIPEG GENERAL POWER COMPANY officially amalgamated with WESR.Co. on July 26. The new company became known as the Winnipeg Electric Railway Company (WERCo.).

1905 WERCo. PURCHASED THE SUBURBAN RAPID TRANSIT COMPANY on October 26. As a subsidiary of WERCo., the suburban line continued to operate under its original company name and was further empowered by a special Act of the Manitoba legislature to build and operate lines through



Judge David Marr Walker.



The Minnedosa River Plant was the first hydroelectric generating station in Manitoba. Its powerhouse contained two vertical water wheels connected by bevel gears to a line shaft driving two 1,100-V alternators. Six transformers increased the power to 11,800 V for transmission to the substation at 10th Street and Lorne Avenue in Brandon — now the site of Manitoba Hydro's customer service office in western Manitoba. The spillway was built with a 6.7-m head, or waterfall, and was 18.3 m wide. After the flood discharge in the spring, timber stop logs were placed in the spillway, raising the water an additional 3 m to the top of the dam and providing a working head of 9 m. The 79-m-long timber dam was built with 13 rows of tamarack piling (between 4.8 m to 15 m in length) driven close together into the river's clay bottom. The dam's upper side was faced with tongue-and-groove lumber.

the rural municipalities of St. Francois Xavier and Portage la Prairie. Starting in 1931, the transit rail line was to be progressively cut back until 1955, when the last streetcar to Deer Lodge was replaced by a bus service.

1906

THE CITY OF WINNIPEG HYDRO ELECTRIC SYSTEM (City Hydro) was formed as a publicly owned utility to check the

power monopoly held by the privately owned WERCo. Alderman John Wesley Cockburn, who held development rights to the Pointe du Bois Generating Station site on the Winnipeg River, surrendered these rights to the City for construction of a power plant there. The generating station was completed in 1911 and it is still in operation today.

WERCo., UPON TAKING OVER THE

Winnipeg Selkirk & Lake Winnipeg Railway Company as a subsidiary, gained the monopoly on all transit service, and electric light, power and gas distribution in and around the City of Winnipeg. Originally a steam railroad, the line was electrified when it was acquired by WERCo. Service continued to Selkirk until September 1, 1937, at which time the electric streetcars were replaced by a gas bus service.

PINAWA WAS THE FIRST hydroelectric generating station on the Winnipeg River and the first hydroelectric generating station in Manitoba to operate year round. Located on the Pinawa Channel of the river, it was built by WERCo. for an initial investment of \$3 million. Pinawa operated with a head of

14 m, and delivered its first power on June 9. Steady service began around June 11. It was officially opened on May 31 by Lieutenant-Governor Sir Daniel McMillan,

During the first year of Pinawa's operation, six units went into production with a total capacity of eight megawatts (one megawatt is one million watts). In 1907, units seven, eight and nine were added, bringing the total capacity to 14 MW. In 1912, the generating station was re-rated to a total of 22 MW.

Pinawa would be retired on September 21, 1951, to provide a more efficient use of the water flows at Seven Sisters Generating Station, which was completed in 1952.

1911

POINTE DU BOIS GENERATING STATION on the Winnipeg River was completed by City Hydro. This was the

first hydroelectric generating station built by the publicly owned utility and today is the oldest power plant still in operation on the river. The initial development cost of the project was \$3,250,000.

Power from Pointe du Bois was first delivered to Winnipeg on October 16, and during the fiscal year of 1911-1912, units one to four and unit seven went on line. More units would be added in 1914, 1917, 1921, 1924 and 1926, bringing the number to 16. Their total capacity was 70 MW. The plant was later re-rated to 75.6 MW. It operates with a head of 14 m.

WINNIPEG RIVER RAILWAY COMPANY was incorporated on March 24 by a special Act of the Manitoba legislature. The company



Pinawa Generating Station, built by the Winnipeg Electric Railway Company (WERCo.), first delivered power to Winnipeg in 1906.



Pointe du Bois Generating Station was built by the City of Winnipeg Hydro Electric System (City Hydro) to counterbalance the growing monopoly of the privately owned WERCo. The first power produced at Pointe du Bois was delivered to Winnipeg in 1911.



The Honourable G.H. Grierson, Minister of Public Works, was the first Cabinet Minister to be given responsibility for MPC. He was appointed in 1919.



Mr. J.M. Leamy, the first MPC Commissioner, was appointed in July 1919.

was empowered to operate “by steam or other power from a point at or near Lac du Bonnet to a point at or near Lake Winnipeg at the mouth of the Winnipeg River”. Great Falls became the chosen site. The company, which was financed by WERCo., became an affiliate of the Winnipeg River Power Company. Due to financing difficulties later on, the assets of both companies were taken over by the Manitoba Power Company, a subsidiary of WERCo. formed in 1920.

MILL STREET STEAM PLANT in Winnipeg was built by WERCo. as an auxiliary plant and terminal point for electricity produced at Pinawa Generating Station. All four units went into operation during the first year for a total capacity of approximately 8,948 kW. The steam plant went out of service in 1944.



WINNIPEG RIVER POWER COMPANY was formed under the Companies Act of the Dominion of Canada as an associate company of WERCo. to develop the generating station at Great Falls, formerly known as Grand du Bonnet Falls. The company completed its preliminary engineering research in 1914, and on September 1, 1915, it was granted a charter to develop the site.

The effects of World War I brought the project to a halt in July 1916. Work on the project resumed in May 1919, but stopped shortly afterwards due to material shortages and uncertain financing. The project was ultimately taken over in 1920 by the Manitoba Power Company, which would complete building Great Falls Generating Station in 1923.

THE MINNEDOSA HYDRO PLANT was constructed to serve the town of Minnedosa. Local citizens under the name of the Minnedosa Power Company built it on the Minnedosa River just north of the town. It originally had a 336-kW horizontal turbine connected to a 250-kW generator. Unfortunately, a sufficient water supply was never available for the plant to provide dependable year-round service. In 1921, the Manitoba Power Commission (MPC) assumed responsibility for the plant, enlarged it, and added two diesel engines to supplement the hydroelectric generators. In 1930, a 33-kV transmission line from MPC’s transmission

line network was constructed. The Minnedosa Hydro Plant was to be phased out by 1933, though the diesel engines continued on a standby basis until 1944.

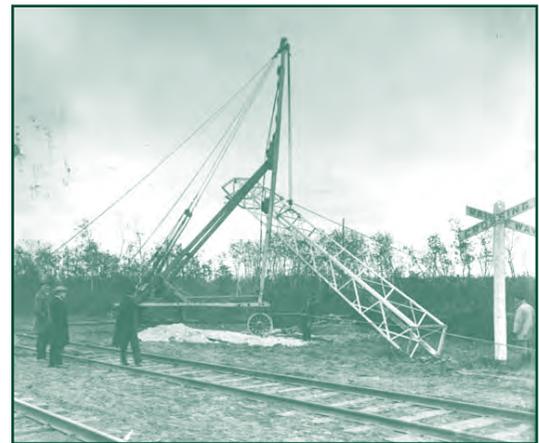
DOMINION GOVERNMENT STUDIES OF NELSON AND CHURCHILL RIVERS

were completed. The Government of Canada’s Department of Mines concluded a comprehensive geological survey of the drainage basins of the two rivers to determine the power potential of Manitoba’s northern river systems. The 1913 report formed the basis for further studies, undertaken half a century later, that ultimately led to the development of Manitoba’s northern water power resources.



MPC CAME INTO EXISTENCE with the passage of an Electric Power Transmission Act of the Manitoba legislature.

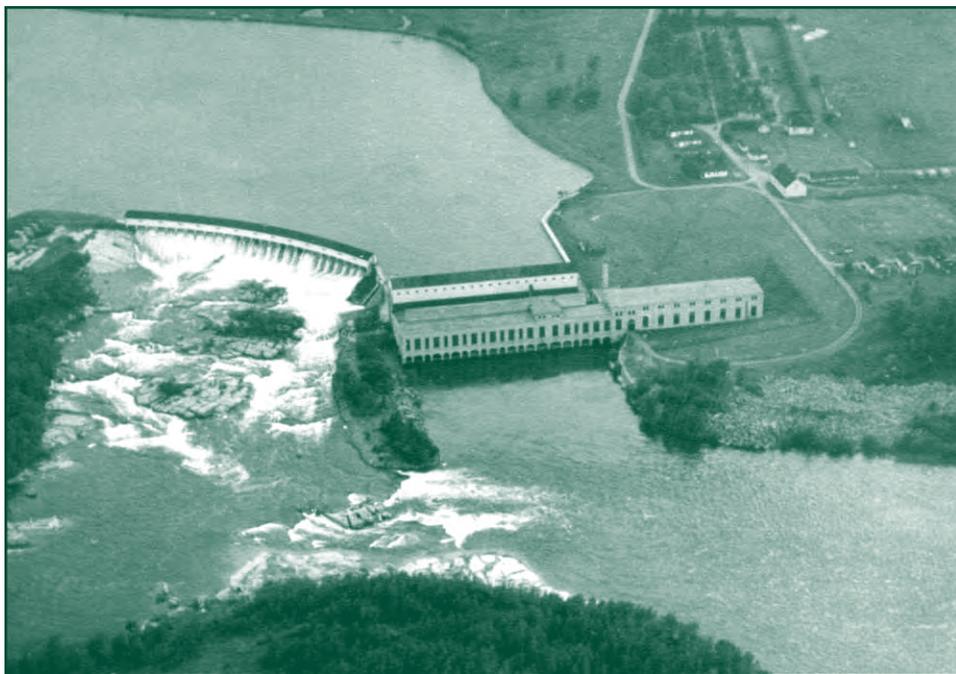
MPC’s legislated mandate was “to generate, purchase, transmit, and distribute electrical energy” throughout rural Manitoba. Under the Act, any municipality could apply for service through the Minister of Public Works. Many municipalities were operating small and costly independent power systems at the time. MPC initially contracted to purchase the power from the City of Winnipeg, and later from the Winnipeg Electric Company (WECO.).



The erection of the first tower on the Manitoba Power Commission’s system took place on October 3, 1919. Witnessing the event were three of the engineers who planned MPC’s transmission line network (Winnipeg to Portage la Prairie): Mr. C. Gunn, Mr. T. Kirby and Mr. J. Rochetti, MPC’s first chief engineer.

Pinawa Generating Station — a bold move into uncharted waters

The construction of Pinawa Generating Station on the Winnipeg River between 1902 and 1906 was a bold move, requiring both imagination and courage on the part of the Winnipeg Electric Railway Company (WERCo.). Pinawa was built at a time when nobody knew whether or not the Winnipeg River was suitable for hydroelectric development. The Dominion Water Board, which was responsible for the administration of water power resources in Manitoba, did not begin its investigation into the potential power capacity of the Winnipeg River until July 1911.



Pinawa Generating Station was located close to the Pinawa townsite, seen at upper right.

In addition to not really knowing the hydroelectric potential of the Winnipeg River, building Pinawa was an engineering challenge in 1902 — at least equivalent to the challenge of building generating stations on the Nelson River in the 1970s. The area where Pinawa was built was rough and unsettled, with no roads and no rail lines into the site.

The modern methods and the machinery available to engineers today did not exist, making the undertaking very laborious. To quote the account of a Mr. W. H. LeRoy, who worked as a rigger during the construction of Pinawa, “Rock drilling was done by tripod steam drills. Steam was supplied by boilers set on skids, and these

were moved from one location to another by the riggers. Hoist and cableway engineers were trained as required. When derricks or heavy equipment had to be moved some distance, they were set on skids and pulled by teams assisted by block and tackle or by using the steam hoist when possible.”

Transportation of materials was one of the chief problems. During the winter, heavy equipment had to be carried over the river ice, and in summer a scow ferried material from Lac du Bonnet. The roads were mostly lumberjack trails. When these became impassable, detours or corduroy roads, had to be built. In all, from 50 to 75 teams of horses were kept in constant use.

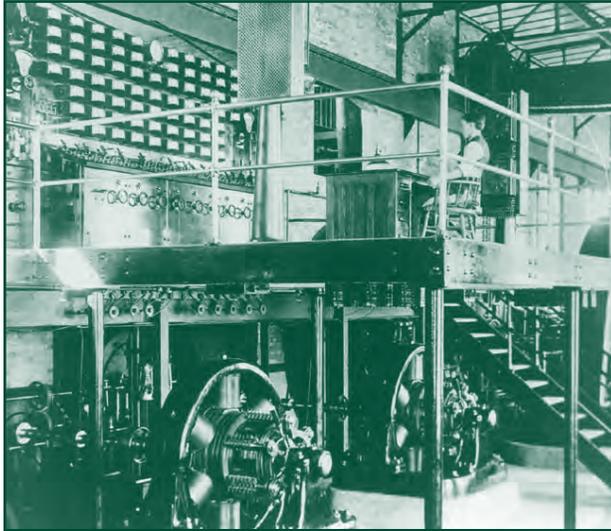
LeRoy reported, “Moving heavy loads such as transformers, generators, and turbine parts was slow and costly. It was customary to build a rail line from the storage shed to the powerhouse. The piece to be moved was jacked up, rails slipped underneath, and the load hauled into place by block and tackle and horses.”

The construction of Pinawa required a total investment of over \$3,000,000, one third of which was allotted for concrete dams alone. Many people had claimed that a plant production of 18,643 kW was far too large for the potential consumer demand in Winnipeg and that the cost was unwarranted. But Winnipeg’s population quadrupled over the 10 years after the generating station officially opened in 1906. It was the greatest period of expansion in the City’s history.

In fact, during the ensuing years, the capacity of the plant was developed and increased to a standard of 22,371 kW. Occasionally, peaks of 27,964 kW were reached.

Another important fact about Pinawa was that halfway through its construction, the City of Winnipeg realized the plant would provide the privately owned WERCo. with a virtual stranglehold on this valuable energy source. Consumers at the time paid 20 cents per kilowatt-hour (kW-h) for electricity. However, the city charter did not allow the City to generate power itself. Alderman John Wesley Cockburn took matters into his own hands in the belief the city charter could be changed, and secured the development rights to Pointe du Bois Falls in his own name. He transferred the rights to Winnipeg when the city charter was amended in 1906, at the time the City of Winnipeg Hydro Electric System (City Hydro) was born.

WERCo. reduced electricity rates from 20 cents to 10 cents per kilowatt-hour when Pinawa came on line. This made its service more attractive to customers and challenged the City owned utility. However, Cockburn then promised that Pointe du Bois would supply the citizens of Winnipeg with electricity at the rate of three cents per kilowatt-hour. But the rate turned out to be 7.5 cents per kilowatt-hour, and the citizens rose up against their own utility, demanding the three cents per kilowatt-hour rate they were promised. Finally, the rate was reduced to 3.3 cents per kilowatt-hour. Low electricity rates had come to Manitoba — and today they remain among the lowest in North America.



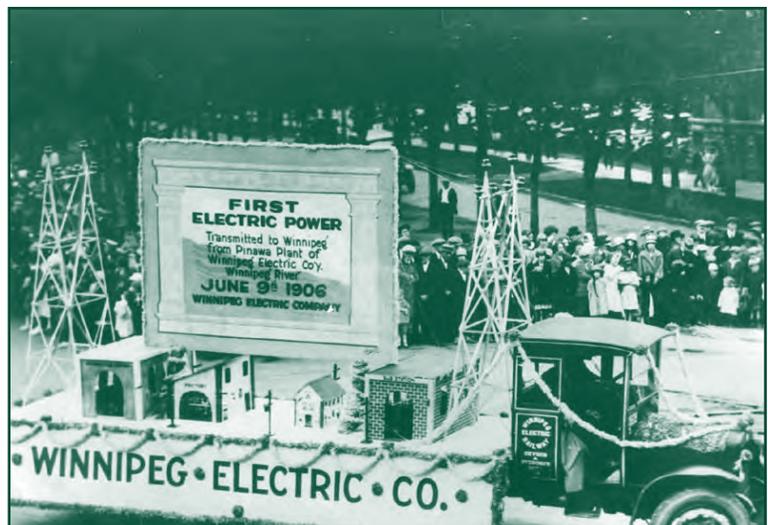
Inside Pinawa Generating Station, on the mezzanine floor, are the plant's controls and one of the operators (seated at the desk). The photo was taken about 1910.

Pinawa was retired from service on October 25, 1951, after 45 years, four months, and 27 days of faithful service. By that time it was inefficient — and small compared to the new generating stations. In fact, one turbine generator's output of electricity at Seven Sisters Generating Station was equal to Pinawa's total output. With the construction of Seven Sisters, the fate of Pinawa was sealed. The design of Seven Sisters called for the full flow of the Winnipeg River, which meant the Pinawa Channel on which the older plant was located had to be dammed up.

Some of the workers and their families who had made their homes at Pinawa were transferred to other generating stations, while some of the veterans who had spent a lifetime with WERCo. retired from service.

The closing of Pinawa truly marked the end of the pioneer era for Manitoba. Today, the site of Pinawa Generating Station is a Provincial Heritage Park.

This float illustrating the transmission of electricity from the generating station to the substation, and from there to homes and businesses, celebrated the first delivery of power from Pinawa in 1906.

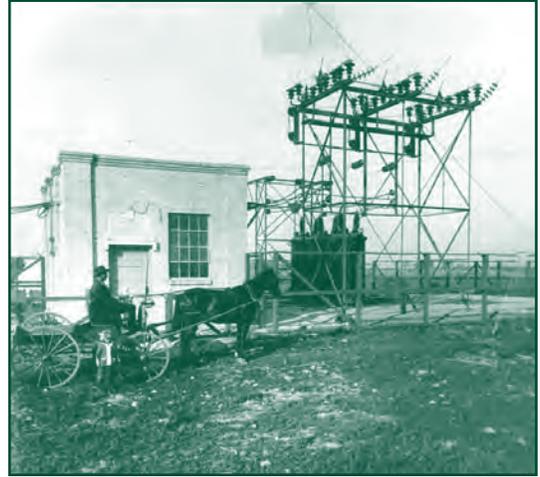


The Twenties and Depression Years

1920

MANITOBA POWER COMPANY (MPC) was formed as a subsidiary of the Winnipeg Electric Railway Company (WERCo.) to take over the rights and properties of the Winnipeg River Railway Company and the Winnipeg River Power Company for the purpose of completing and operating Great Falls Generating Station.

TOWN OF PORTAGE LA PRAIRIE, the first applicant for power network service under the 1919 Electrical Power Transmission Act, was connected to Manitoba Power Commission's (MPC's) electrical system on August 21 via a 66-kV, 96-km-long steel tower transmission line — from Scotland Avenue Substation in Winnipeg.



The Portage la Prairie substation in 1920 was known as MPC Substation No. 2. This structure terminated MPC's first transmission line which linked Winnipeg to Portage la Prairie. The substation was energized on August 21, 1920. Power was supplied by Pointe du Bois Generating Station.



History was made on August 16, 1920 when the MPC Substation No. 1 at Scotland Avenue in Winnipeg began transmitting power from Winnipeg to Portage la Prairie. Staff involved in the planning and construction of the transmission line gathered at the substation to witness this significant moment in history.

1921

RURAL ELECTRIFICATION began to materialize when the towns of Carman, Minnedosa, Morden, Roland, and Virden received electrical service from MPC's growing electrical system. Over the next seven years, about 28 more towns and villages would also be connected. However, with the 1929 financial crash and subsequent depression, followed by the outbreak of World War II, rural electrification plans were put on hold.

CANADAGAS & ELECTRIC CORPORATION OF BRANDON was formed with the consolidation of the Brandon Electric Light Company Ltd. and the Brandon Gas & Power Company Limited (the latter established by Cyrus Eaton of the Abott-Eaton Company, year unknown). Ten years later, the company was taken over by MPC.



Officials and dignitaries visited Great Falls Generating Station to observe the early stages of its construction.



Development work at Great Falls on July 13, 1928. Work crews used barges to place material on the rockfill dam.



Workers at Great Falls and their families lived next to the generating station in a townsite built by the electrical utility.

1923 **GREAT FALLS GENERATING STATION**, built by WERCo., was officially opened on January 4 by Sir James Aikens, Lieutenant-Governor of Manitoba. Located on the Winnipeg River about 128 km to the northeast of Winnipeg, the generating station pioneered a number of new design features that have since become common practice in power plant development. Great Falls went into service initially with units one and two in operation. By 1928, all six units had been installed bringing the total capacity to 132 MW. Today, Great Falls is Manitoba Hydro's headquarters for all four of its Winnipeg River generating stations.

1924 **THE AMY STREET STEAM PLANT**, owned by the City of Winnipeg Hydro Electric System (City Hydro), went into production with units one and two. Its total capacity was 10 MW. Other units were added in 1953 and 1954, which brought the total capacity to 50 MW. The Amy Street Steam Plant was closed on June 2, 1990, after providing 66 years of electricity and steam heat to buildings in downtown Winnipeg.

NAME OF WINNIPEG ELECTRIC RAILWAY COMPANY (WERCo.), formerly the Winnipeg Electric Street Railway Company, was changed to Winnipeg Electric Company (WECO.) on April 5 by an amendment to the Act of the Corporation.



NORTHWESTERN POWER COMPANY was created for the purpose of constructing Seven Sisters Generating Station. In 1927, the company merged with WECO.



The Manitoba Power Commission's Cook by Wire float as it appeared in a parade in Carman on May 24, 1926. The electric stove on the float was the only one available for sale in the town.



Electricity helped with the threshing process on the farm of Mr. D. S. Brown on August 18, 1926.

1931 **SEVEN SISTERS GENERATING STATION**, built by WECO, on the Winnipeg River about 101 km to the northeast of Winnipeg, began operating on May 9. The largest generating station on the Winnipeg River, it also operated with the highest head (a waterfall of 18.6 m) compared to the other Winnipeg River generating stations. In 1948, the capacity of the first three units was increased from 45 MW to 75 MW. This was the result of channel excavation, which raised the forebay by 2.4 m and lowered the tailrace by 1.5 m. Three more units were installed by 1952, bringing Seven Sisters' total capacity to 150 MW.

SEVEN SISTERS AGREEMENT was signed by the provincial government and WECO. Under the terms of the agreement, WECO agreed to supply electricity to MPC. Since its inception in 1919, MPC had been purchasing power from City Hydro.

SLAVE FALLS GENERATING STATION, built by City Hydro on the Winnipeg River, went on line September 1 with units one and two in production. Its total capacity was 17 MW. More units were added in 1937, 1938, 1946, 1947 and 1948. When completed in 1948, the generating station had a total of eight units, which increased its capacity to 67.4 MW.

MPC PURCHASED THE CANADA GAS & Electric Corporation of Brandon.

MANITOBA POWER COMMISSION ACT (MPC Act) was passed by the provincial government to replace the 1919 Electrical Power Transmission Act. The policy of MPC since its inception in 1919 was to sell power to rural municipalities which, in turn, retailed the power to the individual customer. As a result, there was no overall coordination of the system, and a considerable diversity of rates and policies existed. When the Depression occurred, local people began to feel its effects and had trouble paying their electricity bills. Not able to collect from their customers, municipalities in turn had trouble making their payments to MPC.

This situation called for a complete reassessment of the utility's policies. Subsequently, the MPC Act was passed by the provincial government to replace the 1919 Act. The new Act provided essentially for the reorganization of MPC and the appointment of a Board consisting of three members. The three were Mr. D. L. McLean, who served as Chairman, Mr. Herbert Cottingham and Mr. John W. Sanger. McLean resigned after serving only one year.

1933 MUNICIPAL CONTRACTS WERE CANCELLED as a result of the MPC Act. Instead of supplying power to municipalities which then supplied their respective communities, new contracts were drawn up providing municipalities with electricity for public service only. From that point on, MPC began dealing directly with individual customers without the municipal middle man.



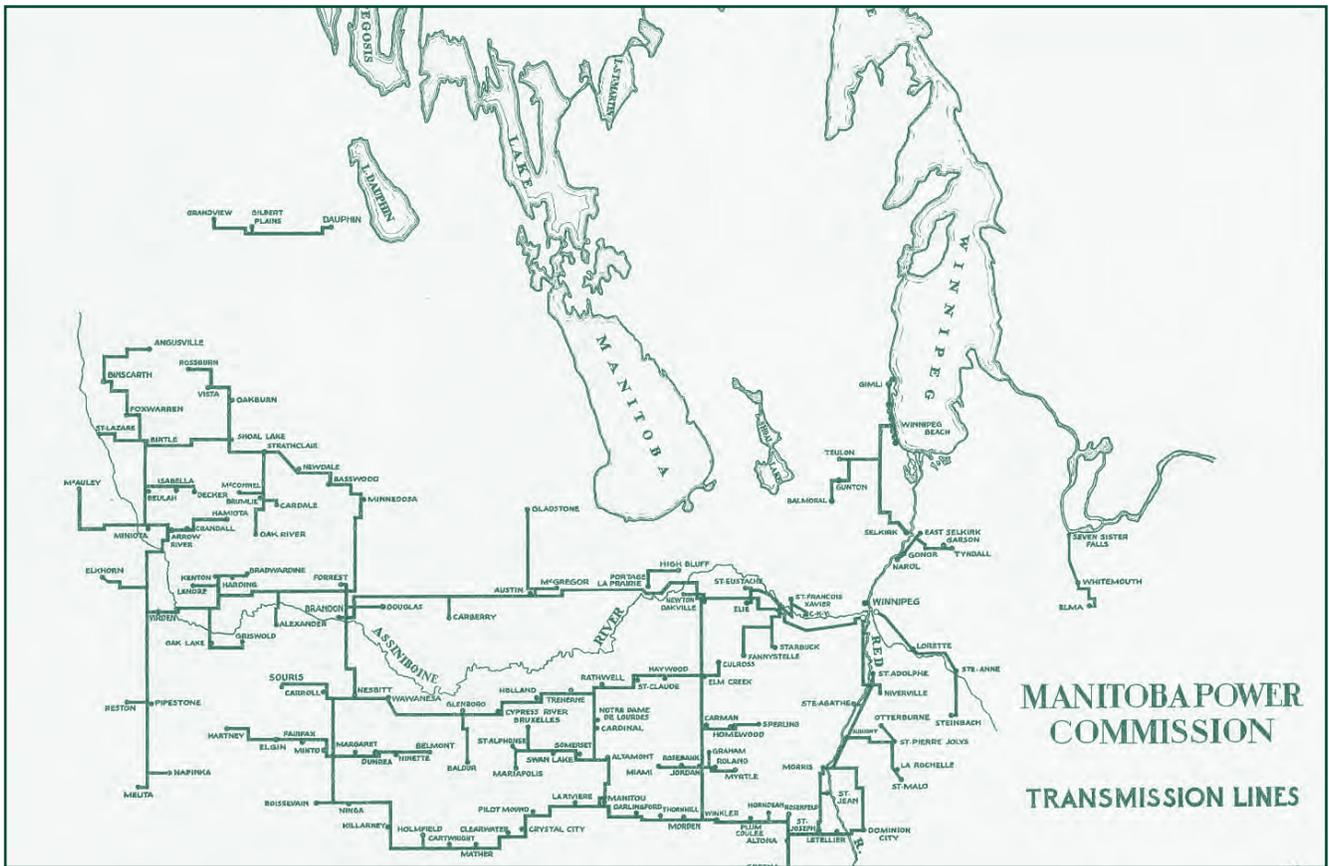
In 1936, the first pole was erected for distributing electricity in the town of Belmont, located in south-western Manitoba. The transmission line network, established for bringing electricity to various towns in Manitoba, later formed the infrastructure for the massive Farm Electrification program.

1936

THE WECO. PLAN OF CONSOLIDATION and Readjustment was approved. In May 1935, a plan to reorganize the properties and operations of WECO. and its associated companies was proposed. The associated companies included the Northwestern Power Company, MPC, Suburban Rapid Transit Company, and Winnipeg Selkirk & Lake Winnipeg Railway Company. In general the plan provided for the consolidation of WECO., MPC, and Northwestern Power Company into one

District Supervisors gathered for the Manitoba Power Commission Annual Conference in 1938. Behind them is the entrance to the 10th Street MPC office in Brandon, which today is Manitoba Hydro's customer service office in western Manitoba.





By 1939, MPC was supplying electricity to 139 communities outside of the City of Winnipeg. By the time Manitoba Hydro was created 22 years later, in 1961, MPC was servicing a total of 523 communities.

company, and for the Winnipeg Selkirk & Lake Winnipeg Railway Company and Suburban Rapid Transit Company to operate as wholly owned subsidiaries. A third subsidiary was created to manage WECO's gas operations. The plan was adopted in 1936.

FIRST EXPORT OF POWER TO THE U.S. from Manitoba occurred when the Dominion Government issued MPC a licence to export a limited amount of power to Interstate Power Company, which served North Dakota and Minnesota. The MPC interconnecting transmission line extended 0.8 km from Gretna to the international boundary.

MPC fights for survival

For a while during the early twenties, it seemed as if nothing could possibly stop the spread of a publicly owned transmission and distribution system throughout Manitoba. The Manitoba Power Commission (MPC) was doing its best to carry out its mandated task of providing electrical service to rural Manitoba from its transmission line network. Until this time, local residents had been receiving power from small, locally owned utilities.

The City of Portage la Prairie was the first rural area in Manitoba to sign a contract to receive electrical service from MPC. The signing officially launched rural electrification, and construction began on a 66-kV transmission line between Winnipeg and Portage la Prairie. The line was completed on August 17, 1920.



In 1921, a 33-kV branch line running southwards to Morden was completed, providing electrical service for the districts of Carman, Morden, and Roland. The future looked bright and MPC continued to expand to the main towns and villages in the province. The utility ultimately planned to serve every hamlet with a population of 20 or more. However, the forces of nature and finance would overpower MPC's best laid plans.

In July 1921, not even a full year after it was completed, extremely high winds brought down four kilometres of the Portage transmission line. Then in June 1922, less than one year later, the Portage line was again ravaged by a cyclone which left several kilometres of twisted towers and wrecked buildings in its wake. At the time of the cyclone, many MPC construction camps were scattered across the Manitoban prairie. MPC employees camped in tents located in fields and farmyards near the transmission lines they were building. These tent camps were, of course, destroyed by the cyclones. One story told of a lineman who was thrown out of his camp bed and in through the window of a nearby house.

In 1923, a general depression and crop failure reduced the number of areas asking for electrical service. This, combined with the fact that revenues from towns already connected to the electrical system were not as great as originally anticipated, threatened the future of MPC.

Responding to this threat, MPC began an electricity load building program, which included a strong promotional thrust aimed at demonstrating the advantages of electricity to farmers. Progress was slow but sure. Then, in 1929, the massive financial disaster of the stock market crash occurred as well as the beginning of the depression years. The utility paused to reassess its policies. In 1931, the 1919 Electrical Power Transmission Act was repealed and replaced by the Manitoba Power Commission Act (MPC Act). The MPC Act established a board of three, including Mr. D.L. McLean, Chairman, who was joined by Mr. H. Cottingham and Mr. J.W. Sanger. These gentlemen were businessmen from privately owned industries unrelated to the electrical industry.

Cottingham and Sanger set about reorganizing MPC. Two of their most important new policies were that it would provide electricity to municipalities for public services only, such as for street lighting and public buildings, and that MPC would sell directly to individual customers, instead of selling bulk to municipalities for distribution to customers. As part of the reorganization, MPC centralized the billing system in its Winnipeg office

to reduce the cost of operations and to prevent inconsistencies in the interpretation of the rate schedule. In another move to get closer to its customers, MPC established a Business Department under Mr. G.A. Wrighton. The Business Department's task was to sell electric appliances and generally help to build the electricity load. This helped to stabilize MPC's financial position.

Another move that helped improve MPC's financial position was a policy developed in 1934 that established guidelines for transmission line extensions. These guidelines required that there be a sufficient number of customers to ensure enough revenue to meet all the costs before the line extension was initiated.

By 1937, MPC's financial picture was improving. When war broke out in 1939, the only new line extensions were for military bases. However, the combination of town electrification and the outbreak of World War II set the stage for one of the most exciting periods in Manitoba's history — Farm Electrification.



Shattered poles strewn in ditches and fields, and the devastated MPC workers' campsite, were just two examples of the damage created by a cyclone on July 29, 1921.



Mr. Herbert Cottingham, Chairman of the Manitoba Power Commission from 1932 until 1946, had the responsibility for steering MPC through some of its most troubled waters.



Mr. J.W. Sanger served as Vice-Chairman of the Manitoba Power Commission from 1932 to 1945. He worked closely with Cottingham to revive the fortunes of the struggling utility.

Farm Electrification Emerges

1942 MANITOBA FARM ELECTRIFICATION ENQUIRY COMMISSION was formed. World War II brought about a shortage of hired farm help, and the farmers, finding it increasingly difficult to handle their work single-handedly, finally presented a petition to MPC demanding electricity. The Manitoba Farm Electrification Enquiry Commission was subsequently formed in 1942 to investigate the feasibility of a postwar program of Farm Electrification. It recommended that a program — designed to ultimately service 90 per cent of all farms in Manitoba within a practical service area — be undertaken on a group or area basis. The plan was put into operation immediately after the war in 1945.

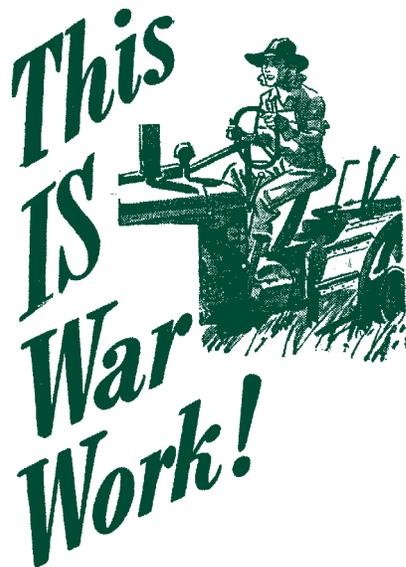
1944 NEEPAWA AND DAUPHIN JOIN THE MANITOBA POWER COMMISSION. MPC took over the distribution system of the town of Neepawa and power network service began on May 1.

In Dauphin, MPC took over the town's existing steam generating station and distribution system. Power network service began December 1 via the Minnedosa to Dauphin transmission line.

1945 FARM ELECTRIFICATION BEGAN following an MPC trial survey to determine the interest of farmers in an electrification program. Based on the 1942 Manitoba Farm Electrification Enquiry Commission, a test project was made involving the extension of service to nearly 1,000 farms located in different areas. The success of the test project prompted a full-scale effort during the next decade to supply electricity to southern rural Manitoba.

1948 THE MANITOBA WATER POWER COMMISSION REPORT, also known as the Hogg Report, was published. By the end of World War II — after some 15 years of the Depression and the war — both the Winnipeg Electric Company (WECO) and the City of Winnipeg Hydro Electric System (City Hydro), were experiencing the pressures of an expanding economy. It was also becoming evident that with an intensified program to bring electrical service to rural Manitoba, the generating capacity contracted to MPC would soon become inadequate.

Thus, in 1947, the provincial government appointed a royal commission, chaired by Dr. T.H. Hogg, to study Manitoba's electrical industry and to submit a report on the best way to ensure adequate generating capacity. Hogg's report, presented in 1948, advocated that the future capital costs of high-cost electrical power development should be merged with the existing low-cost electrical power.



Our hats are off to you, Mr. and Mrs. Farmer; Last year you established new production records —and already you are laying plans for an even bigger year in 1943. We salute your willingness and ability to increase production in spite of the shortage of farm labor—your contribution to the war effort in both manpower and produce. The service you are rendering your country's home front will not be forgotten.

These farmers who have electric service know the advantages it brings them in times like these. To them it was a great convenience in peace time —an essential today.

MANITOBA POWER COMMISSION

20 Sask. Ave. Phone 600
SERVING 151 CITIES, TOWNS AND VILLAGES

Electricity helped to improve the efficiency of operations on farms in Manitoba, as well as to improve the lifestyle of farm families.



An MPC business representative (with hand on the motor) explained the workings of an electric motor at a Field Day in 1948. Farmers quickly created new ways of using electric motors to lessen their workloads.

1949 MANITOBAHYDROELECTRIC BOARD DEVELOPMENT ACT was passed.

Following the Hogg Report, WECO., CityHydro, MPC, and the Government of Manitoba finally agreed that the future power requirements of the province would be best served by a coordinated policy on developing and supplying electrical energy. In the absence of any immediate reorganization plan of the province's electrical industry, the end result of that decision was the formation of the Manitoba Hydro-Electric Board (MHEB) as an agency of the provincial government. The first responsibility of MHEB was to proceed immediately with the construction of a hydroelectric generating station at Pine Falls on the Winnipeg River.

Making farm work easier and life more comfortable

The Farm Electrification program, introduced by the Manitoba Power Commission (MPC), greatly increased a farmer's productivity and made his life and that of his family much more comfortable.

Hen house lighting lengthened winter days allowing flocks to eat more and therefore lay more eggs. Electric pumps helped keep water running for livestock. Electric motors could power threshing and grain handling machinery. Electric yard and shed lights extended the farmer's days. For the farm wife, the convenience of electric appliances, running water, and sewage systems lightened her workload.



No more would farm families have to take the term "candle power" literally for reading and bookkeeping. Electricity replaced kerosene and oil for lighting and heating, and wood for cooking. Instead of relying on dugouts in the ground, or root cellars, or ice boxes to preserve food, refrigerators and freezers were used. In fact, farmers and their families often developed new, labour-saving machines themselves once electricity was connected to their farms. Homemade electric lawn mowers, wood splitters and other pieces of equipment were developed by innovative minds.

Utility field day on a farm near Hamiota during the summer of 1948. The men learned about the benefits of using electricity to help them with their chores, while the women went indoors to learn from an MPC home economist about the benefits of modern electric appliances.

It was an exciting time for farm families and for MPC employees alike. Margaret Shaw, who worked as an MPC Home Economist from 1950 to 1952, remembered, "It was an incredibly exciting time for us, and we really felt we were doing something that would help people. We would set out on two-week-long field trips in two big trucks filled with electric appliances, and each day we would set up on someone's farm. The people would come from all around to see us demonstrating the equipment. The men would go out to the barn, and the women would come into the kitchen to see how electric equipment and appliances could be used on the farm."

From the time of its inception in 1919, MPC had been trying to distribute electricity to rural towns and farms. Some farms had been connected to the electrical system in the early twenties — at great expense to the farmers themselves. The electrical service was uneconomical for MPC to provide because those farms connected did not use enough electricity to justify the connection. Efforts to bring electricity to the farms ended in the late twenties when farmers were unable to pay their electricity bills due to drought conditions and the Depression.

As farmers in Manitoba struggled back to financial stability after about 10 years of drought and depressed economic times, World War II began. Their recovery was jeopardized when productivity dropped. Young farm workers went into the armed services, and those who remained at home and needed help to maintain viable farms realized that electricity could assist in making up for the shortage of farm workers. Farmers from all over Manitoba petitioned the provincial government to provide them with electrical service.

Even with the war going on and with shortages of materials needed for constructing transmission lines, the government listened. In 1942, the Manitoba Farm Electrification Enquiry Commission was asked to look into the feasibility of starting Farm Electrification after the war. The Commission recommended that a Farm Electrification program be

designed, through which about 90 per cent of all farms in Manitoba — that is, those within a practical service area — be connected to the provincial power system. The Farm Electrification program was born.

By the time the program ended in 1954, Manitoba had the distinction of being western Canada's most completely electrified province. This historic accomplishment is amazing, considering the fact that only about 1,000 of 50,000 farms in Manitoba enjoyed the benefits of electrical service in 1942.

Economics was one of the key reasons for the success of the program. The line extensions would be free of cost to the farmer, who would pay only for wiring in his building and power consumption costs. The minimum monthly bill would be about \$3.60. This was not entirely an additional expense, because over half of the \$3.60 replaced other costs, such as coal-oil for lamps and radio battery charging.

In addition to extension lines being built free of charge to the farmer, another economic advantage was being able to use the provincial power system — built for delivering electricity to the towns and villages during the 1920s and 1930s — as a foundation on which to build electrical service for farms.

Technology also played a role in the success of MPC's Farm Electrification program in two ways. One was that new materials and construction methods reduced the cost of erecting lines over vast areas. The other was the development and growing acceptance of home electric appliances, which meant the assurance of greater revenue from electrical service for farms than was previously possible.

The actual execution of the program was a tremendous example of cooperation between municipalities, their citizens, and MPC. It began with a trial survey being conducted in a typical municipality in 1943. The following year, 15,000 farmers were contacted through municipal councils and local Farm Electrification committees. In each area to be served, the local groups provided detailed information about each farm. Those who were most anxious to have the benefits of electrical service persuaded their neighbours to sign up for electricity so the minimum number of contracts required for electrical service to their area could be attained quickly.

The next step was to provide farmers with basic information about wiring homes and buildings. "Wire once, not once a year" was the advice given, in order that each farmer would have his buildings adequately wired to reap the full benefits of electrical service.

The success of Farm Electrification changed life on the farm forever — and for the better.

No matter what the terrain was like, line crews worked in all types of conditions to construct transmission and distribution lines for the Farm Electrification program.



A New Dynasty Forms



Pine Falls Generating Station on the Winnipeg River was the first project to be undertaken after the Manitoba Hydro-Electric Board Development Act was passed.

1951

THE MANITOBA HYDRO-ELECTRIC BOARD'S FIRST MEMBERS were appointed on May 18 — the date that has gone on record as the beginning of MHEB as a separate entity. From 1949 until 1951, the provincial Department of Mines and Natural Resources had conducted MHEB business on an interim basis.

PINE FALLS GENERATING STATION, built by MHEB on the Winnipeg River at Pine Falls, went into service. The first power project to be developed under the Manitoba Hydro-Electric Board Development Act of 1949, the construction of Pine Falls was initiated by the provincial Department of Mines and Natural Resources, acting on behalf of MHEB. Six units were installed during the fiscal year of 1951-52 for a total capacity of 82 MW.

PINAWA GENERATING STATION, the first hydroelectric plant on the Winnipeg River, was dismantled after 45 years of continuous service. It was retired to provide a more efficient use of water flows at Seven Sisters Generating Station, which was completed in 1952.

1952

THE MANITOBA POWER COMMISSION (MPC) ACQUIRED the transmission and distribution facilities of the National Utilities Corporation Limited, which supplied electricity to six towns and villages located in the Swan River Valley.

THE PROVINCIAL GOVERNMENT AUTHORIZED MHEB TO NEGOTIATE WITH WINNIPEG ELECTRIC COMPANY (WECO.) SHAREHOLDERS in order to acquire control and operation of WECO's generation and distribution assets. The negotiations culminated in a formal offer on October 28, which WECO accepted.

On November 30, WECO transferred its gas and transit assets to two newly incorporated companies. Its gas assets to Greater Winnipeg Gas, and its transit assets to Greater Winnipeg Transit Company.

In the early 1950s, MPC crews used modern vehicles and communicating equipment to bring electricity to farms as quickly as possible.



1953

MHEB AND WECO. amalgamated. By April 4, all issued and common shares of WECO. came under the ownership of MHEB. In other words, WECO. remained in business as a power generation and distribution utility only, with MHEB in control.

1954

FARM ELECTRIFICATION MILESTONE was reached on October 22 when MPC connected its 100,000th customer. By this date, the Farm Electrification program was virtually completed, with about 75 per cent of all farms in Manitoba having electrical service.

McARTHUR GENERATING STATION went into service as the second power project undertaken by MHEB. Eight units were installed during 1954 and 1955 for a total capacity of 56 MW. Its construction marked the end of hydroelectric development on the Winnipeg River. Although McArthur is the smallest generating station on the Winnipeg River, it also has the distinction of being the largest in the world operating with such a low head (waterfall) — seven metres.

1955

THE TRANSFER OF WINNIPEG'S DISTRIBUTION PROPERTIES occurred under the terms of an agreement reached between MHEB, MPC, and the City of Winnipeg Hydro Electric System (City Hydro) whereby:

1) all distribution properties in the suburbs owned by City Hydro were sold to MPC, which became the sole distributor of electrical energy in suburban Winnipeg and the rest of the province;

2) all distribution properties in the City of Winnipeg owned by the former WECO. were sold to City Hydro which then became the sole distributor within the boundaries of the City of Winnipeg as they existed at that time.

Under the terms of the agreement, MHEB would supply the additional power requirements of City Hydro. The two systems were interconnected at the Mill Street terminal station in Winnipeg.



In 1954, MPC celebrated connecting the 100,000th customer to the provincial power system through the Farm Electrification program.



McArthur Generating Station was the second power project built by MHEB, and was the last plant to be constructed on the Winnipeg River.



Brandon Generating Station was MHEB's first thermal (coal burning) generating station. With a capacity of 237 MW, it was designed to supplement the hydroelectric generating stations during periods of extreme drought.

1956

FIRST INTERCONNECTING TRANSMISSION LINE went into service October 25 between Manitoba and Ontario for the exchange of power. The transmission line from Seven Sisters to Kenora connected the northwestern system of Ontario Hydro and the southern system of MHEB. The two utilities have subsequently signed many power exchange agreements.



The flood of 1950 was a major disaster for all those who lived in the Red River valley. This photo features the approach to the Norwood Bridge looking toward downtown Winnipeg. Every able bodied person pitched in to help authorities battle the flood waters. Trolley buses, like the one pictured, were rapidly taking over from streetcars as the main vehicle for public transportation at that time.

STUDIES OF LAKE WINNIPEG AND LAKE MANITOBA were undertaken after the governments of Manitoba and Canada entered into an agreement to carry out a flood control survey of the lakes and all waters flowing into them. The study was carried out by an appointed agency known as the "Lakes Winnipeg and Manitoba Board". The Board's report in 1958 affirmed that regulation of the lakes would be advantageous to the development of potential generating sites on the Nelson River.

more populated southern areas of the province. The take-over at The Pas was the first step north of the 53rd parallel and the start of a new chapter in the history of electrical power development in Manitoba.

1957

BRANDON GENERATING STATION, the first coal-burning generating station built by MHEB, went into initial service December 18 with one 33-MW unit. Three more units, each rated at 33 MW, were added in 1958. In October 1970, the installation of a 105-MW unit was completed, bringing the total capacity to 237 MW. The thermal generating station is located on the eastern edge of the City of Brandon.

1959

MPC DISCONTINUED ITS APPLIANCE SALES after being in the retail business for almost 40 years. Electric appliance sales had been an integral part of MPC's load building program ever since the early 1920s, when all-out efforts were made to promote the use of electricity. However, by the 1950s, with many retailers now carrying electric appliances, it was no longer practical for MPC to continue in the business.

MPC PURCHASED THE CRANBERRY PORTAGE DISTRIBUTION SYSTEM, the privately owned electrical distribution system serving the northern community of Cranberry Portage. Diesel generation power was supplied under special arrangements with the Department of National Defence. Then, in 1964, MPC installed its own diesel generating station. In September 1976, Cranberry Portage was connected to the provincial power system.

MPC PURCHASED THE TOWN OF SELKIRK'S electrical distribution system.



1958

MPC'S FIRST MOVE NORTHWARDS WAS PURCHASE of the diesel generation facilities and distribution system of The Pas Electrical Utility. Until then, activities were for all practical purposes confined to the



For many years, MPC sold electric appliances in its showroom in downtown Winnipeg. This was how it appeared in the 1930s.

Electrical industry at the crossroads

After World War II, the economy of Manitoba began to expand following the Depression years and war-time shortages. This economic expansion, plus the fact that Farm Electrification was extending electrical service throughout the province, meant that existing generating capacity would quickly become inadequate.

Realizing this, the three major electrical utilities in the province, the City of Winnipeg Hydro Electric System (City Hydro), the Winnipeg Electric Company (WECO.), and the Manitoba Power Commission (MPC), met with the provincial government in 1949. All parties agreed that the future power needs of Manitoba would be best served by a coordinated policy for developing and distributing electricity. To carry out this policy, the Manitoba Hydro-Electric Board (MHEB) was formed by the Government of Manitoba.

In the words of the Manitoba Hydro-Electric Board Development Act, MHEB was “to provide for the continuance of a supply of power adequate for the needs of the province, and to promote economy and efficiency in the generation, distribution, and supply of power”.

Initially, the affairs of MHEB were the responsibility of the provincial Department of Mines and Natural Resources. The first task was to build Pine Falls Generating Station on the Winnipeg River to meet the growing electricity needs of the province. On May 18, 1951, the first MHEB members were appointed, and that date was considered as the beginning of MHEB’S existence as a separate entity from government departments. The members were: Messrs. D. M. Stephens (Chairman and General Manager), W.D. Fallis, J.W. Sanger, D.A. Thompson, and A.H. Watson. Mr. George Reid was appointed as Acting Secretary.

Their first task was to consolidate the generation and distribution facilities in Manitoba — a task which would ultimately take about 10 years to complete. During 1952-1953,



Members of MHEB, MPC, and WECO. sign the agreement for the purchase of WECO.'s distribution properties by MHEB. In front (left to right) are Messrs. W.D. Fallis, D.M. Stephens, and G.E. Sharpe. In the back row (left to right) are Messrs. George Reid, Ray Wildgoose, T.E. Storey, A.W. Wrighton, J.R. McInnes, W. Fraser, J.W. Sanger, and A.H. Watson.

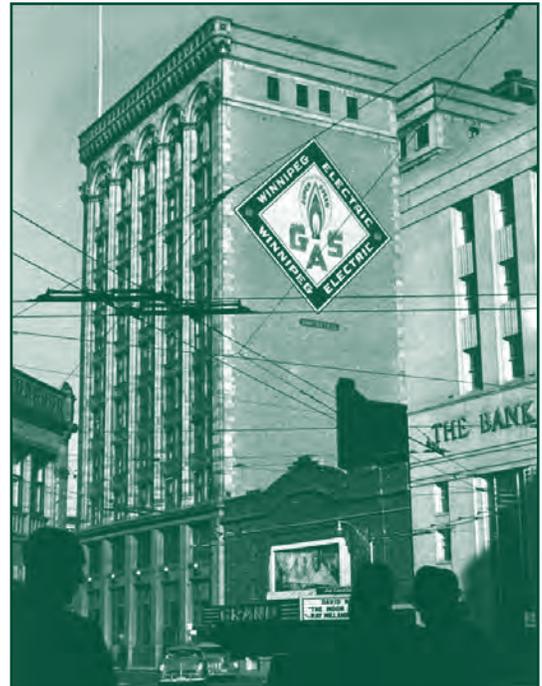


District crews gathered in 1959 to perform the task of tightening hardware along the Glenboro to Treherne line.

MHEB acquired the generation and distribution facilities of WECO., reducing the number of electrical utilities in Manitoba to three — MHEB and MPC, which were owned by the provincial government, and City Hydro, which was owned by the City of Winnipeg.

In 1955, the next step in the consolidation process took place. Agreement was reached between MHEB, MPC, and City Hydro, whereby MPC became the sole distributor of electricity in suburban Winnipeg and the rest of Manitoba, while City Hydro became the sole distributor within the boundaries of the City of Winnipeg. Also through this agreement, MHEB promised to supply the additional power requirements of City Hydro.

Ten years later, the two provincially owned utilities, MHEB and MPC, were amalgamated via the Manitoba Hydro Act, which was passed by the Manitoba legislature on April 1, 1961.



The 11-storey Electric Railway Chambers at the corner of Notre Dame Avenue and Albert Street in Winnipeg in the early 1950s. From the turn of the century, through all of the Winnipeg Electric Company's name changes, this building stood as a symbol of the company's vast transportation and energy empire (gas and electricity). The empire was split apart in April 1953. MHEB then controlled the generation and distribution of electricity, and the Winnipeg and Central Gas Company and the Greater Winnipeg Transit Company controlled the gas and transportation facilities respectively.

The Birth of Manitoba Hydro, and Northern Expansion

1960

KELSEY GENERATING STATION, THE FIRST HYDRO-ELECTRIC PLANT TO BE DEVELOPED on the Nelson

River in northern Manitoba, went into service on June 23. The generating station was built by the Manitoba Hydro-Electric Board (MHEB) to supply the power requirements of the International Nickel Company's townsite and mining, smelting and refining operation in Thompson. The original installation of five, 32-MW generators was completed in 1961. Between 1969 and 1972, two more units were added, bringing the total capacity to 224 MW. The operating head, or waterfall, at Kelsey was 16.2 m.

THE MANITOBA POWER COMMISSION (MPC) assumed responsibility for the distribution of electricity in the town of Churchill, which had been supplied previously by the National Harbour Board from its elevator operations. MPC used power secured from the federal government's military diesel generating station at Fort Churchill — that is until the responsibility for producing power was taken over by Manitoba Hydro in 1968.

FIRST MANITOBA TO SASKATCHEWAN INTERCONNECTION went into service on November 29 by means of a 138-kV transmission line between Brandon Generating Station and Saskatchewan Power Corporation's Boundary Dam Thermal Generating Station near Estevan. The line was to be increased to 230 kV in 1968. Subsequent agreements have since been made between the two provinces.

SELKIRK GENERATING STATION, the second coal-fired plant built by MHEB, started delivering power on October 1 with the first of its two 66-MW steam turbine generators. It is located in East Selkirk, which is about 20 km northeastwards of Winnipeg. In 1967, the first of two gas turbines, each capable of producing 12.5 MW, were added to provide additional capacity for emergencies and peak load periods. However, these jet-fueled turbines were decommissioned in 1988.

1961

FORMATION OF MANITOBA HYDRO took place when the Government of Manitoba united

the two provincial utilities, MHEB and MPC, through the enactment of the Manitoba Hydro Act, which was passed by the Manitoba legislature, effective April 1. This brought the organization of electrical utilities in the province to its present state — Manitoba Hydro being responsible for providing electrical service throughout Manitoba, except for the central portion of the City of Winnipeg, which is serviced by Winnipeg Hydro.



Kelsey Generating Station was the first Manitoba Hydro power plant to be built on the Nelson River.

Calendar of communities served by the Manitoba Power Commission, 1920 to 1961

During this 41-year period, MPC and MHEB were united and Manitoba Hydro was formed, 523 communities were connected to the provincial power system.

1920	Portage la Prairie	1949	Broad Valley, Chatfield, Dunnottar, Fisher Branch, Melbourne, Mentmore, Pleasant Point, Poplarfield
1921	Carman, Minnedosa, Morden, Roland, Virden	1950	Amaranth, Argyle, Ashern, Ashville, Bannerman, Bede, Bield, Broomhill, Caliento, Camper, Dand, Deepdale, Deleau, Eastdale, Endcliffe, Eriksdale, Ethelbert, Faulkner, Firdale, Fork River, Gardenton, Garland, Gnadenthal, Grahamdale, Grosse Isle, Gypsumville, Helston, Hilbre, Lake Francis, Langruth, Landseer, Lavinia, Lundar, Magnet, Makaroff, Marchand, Mayfeld, Menesino, Moline, Moosehorn, Mulvihill, Pine Creek, Pine River, Ridgeville, Rorketon, Roseisle, Rosser, Ste-Amelie, St-Laurent, St-Martin, Sarto, Shevlin, Shortdale, Spearhill, Steeprock, Stephenfield, Stuartburn, Tenby, Tolstoi, Two Creeks, Vita, Waldersee, Warren, Winnipegosis, Woodlands
1922	Elm Creek, Oakville	1951	Alonsa, Bellevue, Blumenfeld, Chortitz South, Cook's Creek, Cromer, Deerhorn, Domain, Fredensruch, Halbstadt, Haskett, Hochfeld, Katrime, Kirkella, Lac du Bonnet, Ledwyn, Libau, Meadows, Middlebro, Muir, Neuenberg, Norgate, Osterwick, Poplar Park, Regent, Reinland, Rosengart, Rossendale, Sattel, Scarth, Schanzenfeld, South Junction, Sprague, Stockton, Terence, Uno, Vassar, Vidir, Wampum, Woodnorth, Woodside
1923	Newton Siding	1952	Barnsley, Blumenort, Butler, Coulter, Dauphin Beach, Ebor, Ewart, Findlay, Grande Clairière, Hilton, Kelloe, Ladywood, Lakeland, Methley, Mountain Road, Mountainside, Neuhorst, Olha, Polonia, Rosenort, San Clara, Schoenwiese, Solsgirth
1925	Homewood, Miami, Myrtle, Rosebank, Sperling	1953	Beaconia, Benito, Birdtail, Bowsman, Dencross, Durban, East Braintree, Glencairn, Grand Beach, Grand Marais, Green Oak, Greenwald, Gull Lake, Hadashville, Harrowby, Kenville, Lavenham, Lydiatt, Malonton, McMunn, Millwood, Minitonas, Mink Creek, Ochre Beach, Overstoneville, Powerview, Rackham, Rhodes, Rosa, Roseau River, Ross, St-Georges, St-Ouens, Senkiw, Silver, Silverwood, Stead, Swan River, Thalberg, Valley View, Venlaw, Vivian
1926	High Bluff	1954	Birch River, Clarkleigh, Cowan, Dufresne, Fishing River, Greenridge, Hecla Island, Lido Plage, Marco, Molson, Pratt, Rosewood, Sandy Lake Beach, Toutes Aides, Ukraina, Victoria Beach, Woodmore, Worby
1927	Altamont, Cardinal, Crystal City, Cypress River, Darlingford, Glenboro, Holland, La Rivière, Manitou, Notre Dame, Pilot Mound, Rathwell, Somerset, Swan Lake, Treherne	1955	Albert Beach, Bellsite, Hanover, Camperville, Erinview, Kronsgart, Mafeking, Metigoshe Beach, Narcisse, Novra, Reeder, Rennie, St-Ambroise, Sandy Hook, Woodridge
1928	Winkler	1956	Assiniboia, Brooklands, Carrick, Charleswood, East Kildonan, East St. Paul, Fort Garry, Loni Beach, North Kildonan, Old Kildonan, Reeve, St-Vital, Transcona, Tuxedo, West Kildonan, West St. Paul
1929	Baldur, Boissevain, Cartwright, Elkhorn, Killarney, Melita, Pipestone, Reston, Wawanesa	1957	Bird's Hill, Emerson, Falcon Lake, Glenlea, Lockport, Sewell, West Hawk Lake
1930	Arrow River, Binscarth, Birtle, Brandon, Crandall, Foxwarren, Gilbert Plains, Gimli, Grandview, Holmfield, Miniota, Starbuck, St. Lazare, Winnipeg Beach	1958	Beausejour, Jordan
1931	Bradwardine, Harding, Kenton, Lenore, Napinka, Teulon, St-Claude	1959	The Pas
1932	Gladstone	1960	Cranberry Portage, Glass Siding, Hazelglen, Melrose, Thompson
1933	Elie	1961	Churchill
1934	Austin, MacGregor, Ninga		
1935	Altona, Dominion City, Graham Siding, Gretna, Horndean, Letellier, Morris, Oak Lake, Plum Coulee, Rosenfeld, St-Eustache		
1936	Alexander, Belmont, Beulah, Decker, Dunrea, Elgin, Fairfax, Griswold, Hamiota, Isabella, Margaret, Minto, Ninette, Shoal Lake, St-Francois-Xavier, St-Joseph		
1937	Elma, Whitemouth		
1938	Balmoral, Bruxelles, Cardale, Clearwater, East Selkirk, Garson, Gonor, Gunton, Lorette, Mariapolis, Mather, McConnell, Newdale, Oakburn, Oak River, Rossburn, St-Alphonse, Ste-Anne, St-Jean-Baptiste, Steinbach, Strathclair, Tyndall, Vista		
1939	Angusville, Basswood, Carberry, Carroll, Culross, Douglas, Fannystelle, Forrest, Hartney, Haywood, Manson, McAuley, Nesbitt, Niverville, Otterburne, St-Adolphe, Ste-Agathe, St-Malo, St-Pierre-Jolys, Silverton, Souris, Thornhill		
1940	Russell		
1941	Birnie, Eden, Franklin, Kelwood, Laurier, Makinak, McCreary, Ochre River, Riding Mountain, Ste-Rose-du- Lac		
1943	Rivers		
1944	Aubigny, Dauphin, Neepawa, Ste-Elizabeth, Underhill		
1945	Fortier, Greenway, Hargrave, MacDonald, Upper Seven Sisters		
1946	Anola, Arborg, Arden, Arnaud, Bethany, Blumenort South, Brookdale, Brunkild, Camp Morton, Carey, Chater, Claudeboye, Clanwilliam, Dufrost, Dugald, Elphinstone, Elva, Erickson, Giroux, Glenella, Glenora, Île-des-Chenes, Justice, Kane, Keyes, La Broquerie, La Rochelle, La Salle, Lowe Farm, Menzie, Moorepark, Neelin, Netley, Oakland, Oberon, Ogilvie, Petersfield, Pierson, Plumas, Poplar Point, Rapid City, Richer, Riverton, Sandy Lake, Sanford, Sydney, St-Léon, Wellwood, Westbourne, Wheatlands, Willen		
1947	Arnes, Cordova, Cracknell, Deloraine, Delta, Dropmore, Gregg, Grunthal, Hazelridge, Hnausa, Ingelow, Inglis, Kaleida, Komarno, Lyleton, Magnusson, New Bothwell, Oakbank, Oak Bluff, Reinfeld, Roblin, Shellmouth, Sifton, Sinclair, Springsstein, Stonewall, Stony Mountain, Valley River		
1948	Bagot, Beaver, Beresford, Carlowrie, Chortitz, Cloverleaf, Dacotah, Edwin, Fraserwood, Goodlands, Graysville, Harte, Inwood, Kemnay, Lauder, Lena, Marquette, Medora, Meleb, McTavish, Oakner, Onanole, Osborne, Pope, Purves, Reaburn, Rosenort, Rounthwaite, Silver Plains, Snowflake, St-Lupicin, Tilston, Treesbank, Wakopa, Waskada, Whitewater, Woodbay		

Selkirk Generating Station was completed in 1961.



1963 STUDY OF THE HYDRO-ELECTRIC POTENTIAL OF THE NELSON RIVER began.

On February 18, the province of Manitoba entered into an approximately \$1.3-million cost-sharing agreement with the Government of Canada to investigate the feasibility of hydroelectric development on the Nelson River. A Nelson River Programming Board was set up to carry out the investigations. Its report, tabled in the Parliament of Canada and in the Manitoba legislature in 1964, led to a second agreement for a further \$3-million study that was to be completed by 1966.

Also in 1963, Manitoba Hydro, in agreement with both levels of government, commissioned G.E. Crippen & Associates to investigate the economic feasibility of developing hydroelectric generating stations on the lower Nelson River, which is the stretch of the Nelson River from Split Lake to Hudson Bay.

NORTHERN COMMUNITIES SERVED BY DIESEL GENERATION. Norway House in northern Manitoba received power for the first time by means of an independent diesel generating station. The community was connected to the provincial power system 10 years later.

The 910-kW diesel generating station at Norway House was one of Manitoba Hydro's largest diesel facilities.



Norway House was the first native community to receive electrical service under a Northern Electrification program — a program that is still going on in cooperation with the federal Department of Indian Affairs and Northern Development. Since the program began, several communities served by diesel generating stations have had their electrical services upgraded, while others have been transferred from diesel generation to the provincial power system as a result of expanding transmission line facilities in the north.

1964 MANITOBA HYDRO AND THE MID-CONTINENT AREA POWER PLANNERS (MAPP)

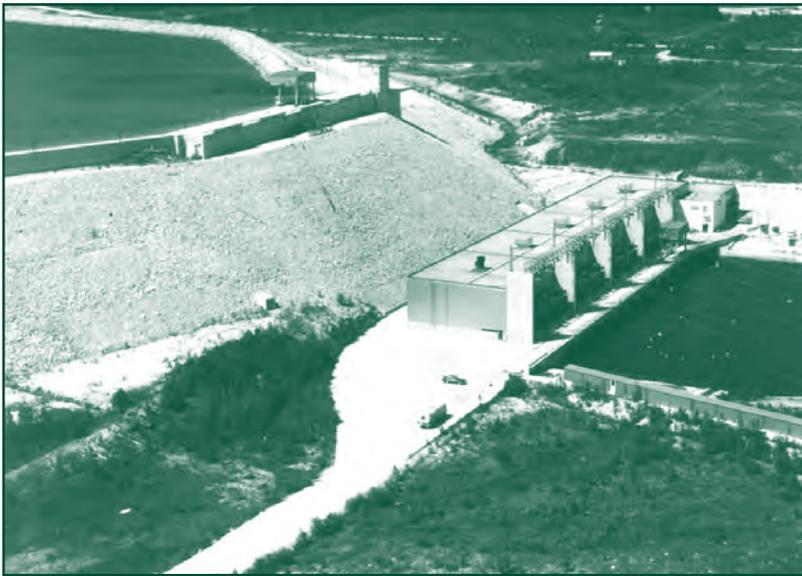
signed a memo of understanding for possible interconnecting transmission lines to carry large-scale exchanges of power to U.S. utilities. At this time, MAPP consisted of 22 public and investor owned electrical utilities operating in the central and northcentral states.

CITY HYDRO, the name commonly used over the years to identify the City of Winnipeg Hydro Electric System, was changed to Winnipeg Hydro.

1965 GRAND RAPIDS GENERATING STATION, located on the Saskatchewan River about four kilometres from Lake Winnipeg,

was officially opened on November 13. Its three units produced a total capacity of 330 MW. The generating station was re-rated to 339 MW in 1966, and to 354 MW in 1967. In 1968, the final unit was placed in service bringing the total capacity to 472 MW. Grand Rapids operated with a 36.6-m head, or waterfall — the largest in Manitoba. The giant Kaplan turbines and generators at Grand Rapids were the largest installed in North America for this size of operating head.

One of the most challenging problems in developing the forebay at Grand Rapids was the prevalence of limestone and dolomite in the region. To prevent water from seeping out of the storage area through numerous crevices and separations found in limestone, it was necessary to form an underground seal beneath the dykes. Over 99,909 tonnes of cement were used in the sealing or “grouting” program, one of the largest of its kind ever attempted in the world.



Grand Rapids Generating Station on the Saskatchewan River was completed in 1968. It is Manitoba Hydro's only generating station on the Saskatchewan River.

1966 **DEVELOPMENT OF THE NELSON RIVER** was started. As a result of the Nelson River Programming Board's investigations that began in 1963, the federal and provincial governments entered into an agreement February 15, 1966, to jointly undertake the development of the hydroelectric potential of the Nelson River.

The federal government's participation in the program was to finance direct current transmission line facilities for bringing power from northern Manitoba to the southern areas. Atomic Energy of Canada Limited was assigned to act as the federal government's agency in the construction of the line.

Manitoba Hydro was to repay the federal government over a period of 50 years. In 1992, Manitoba Hydro bought out the remaining years of the financing arrangement.

With the agreement in place, Manitoba Hydro began to develop the site on the Nelson River where Kettle Generating Station was to be built.

1967 **NELSON POWER CONNECTED TO THE PROVINCIAL POWER SYSTEM**

with the completion of a 230-kV transmission line between Kelsey Generating Station on the Nelson River and Grand Rapids Generating Station on the



Manitoba Hydro's High Voltage Direct Current transmission lines, which follow a route almost 900 km long, are among the world's longest.

Saskatchewan River. The 328-km line was built primarily to supply International Nickel's new Soab Lake mine 75 km southwest of Thompson.

1968 **FIRST GENERAL RATE INCREASE** in 57 years went into effect for all meter readings taken after July 15. The increase was required to raise \$3.3 million in additional annual revenue, needed to maintain financial reserves. In addition to increasing Manitoba Hydro's total revenue by six per cent, the new rate schedule reduced variations in rates.

THE PAS DIESEL GENERATING STATION was retired when the town was connected to the provincial power system by means of the new 230-kV and 115-kV transmission lines from Grand Rapids. The generating station — which had served the community since 1914 and was taken over by MPC in 1958 — was subsequently retired.

MANITOBA HYDRO ACQUIRED THE CHURCHILL DIESEL GENERATING STATION from the federal Department of Public Works. Since 1960, the utility had been responsible for only the distribution of power in the town.

1969 **NORTHERN MICROWAVE SYSTEM** was completed when the final link in a 1,011-km-long microwave system from Winnipeg to Gillam was finished. A joint venture of the Manitoba Telephone System and Manitoba Hydro, the system was designed primarily for controlling the DC transmission of Nelson River power to the south. In addition, the microwave system improved north to south telecommunications, and brought live television to northern residents.

The microwave system follows a route northward through the Interlake area to Grand Rapids, then heads northeast via Thompson to Gillam, where it terminates at Manitoba Hydro's Radisson Converter Station.

A second microwave system, following a route on the east side of Lake Winnipeg, was completed in 1977.

Manitoba Hydro created



Through the passage of the Manitoba Hydro Act in 1961, the utility was set up as a Crown Corporation — an agency of Her Majesty the Queen through which the Government of Manitoba provides power to meet the electricity needs of the province. As a Crown Corporation, Manitoba Hydro is a commercial organization in its own right. It is a publicly owned utility that is responsible to the provincial government, but operates as a separate entity. The people of the province are the shareholders of the utility. They are also its customers.



Manitoba Hydro submits quarterly financial statements and an annual report to the Manitoba legislature rather than to a meeting of shareholders. The Manitoba legislature refers the documents to the standing Committee on Public Utilities and Natural Resources.

The provincial government has three main methods for controlling Manitoba Hydro's policy and its activities: through the appointment of the members of the Manitoba Hydro-Electric Board (MHEB); the utility's limit to capital borrowing is, from time to time, set by legislation; the requirement that certain extraprovincial electricity sales require cabinet approval. Also, Manitoba Hydro is subject to several licensing requirements of the provincial government.



Early symbols of Manitoba Hydro included two versions of the character Alec-tricity and the first corporate logo. Alec was out of a job when the three-pronged plug was introduced and the original logo was retired in 1974.



Mr. D.M. Stephens was the first Chairman of MHEB after the passage of the Manitoba Hydro Act.



Mr. W.D. Fallis was the first General Manager of Manitoba Hydro.



Manitoba Hydro took delivery of a new mobile substation manufactured by Federal Pioneer Limited of Winnipeg. Mobile substations were used in emergency situations and as substitutes for regular substations undergoing repairs or maintenance.

A Period of Growth and Change

1970

KETTLE GENERATING STATION was the second hydroelectric generating station to be developed on the Nelson River and the largest in Manitoba at that time. Located about 6.4 km downstream from the community of Gillam and 712 km by air from the City of Winnipeg, Kettle's first turbine generator (unit) went into service four months ahead of schedule. Harnessing a 30-m head, or waterfall, the generating station was designed for 12 units, each with a capacity of 106 MW. Kettle was completed in November 1974 with a total capacity of 1,272 MW.

U.S. TO MANITOBA POWER EXCHANGE was approved by the National Energy Board. The Board granted Manitoba Hydro a permit to establish an interconnecting transmission line with three midwestern utilities in the U.S. The 232-km-long, 230-kV transmission line stretches from Winnipeg to Grand Forks, North Dakota. It was completed and placed in service in July for a power exchange with the Northern States Power Company of Minneapolis, Otter Tail Power Company of Fergus Falls, and Minnkota Power Co-operative Inc. of Grand Forks. The line cost \$7.7 million, with Manitoba Hydro's share amounting to about \$2 million.

TWO LAURIE RIVER GENERATING STATIONS OFFICIALLY TAKEN OVER on June 1 by Manitoba Hydro from Sherritt Gordon Mines Limited. Located about 64 km south of Lynn Lake in northwestern Manitoba, the two originally went into operation in 1952 and 1958 respectively to supply Sherritt Gordon's mining operations in the area. The generating stations, with a total of three units, produce a combined capacity of 10 MW. Laurie II Generating Station is operated by remote control from Laurie I Generating Station. The operating head is 16.8 m.

In conjunction with the Laurie River take-over, a 213-km-long, 138-kV transmission line was constructed from Thompson to connect the two generating stations and the community of Lynn Lake to the provincial power system.

DEVELOPMENT OF LAKE WINNIPEG REGULATION PROJECT BEGAN, under the terms of an agreement between the province of Manitoba and the Government of Canada, reached in February 1966. Manitoba Hydro was authorized to proceed with a plan for Nelson River development which included using Lake Winnipeg as a reservoir. The Lake Winnipeg Regulation project entailed excavating channels to increase the natural outflow capacity of the lake, and building a

Kettle Generating Station, with a total capacity of 1,272 MW, was completed in 1974. It was named for the Kettle Rapids on which it was built. Kettle is about 3 km upstream of the town of Gillam, which is located near the Nelson River.



control structure to regulate this outflow. Jenpeg Generating Station and the Control Dam were built at the point where the west channel of the Nelson River flows into Cross Lake. Regulation guaranteed adequate minimum flows for hydroelectric generating stations on the Nelson River, according to the plan.



Dorsey Converter Station is located 26 km northwest of the City of Winnipeg in southern Manitoba.

1971

THE NELSON RIVER HIGH VOLTAGE DIRECT CURRENT LINE

was first energized. The HVDC transmission line carrying power from the generating stations built on the Nelson River was constructed by Atomic Energy of Canada Limited under the federal-provincial agreement of 1966.

Known as Bipole 1, the transmission line began carrying power in June 1972. Bipole 1 now operates at 900 kV (± 450 kV nominal). The Bipole 2 line was built later, in 1978.

DORSEY AND RADISSON CONVERTER STATIONS began operating. The construction of Dorsey Converter Station actually started in 1968, but the facility didn't become operational until 1971 with the completion of Bipole 1. Located near the town of Rosser, which is 26 km northwest of Winnipeg, Dorsey acts as the southern terminus of the HVDC transmission lines. The power produced as alternating current (AC) at the generating stations on the Nelson River is converted to direct current (DC) at Radisson for transmission to Dorsey.



Radisson Converter Station is located near the Nelson River in northern Manitoba.

When the DC power reaches Dorsey, it is converted once again to AC for distribution to the provincial power system.

1972

THE SECOND MANITOBA TO ONTARIO INTERCONNECTING TRANSMISSION LINE

was placed in service. The 230-kV transmission line, which connected Manitoba Hydro's Whiteshell facility near Seven Sisters with Ontario Hydro's terminal station near Kenora, began transmitting power in October. The line was constructed to meet the terms of an agreement reached in 1971. This replaced the original 1956 agreement between the two utilities. Under the new agreement, Manitoba Hydro would sell Ontario Hydro over \$26 million worth of electricity by April 1978. In 1974, a new power exchange agreement would be made for the sale of \$47 million worth of surplus electricity.

SECOND MANITOBA TO SASKATCHEWAN INTERCONNECTING TRANSMISSION LINE was completed via a 176-km, 230-kV transmission line between Dauphin, Manitoba, and Yorkton, Saskatchewan. An intermediate station was located at Roblin, Manitoba. The interconnection, permitting a power exchange of up to 150 MW, was built in accordance with an agreement made between the two utilities in 1970.



REGIONALIZATION—A NEW ORGANIZATION PLAN adopted by Manitoba Hydro — was designed essentially to decentralize certain Head Office functions, bringing about a more effective customer service. The plan became fully operational by April 1973.

Prior to regionalization, the province was divided into 12 service areas (reduced in 1972 to 11) with offices that provided administration for the local District Offices. The Area Managers reported directly to the Field Operations Division at Head Office in Winnipeg.

Under regionalization, the province was initially divided into three geographic regions: Eastern, Western and Central. The Area Managers in each region reported directly to their respective Regional Directors. Each region was responsible for planning, designing, constructing, operating and maintaining the electrical distribution system within its respective area, and for ensuring reliable and efficient customer service.

Overall system planning and design, power generation, and major construction projects remained the responsibility of staff at Head Office.



THE RATE EQUALIZATION PLAN — DEVELOPED by Manitoba Hydro and Winnipeg Hydro to equalize rates for customers residing in Unicity Winnipeg — was approved by the Winnipeg City Council on June 21 and became effective on August 1. The equalization of rates was required by an Act of Legislature (City of Winnipeg Act) of July 30, 1971, which among other things required that the rates for electricity of both utilities be the same for customers living within the boundaries of the area known as Unicity.



Laurie River I Generating Station, with a capacity of 5 MW, was completed in two stages — the first in 1952, the second in 1970.

LAST INDEPENDENT ELECTRICAL SYSTEMS IN THE PROVINCE joined Manitoba Hydro when the utility assumed responsibility for the northern communities of Flin Flon and Snow Lake by agreement with Hudson Bay Mining & Smelting Company Limited (HBM & S). Manitoba Hydro acquired the distribution facilities of the Northern Manitoba Power Company Limited, a subsidiary of HBM & S. The Churchill River Power Company Limited, another subsidiary of HBM & S, continued to supply the company's mines, mill, and smelter from its Island Falls Generating Station in Saskatchewan.

With the takeover of Flin Flon and Snow Lake, Manitoba Hydro assumed full responsibility for the transmission and distribution of power for all of the province, with the exception of Winnipeg Hydro's service area.

PLANNING STUDIES FOR LONG SPRUCE GENERATING STATION were completed, and the Long Spruce site, 22.4 km by road downstream from Kettle Generating Station, became accessible by an all-weather road connected to Gillam.

A NEW CORPORATE LOGO for Manitoba Hydro was designed and adopted by the utility.

MORE NORTHERN COMMUNITIES CONNECTED TO PROVINCIAL POWER SYSTEM. The communities of South Indian Lake, Norway House, and Cross Lake, served initially by diesel generation, were transferred to the provincial power system. The communities of Gods River and Shamattawa were added to the 21 isolated communities that received electrical service from local diesel generating stations.



Laurie River II Generating Station, with a total capacity of 5 MW, was completed in 1958. In 1970, Laurie River I and Laurie River II were purchased by Manitoba Hydro from Sherritt Gordon Mines Limited.

1974

MANITOBA HYDRO BEGAN NUCLEAR STUDIES. A small nuclear development department was established to begin the task of potential site identification.

1975

GRANVILLE LAKE AND PAUINGASSI SERVED BY DIESEL GENERATION while Pine Dock and Matheson Island were switched from diesel generation to the provincial power system. The capacity of diesel generation was increased at the communities of Little Grand Rapids, Red Sucker Lake, St. Theresa, and Wasagamack.

TWO OF THE THREE LAKE WINNIPEG DIVERSION CHANNELS were used for the first time. The Jenpeg Control Dam was completed late in 1975, and the completion of the remaining two-mile channel between Lake Winnipeg and Playgreen Lake was scheduled for the fall of 1976. Installation of the first bulb-type turbine generators to be used in North America was underway at Jenpeg Generating Station, with the first going into service in 1977.

1976

MAJOR CONCRETE WORK AT LONG SPRUCE Generating Station was completed, and construction of the powerhouse was well advanced. The earthfill section of the main dam was also underway.

CHURCHILL RIVER DIVERSION PROJECT BEGAN OPERATING in September when an initial water flow of approximately 283.16 cubic metres per second was released through the Notigi Control Dam. The Control Dam at Missi Falls on the Churchill River channel from Southern Indian Lake was completed. Also work at Nelson House and Thompson during the year.

LAKE WINNIPEG REGULATION works began operating when the Jenpeg Control Dam was completed.

AGREEMENT REACHED ON 230-kV INTERCONNECTION LINE with Minnesota Power and Light Company of Duluth, U.S., to interconnect at the international border in southeastern Manitoba. Manitoba Hydro received approval to build a transmission line from Ridgeway Station to the U.S. border south of Sprague, Manitoba. Licences were also granted for the export of interruptible power and firm power during the period from November 1976 to October 1982.

South of the border, 320 km of line from Hibbing to Duluth were built by two U.S. utilities — Minnesota Power and Light Company of Duluth, and Minnkota Power Cooperative Inc. of Grand Forks.



Jenpeg Generating Station and Control Dam on the Nelson River. Although Jenpeg does produce electricity, its primary purpose is to control water levels in accordance with the terms of Manitoba Hydro's licence for regulating Lake Winnipeg.



The Missi Falls Control Dam at the natural outlet of Southern Indian Lake controls the water outflow from the lake. The lake's level was raised three metres as part of the Churchill River Diversion Project.



The Notigi Control Dam, also part of the Churchill River Diversion Project, is located on the Rat River and controls the flow of water from the Churchill River into the Burntwood-Nelson river system.



Mitigation work related to the Churchill River Diversion Project was advanced with the negotiation of a 668-hectare land clearing contract. Mr. Len Bateman, Chairman of Manitoba Hydro, and Chief Nelson Linklater of the Nelson House Band signed the contract on February 2, 1977.

WORK ON SECOND NORTHERN MICROWAVE SYSTEM BEGAN in conjunction with the Manitoba Telephone System. The microwave system ensured a high degree of reliability for the expanded DC system, and also provided an improved telephone service and live television service to a number of northern communities.

This link was constructed on the east side of Lake Winnipeg and supplied an alternative route for HVDC control and communications. The first buildings and towers were shipped to remote sites during February 1976, and the system was put into service in October 1977.

CRANBERRY PORTAGE EXTENSION ENERGIZED in September, bringing electricity via the provincial power system to the community of 924 residents. The extension was a 230-kV transmission line from Flin Flon to Cranberry Portage. The community of Baker's Narrows, midway along the 48-km extension from Flin Flon to Cranberry Portage, also obtained service. The retirement of the diesel generating station meant an estimated annual saving of over two million litres of diesel fuel.



SOUTH CENTRAL MANITOBA EXPERIENCED SEVERE ICING CONDITIONS, causing the worst

impact on Manitoba Hydro's electrical service in the utility's history. Most sub-transmission lines in the area were out of service at various times, and all required some form of ice removal. A total of 7,400 km of power lines were rolled to remove ice during and following the storm, and 1,600 km of power lines were de-iced. Due to these conditions, about 1,500 poles and 600 crossarms were broken and the associated hardware damaged.

The most severely affected small towns and villages were without electricity for periods of up to 49 hours. Hundreds of farm customers were also without — some for as long as six days. The cost to restore service was \$1.4 million.

FIRST UNIT AT LONG SPRUCE Generating Station went into service in October. All 10 of the 98-MW units were in service by August 1979. The generating station was officially opened by the premier of Manitoba on June 16, 1979.



Neither rain, nor snow, nor ice... Manitoba Hydro's linemen always do their best to maintain the supply of electricity to customers.

THE NORTHERN FLOOD AGREEMENT (NFA) WAS SIGNED in December by the Governments of Manitoba and Canada, Manitoba Hydro, and five Indian Bands—Nelson House, Norway House, Cross Lake, Split Lake, and York Factory. The purpose of the agreement was to establish a mechanism for compensating those individuals or communities adversely affected by the Lake Winnipeg Regulation and Churchill River Diversion Project.

The NFA ensured discussions about the cause or extent of adverse effects, and facilitated the implementation of appropriate response measures. The NFA allows parties to seek resolution through an arbitrator when required.

1978 HIGH PRESSURE SODIUM LIGHTING (HPS) was installed for the first time by Manitoba Hydro. The lighting

was installed at the Perimeter Highway and Roblin Boulevard interchanges on the west side of Winnipeg. HPS lighting is more efficient than mercury vapour lighting, which had been used in Manitoba for street lighting almost exclusively for many years.

LIMESTONE DEFERRED due to lower than expected demands for electricity in the province. The scheduled in-service date of Limestone Generating Station was postponed from 1984 until 1987. This resulted in the suspension of further work on the project following the completion of the Stage 1 cofferdam. The Limestone camp, town, and associated works were shut down.

HENDAY CONVERTER STATION, located near Limestone, was completed, thus allowing Manitoba Hydro's second HVDC bipolar transmission line, Bipole 2, to be placed in service. Henday began performing the same function as Radisson Converter Station, converting AC power to DC for transmission south to Dorsey Converter Station. Bipole 2 transmitted power from Henday to Dorsey for the first time on October 1. With the addition of Henday, more conversion equipment was installed at Dorsey.

1979 REHABILITATION WORK AT GREAT FALLS GENERATING STATION began. The

work at the 56-year old plant on the Winnipeg River included replacement of the spillway and the west non-overflow dam. Cracks in the water passages underneath the powerhouse were sealed and the head gates reinforced. Repairs to the generating station's electrical and mechanical equipment were also undertaken.

NORTH DAM RECONSTRUCTION AT SEVEN SISTERS GENERATING STATION included the construction of an access road to the work site, foundation preparation, installation of anchors, and placement of approximately 60 per cent of the concrete for the new north dam.



Long Spruce Generating Station on the Nelson River, with a total capacity of 980 MW, first produced power in 1977.

JENPEG GENERATING STATION COMPLETED on the Nelson River. The last of its six turbine generators (units) was placed in service in November. Jenpeg's total winter capacity became 126 MW.

THIRD INTERCONNECTING TRANSMISSION LINE FROM MANITOBA TO SASKATCHEWAN was placed in service in November. The 230-kV transmission line—which extended from The Pas to Saskatchewan Power Corporation's Squaw Rapids Generating Station, later renamed the E.B. Campbell Generating Station—improved the stability of the provincial power system and increased power exchange capabilities for both provinces.

ENERGY RATE STABILIZATION ACT came into force on April 1. It enabled the Government of Manitoba to implement a five-year fixed electricity rate for all customers in Manitoba—other than bulk purchasers and those with separate contracts. The Act provided for the Province of Manitoba to relieve the utility of the costs associated with the foreign debt of Manitoba Hydro. It did so by replacing them with Canadian-equivalent costs based on Canadian rates for similar terms at the date the debt was incurred.



Rehabilitation work at Seven Sisters Generating Station was underway from 1979 until 1985. Major repairs were made to the spillway and sluiceway, the north dam, and the powerhouse.



Because of concrete deterioration after more than half a century of continuous use, major rehabilitation work at Great Falls Generating Station began in 1978. The work included replacement of the spillway and west non-overflow dam, as well as concrete repairs to the powerhouse.

The seventies: a time of development of the Nelson River's hydroelectric resources

From the early 1900s, Manitoba's power planners were aware of the hydroelectric potential of the province's northern rivers. The major stumbling block to such development was how to transmit the power from the north to the more populated areas of the south. By the early sixties, technological advances in the field of power transmission were such that northern power projects could be considered in earnest.

In 1963, the Government of Canada and the Government of Manitoba had entered into an agreement to investigate hydroelectric development on the Nelson River, and to equally share the cost of the research. After exhaustive investigations, a new agreement was signed between the two governments in 1966. Under its terms, the two governments would cooperate and proceed with Phase One Development of the Nelson River. The costs of phase one were estimated to be approximately \$300 million.



The federal government agreed to provide a long-term loan of \$112 million to cover the costs of erecting transmission lines, and installing intermediary and terminal controls and structures. In the agreement, Atomic Energy of Canada Limited (AECL) was designated as the federal government agency and Manitoba Hydro as the province's representative.

The primary objectives of phase one was to convert the rich natural resource of the Nelson River into a power base for industrial and economic development in Manitoba, and to create a potential for the sale of power outside of Manitoba.

Phase One Development of the Nelson River included four main components: construction of Kettle Generating Station; a high voltage direct current (HVDC) transmission system from Kettle to Winnipeg; the Churchill River Diversion Project; and Lake Winnipeg Regulation.

1. Construction of Kettle began in 1966 and was completed in November 1974. The 1,272-MW generating station consolidated a series of rapids into a 30-m operating head (the waterfall created by Kettle's structure). At that time, Kettle was the largest generating station in Manitoba.

2. One of the keystones to northern hydroelectric development was the transmission system. Manitoba Hydro undertook extensive studies into possible transmission systems as part of the investigations conducted under the 1963 agreement. Alternating current (AC) and direct current (DC) transmission systems were evaluated, and two routes for the transmission lines were assessed — one on the east side and one on the west side of Lake Winnipeg.

In 1966, AECL and private consultants initiated detailed studies with a view to determining which mode of transmission facilities to build and which route to build along. These studies were known as the "Stage One Studies" and included the detailed examination of the eastern and western routes using aerial photographic surveys, soils interpretation, soils sampling, ground reconnaissance, and terrain typing. Also, Manitoba Hydro's load growth forecasts were examined. AECL and Manitoba Hydro conducted extensive system stability studies for both AC and DC transmission systems for three alternative load situations — Manitoba's needs alone, Manitoba's needs plus some export to Saskatchewan, and Manitoba's needs plus

Dredging work was done on the eight-mile Channel between Playgreen Lake and Kiskittogisu Lake. The three channels were constructed as part of the Lake Winnipeg Regulation — two-mile Channel, eight-mile Channel, and Ominawin Channel — and helped to increase water flows for hydroelectric development on the Nelson River.

exports to Saskatchewan, Ontario, and the U.S. A fourth study made economic comparisons of all the systems.

After careful consideration, direct current (DC) transmission was selected over alternating current (AC) because power losses over long distances would be less and the cost of a DC transmission system amounted to about two-thirds the cost of an AC transmission system. As for route selection, the route on the west side of Lake Winnipeg was chosen because it had better access by road and rail in both southern and northern Manitoba. Also, in spite of being 160 km longer, the route on the west side would be less costly to construct since swamp, muskeg, and permafrost conditions were fewer.

This project entailed the construction of two HVDC transmission lines — one line starting at Radisson Converter Station, three kilometres south of Kettle Generating Station; the other starting at Heday Converter Station, 42 km northeast of Kettle. Dorsey Converter Station is the southern terminus for both lines. The transmission systems are referred to as Bipole 1 and Bipole 2. The converter stations are needed to convert the AC power produced at the northern generating stations into DC power for transmitting nearly 900 km to the south. It is then converted back to AC power for distribution to customers. Bipole 1 was in full operation by June 1972 and Bipole 2 was completed by October 1978.

3. The portion of the Churchill River in Manitoba, which is downstream of Southern Indian Lake, has a hydroelectric potential of more than 3,000 MW. However, instead of developing generating stations on the Churchill River itself, it was believed that diverting the Churchill River into the Nelson River would be more economical. It was felt that while the Lake Winnipeg Regulation would assure a more dependable water flow in the Nelson River, the Churchill River Diversion Project would increase the power producing potential of the Nelson by as much as 40 per cent.

Three major components accomplished the diversion. One, a Control Structure at Missi Falls, the natural outlet of Southern Indian Lake which controls the outflow and raises the lake level by three metres. Two, an excavated channel from Southern Indian Lake to Isset Lake to allow Churchill River water to flow into the Rat-Burntwood-Nelson river system. Three, a Control Dam at Notigi on the Rat River to regulate the amount of water being diverted.

Under terms of the licence granted in 1972, Manitoba Hydro is permitted to divert up to 850 cubic metres per second (m^3/s) of water from the Churchill into the Nelson. The outflow from the Missi Falls Control Dam must be at least $14 \text{ m}^3/\text{s}$ during open water season and $43 \text{ m}^3/\text{s}$ during the ice cover period. The project went into operation in 1977.

4. The regulation of Lake Winnipeg was deemed necessary because in its natural state, the water outflow into the Nelson River is more during the spring and early summer months and less in the fall and winter months. The problem for hydroelectric generation in Manitoba is that the greater volume of outflow is needed in the fall and winter than it is in the spring and summer. With regulation, the outflow from the lake would be reduced in the spring and early summer, and increased during the fall and winter to meet the province's demand for electricity.

Work on the Lake Winnipeg Regulation project began in 1970 and consisted of three main elements. One, the two-mile Channel, the eight-mile Channel, and the Ominawin Channel, which were built to increase water outflow from the lake in winter. Two, Jenpeg Generating Station and its Control Dam, which was built at the point where the west channel of the Nelson River discharges into Cross Lake. And three, a dam was built at the outlet of Kiskitto Lake to prevent water from backing up into the lake (Kiskitto Lake was later regulated as a wildlife sanctuary area).

Manitoba Hydro was licensed to regulate Lake Winnipeg between the upper storage limit of 715 feet above sea level and the lower storage limit of 711 feet above sea level for power production purposes. The parameters of regulation are expressed in "wind eliminated" terms because the lake's natural characteristics alter water levels at varying points around the lake.

Without HVDC technology and the Lake Winnipeg Regulation, development of the hydroelectric potential of the Nelson River could not have proceeded.

The Eighties: A Decade of Improvements in Service and Reliability

1980

MOOSE LAKE CONNECTED TO THE PROVINCIAL POWER SYSTEM. The diesel generating station which for 15 years served the northern community located southeast of The Pas was retired. A 66-kV line from the provincial power system brought residents unrestricted use of electricity for the first time. The changeover to the main provincial power system would save about 450,000 litres of diesel fuel annually.

THE 500-kV WINNIPEG TO MINNEAPOLIS INTERCONNECTING TRANSMISSION LINE WAS COMPLETED, providing a third interconnection with the U.S. Operating at 500-kV, it was the highest AC voltage ever used in Manitoba. The new line more than doubled Manitoba's power exchange capability with the U.S. The northern terminus of the 500-kV line was at Manitoba Hydro's Dorsey Converter Station.

MANDAN LETTER OF INTENT WAS SIGNED by Manitoba Hydro and the Nebraska Public Power District of Columbus for a proposed 500-kV transmission line between Manitoba and Nebraska. The proposed interconnection was referred to as the MANDAN line. By the fall of 1980, a set of alternative transmission line corridors was defined, and meetings were held with interested parties to discuss corridor preferences. The project would be terminated in 1985.

1981

THE 525-kW LAC BROCHET DIESEL GENERATING STATION was commissioned in November at the remote site 40 km south of the 59th parallel, close to the Saskatchewan border. A 350-kW diesel generating station was designed for Tadoule Lake, located at about the same latitude as Lac Brochet, with an in-service date of mid-summer 1982.

VERTICAL AXIS WIND TURBINE was installed near Churchill, Manitoba, a town located on the shores of Hudson Bay. Manitoba Hydro entered into a parallel generation agreement with the Churchill Research Centre, whereby the utility paid for power and energy received from the customer. The experimental installation was rated at 75 kW.

SIX SUPER ENERGY-EFFICIENT HOUSES were built by Manitoba Hydro in Gillam to test a variety of energy-efficient techniques in housing. The heat loss of each house was designed to be only four kilowatts, rather than the 24 kW of a conventional house of comparable size.



During construction of the 500-kV, Winnipeg to Minneapolis transmission line, 191 of these self-supporting towers were used on the part of the line that ran between Vivian, Manitoba, and Dorsey Converter Station at Rosser. With a base of only 6.5 m by 7 m from leg to leg, this type of tower was used on agricultural land because it occupied less space than other types.

1982

HIGH VOLTAGE DIRECT CURRENT RESEARCH CENTRE WAS WORLD'S FIRST.

A complete research centre for HVDC technology opened in Winnipeg on January 15. The research centre was a consortium of five sponsoring organizations: Manitoba Hydro, the University of Manitoba, Teshmont Consultants, Federal Pioneer Electric Ltd., and the province of Manitoba.

1983

THE PAS TO FLIN FLON 230-kV LINE was placed in service. The line and new terminal station at Flin Flon

provided a reliable supply of electricity to the Flin Flon area as well as a fourth interconnecting transmission line with Saskatchewan Power Corporation (SPC), with its Island Falls Generating Station on the Churchill River. SPC contributed two-thirds of the annual costs for these facilities. The sharing of costs was based on the relative benefits to each of the two utilities.

SEVERE ICING CONDITIONS occurred in the southwestern and central parts of the province between February 27 and March 10, causing widespread service interruptions lasting up to five days for some farm customers. A workforce of up to 944 employees and volunteers toiled throughout the storm to remove ice and restore service. The storm covered a significant area of the province — from the Saskatchewan boundary to an area just east of Winnipeg, and from the U.S. border to a line running from Riding Mountain National Park to Gimli.

As a result of the storm, the Rural Underground Distribution program was implemented in some areas in an attempt to minimize power outages caused by ice storms. Underground power lines were installed between Manitou and Darlingford, replacing 13 km of overhead power lines.

BLOODVEIN CONNECTED TO PROVINCIAL POWER SYSTEM in March. The Bloodvein Indian Reserve on the east side of Lake Winnipeg was the first of a number of native communities that switched from diesel generation to the provincial power system — part of Manitoba Hydro's east of Lake Winnipeg project.

REHABILITATION WORK AT SEVEN SISTERS GENERATING STATION COMPLETED below budget, at a total cost of \$22 million. The rehabilitation program, spanning five consecutive years, was expected to extend the life of Seven Sisters by another 50 years.

1984

HIGH VOLTAGE DIRECT CURRENT REACHED A MILESTONE when the first

successful addition of solid state equipment at Henday and Dorsey converter stations was achieved. It enabled Manitoba Hydro's HVDC system to bring an additional 450 MW of power from generating stations located on the Nelson River to southern Manitoba.



Manitoba Hydro's crews installed underground power lines between the towns of Manitou and Darlingford. This was a part of the Rural Underground Distribution program, which was established to help minimize power outages in areas of the province susceptible to ice storms.



Twenty-four hours per day, seven days a week, Manitoba Hydro's System Control Centre in Winnipeg is staffed. The control centre ensures the ever-changing electricity demands of customers in Manitoba are met. Computer controls help improve system reliability and operating efficiency. The generating stations, transmission lines, and electricity exports to other utilities are monitored constantly.

AUTOMATIC CONTROL WAS INSTALLED AT SYSTEM CONTROL CENTRE in Winnipeg. The AGC/SCADA computer-based control system was installed in the centre to provide automatic generation control (AGC), and supervisory control and data acquisition (SCADA) functions. The operators monitor Manitoba Hydro's generating stations, transmission lines, and exports to neighbouring utilities using the AGC and SCADA systems, which can automatically adjust the generation of electricity to meet customers' needs.

BERENS RIVER, PRINCESS HARBOUR, AND LOON STRAITS CONNECTED to the provincial power system in March. This was part of Manitoba Hydro's east of Lake Winnipeg project.

MANITOBA SUFFERED A SERIOUS ICE STORM as heavy rains and freezing north winds struck in the southwestern and interlake parts of the province. The storm destroyed

approximately 3,500 wood poles and 12 steel towers on the 230-kV transmission line between Brandon and Winnipeg.

As a direct result of two of the worst ice storms in the province's history occurring in consecutive years, both of which resulted in costly damage, Manitoba Hydro established a special ice storm task force to deal with the problem. The five-year, \$25-million plan was implemented on February 15, 1985.

TORNADOES STRUCK SOUTHERN MANITOBA in July causing an estimated \$250,000 worth of damage to distribution and transmission lines.

SOUTHERN INDIAN LAKE COMMERCIAL FISHERMAN'S ASSOCIATION and Manitoba Hydro signed a \$2.5-million compensation agreement for damage caused by the Churchill River Diversion Project and the raising of the level of Southern Indian Lake.

1985

MANITOBA HYDRO CREATED AN EXPORT SERVICES DEPARTMENT

with the intention of exporting Manitoba Hydro's expertise to other utilities and organizations, specifically in developing countries. Through the skills of its own employees, Manitoba Hydro can offer knowledge at every level of power system development.

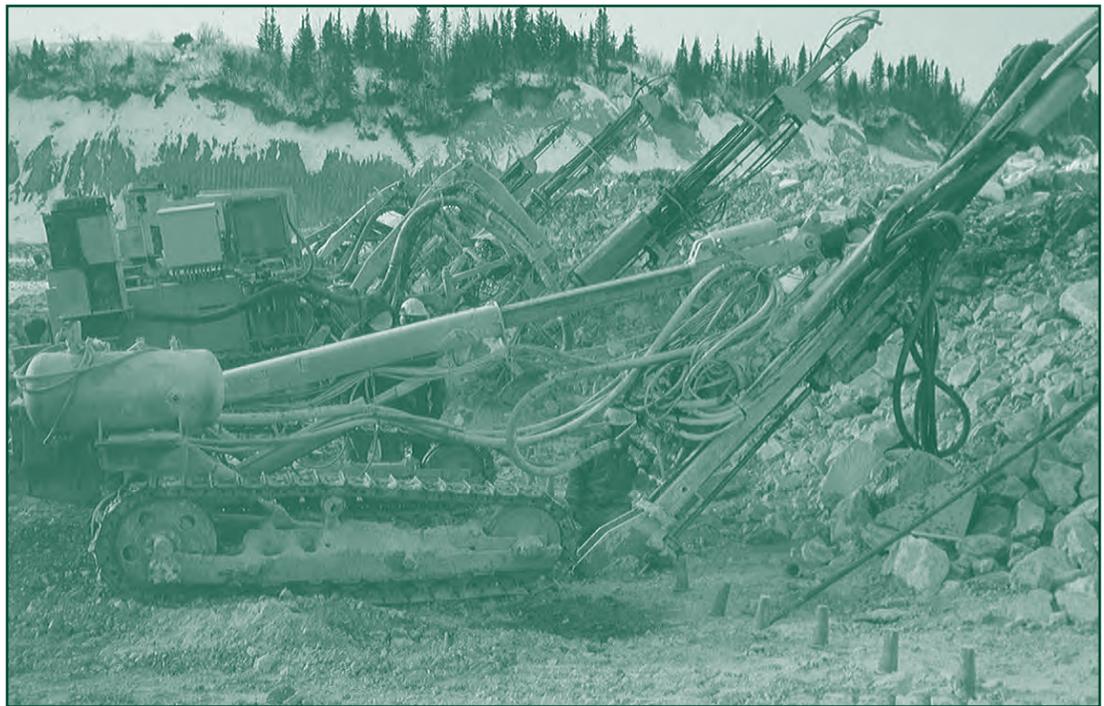
THE CONSTRUCTION OF LIMESTONE GENERATING STATION RESUMED.

In January, Manitoba Hydro called for tenders on the general civil contract for Limestone Generating Station. The contract was contingent upon Manitoba Hydro's obtaining approval from the National Energy Board to export power to the Northern States Power Company of Minneapolis.

In March, the National Energy Board issued a 12-year licence to MHEB for the export of firm power and energy to the Northern States Power Company of Minneapolis. The licence allows Manitoba Hydro to export a maximum of 500 MW of firm power in each 12-month period from May 1, 1993 to April 30, 2005.

Later that same month, Canadian General Electric was awarded the contract to supply the 10 turbines and generators required for Limestone Generating Station.

In June, the general civil contract for Limestone was awarded to a consortium involving Bechtel Canada Ltd. and Kumagai-Gumi Co. Ltd. The general civil contract was the largest single contract associated with the construction of Limestone.



At the Limestone Generating Station site in 1986, diamond drills bore holes into which explosives were placed and detonated to loosen some of the rock and soil that had to be excavated. This allowed construction of the powerhouse and spillway to begin. After excavation, forms were built for the concrete structures.

Workers removed material from a section of the cofferdam that surrounded Limestone Generating Station's powerhouse and spillway structures.



PUKATAWAGAN AND GRANVILLE LAKE CONNECTED to the provincial power system. The 69-kV transmission line to the Pukatawagan Indian Reserve and the community of Granville Lake in northwestern Manitoba was constructed in accordance with the terms of a cost-sharing agreement between Manitoba Hydro and the Department of Indian and Northern Affairs.

MANDAN LINE TERMINATED in March when the Board of the Nebraska Public Power District of Columbus, Nebraska, passed a resolution calling for the termination of the proposed transmission line. The main reason cited for the termination was the failure to secure a commitment for cost-sharing arrangements from the other participating U.S. utilities.

BIPOLE 2 REACHED FULL POWER with the completion of the third stage of Bipole 2 on June 17. This enabled the high voltage direct current transmission line to operate at 1,000 kV (± 500 kV nominal). Bipole 2 added an extra 2,000 MW of capacity to the provincial power system.

CUSTOMER SERVICE SYSTEM (CSS) INTRODUCED to Manitoba Hydro's customers serviced by the Transcona District Office. They were the first to benefit from the new computerized CSS, which was established to streamline Manitoba Hydro's customer service by providing localized access to billing accounts.

1987

PAUINGASSI AND LITTLE GRAND RAPIDS WERE CONNECTED to the provincial power system, marking the

successful conclusion of a five-year program to extend service to remote communities on the east side of Lake Winnipeg.

138-kV GILLAM TO CHURCHILL LINE ENERGIZED in April. Constructed over three winters, the 270 km transmission line was jointly funded by Manitoba Hydro and the federal and provincial governments for \$35.6 million.

1988

INTERCONNECTING LINE COMPLETED BETWEEN MANITOBA HYDRO AND WINNIPEG HYDRO. The

new interconnection between Manitoba Hydro's St. James substation and Winnipeg Hydro's Sherbrook substation involved the construction of a 3.5-km, 115-kV underground transmission line — the longest of its type in Manitoba. It increased the capacity and reliability of interconnections between the two utilities.

MANITOBA HYDRO'S LINE AND POLE CREWS HEADED TO JAMAICA AFTER HURRICANE HIT THE ISLAND. In October and November, Manitoba Hydro and other Canadian, British, and U.S. electrical utilities sent manpower and equipment to Jamaica in order to assist in restoring the island's electrical distribution system — much of it destroyed by Hurricane Gilbert in September. The mission was an unqualified success for the line and pole crews from Manitoba Hydro, which returned from Jamaica in February. Financed by the Canadian International Development Agency, the relief effort was without precedence in Manitoba Hydro's history.



Manitoba Hydro's mobile PCBX decontamination unit, purchased in 1985, was the first of its kind in Canada. In addition to the mobile facility, Manitoba has PCB storage and laboratory facilities.

MANITOBA HYDRO FIRST UTILITY IN CANADA to purchase a mobile decontamination unit for the chemical processing and removal of low-level polychlorinated biphenyls (PCBs) from insulating oil used in electrical apparatus.

1986

POPLAR RIVER CONNECTED TO PROVINCIAL POWER SYSTEM. Poplar River, 360

km north of Winnipeg on the eastern shore of Lake Winnipeg, was switched from diesel generation to the provincial power system.

25TH ANNIVERSARY OF MANITOBA HYDRO was celebrated on April 1. It was in 1961 when MHEB and MPC amalgamated to become one company under the new name of Manitoba Hydro.

PINAWA GENERATING STATION SITE BECAME A PROVINCIAL HERITAGE PARK in late June through the combined efforts of the provincial Department of Natural Resources, Historical Resources, and Parks Branch, as well as the Rural Municipality and town of Lac Du Bonnet, and Manitoba Hydro. Abandoned since 1951, Pinawa had served Winnipeg for over 45 years.

1989

FIRST SALE OF MANITOBA HYDRO SAVINGS BONDS

took place in April. HydroBonds enabled Manitobans to make an investment in their own province. The HydroBonds were designed to raise funds to meet the financial requirements of Manitoba Hydro, and to develop a sizeable new capital market in Manitoba that contributed Canadian-dollar financing to ongoing debt requirements.

SEASONAL DIVERSITY POWER EXCHANGE AGREEMENTS were signed with the Northern States Power Company of Minneapolis and the United Power Association of Elk River. The power exchange can be up to 300 MW on a seasonal basis for 20 years,

beginning in 1995. The agreement included the construction of a new transmission line from Winnipeg to Winger, Minnesota, a distance of 322 km, though this line never was constructed. Instead, existing lines were upgraded to meet the requirements.

PLANS ANNOUNCED FOR UPGRADING SIX DIESEL GENERATION COMMUNITIES from 15 amps to 60 amps. When completed, residents of the communities — Tadoule Lake, Lac Brochet, Brochet, Shamattawa, Pikwitonei, and Thicket Portage — would be able to use modern household electric appliances. The first community received the improved service during Manitoba Hydro's fiscal year of 1993-94 .

When Hurricane Gilbert destroyed much of Jamaica's electrical distribution system in 1988, Manitoba Hydro, and other Canadian, British, and U.S. electrical utilities helped repair the damage.



Protecting the environment

Throughout its history, Manitoba Hydro has been conscious of the fact that developing hydro-electric generating stations and constructing major transmission lines to provide electricity for Manitobans may affect the way in which people use and enjoy the water and land resources.

During the 1980s, public environmental awareness and media attention increased dramatically. Through increased scientific research, it quickly became clear that as a result of industrial development, the environment was being affected in many more ways than anyone had ever conceived. Globally, increased pressure was put on individuals, governments and corporations to protect the environment. The result was that by the late 1980s, the Government of Manitoba began the environmental licensing of some of the aspects of all major construction projects in the province.



As part of the environmental studies at Limestone, radio tags were placed on one of Manitoba's heritage fish species, the brook trout. The tags enabled researchers to track the fish and their response to the project's activities.

Conscious of demonstrating good stewardship of the land and water, Manitoba Hydro re-committed itself to protecting the environment. This commitment was reflected by the actions the utility took to prevent and reduce adverse environmental impacts where possible, and to assist people in adapting to any unavoidable impacts. Manitoba Hydro incorporated environmental assessments and monitoring measures into the planning, designing, and building stages of its new facilities.

The Limestone Generating Station construction project served as an example of Manitoba Hydro's commitment to respecting the environment. During the construction period, the utility's environmental inspection program and the provincial Department of Natural Resource's on-site inspection-enforcement function ensured compliance with environmental requirements and corporate commitments. Rehabilitation of the sites disturbed by project activities was ongoing, and site clean-ups and the proper disposal of debris were undertaken.

To enhance the socio-economic benefits to the people in the area, special hiring policies and training were implemented. Where qualified, northern aboriginal and other northern residents were given the first opportunity at employment. The Limestone Training and Employment Agency was established as a Crown Agency in January 1985 to provide pre-employment training to local people and to coordinate on-the-job training programs established by the contractors.

In addition, Manitoba Hydro purchased as many goods and services as practicable from northern and northern aboriginal businesses. Corporate purchasing guidelines were applied in order to provide the best possible opportunities for northern aboriginal businesses, northern businesses, and businesses in Manitoba respectively. Wherever it was reasonable and practical to do so, smaller tender packages were created to give opportunities to northern aboriginal and other northern companies.

During the 1980s, the utility, reflecting society as a whole, faced many challenges in adapting to a more responsible and respectful relationship with the environment. By incorporating environmental concerns, by conducting environmental monitoring and assessment, and by including public participation as a critical element in the assessment process, Manitoba Hydro undertook effective management programs to reduce the probability and seriousness of any adverse environmental and socio-economic impacts of its projects.

Limestone Generating Station — Leading the Way to the 21st Century

1990

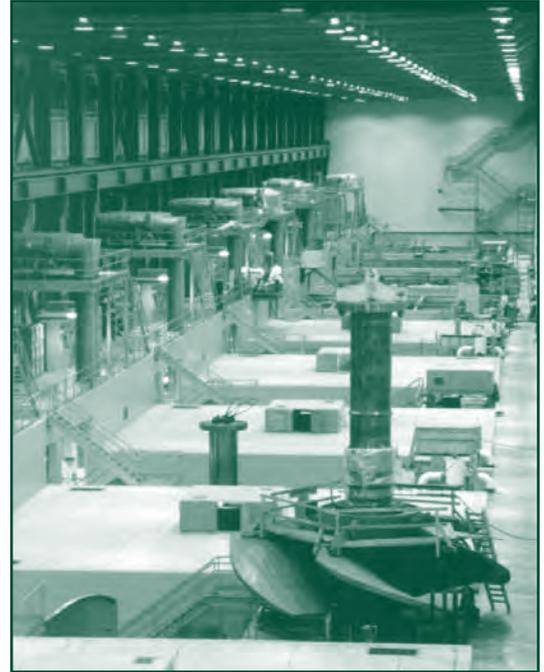
FIRST LIMESTONE UNIT ON-LINE on September 8 — 10 weeks ahead of schedule — setting the pace for units two, three and four to follow during the fiscal year of 1990-91. Each unit had a capacity of 133 MW.

AGREEMENT REACHED BETWEEN MANITOBA HYDRO AND THE CHEMAWAWIN-EASTERVILLE AND MOOSE LAKE RESIDENTS in November. The residents of the two communities received \$21 million in compensation for the socio-economic changes which occurred when Grand Rapids Generating Station was built in the 1960s.

CORPORATE DEVELOPMENT PLAN WAS ENDORSED BY THE PUBLIC UTILITIES BOARD. The PUB approved Manitoba Hydro's four-point Corporate Development Plan in December. This was the first time the utility presented its major capital plans before the PUB for public scrutiny and approval. The plans included: the sale of 1,000 MW to Ontario Hydro over a 22-year period, beginning in the year 2000; the seasonal diversity exchange agreements totalling 300 MW with two U.S. utilities; the refurbishment of Manitoba Hydro's two thermal generating stations; and a 100-MW reduction in the forecasted increase in electrical load, later changed to 285 MW due to the launch of POWER SMART programs.

1991

WORK ON 28-km ROAD TO CONAWAPA UNDERWAY in February, when contractors began building sections of the all-weather gravel road between the town of Sundance and the site of the proposed Conawapa Generating Station.



One of the turbine assemblies stood ready for installation in the Limestone Generating Station powerhouse. Each one of the 10 turbine generators at Limestone can produce 133 MW of electricity.

POWER SMART CONCEPT INTRODUCED TO MANITOBA HYDRO'S CUSTOMERS. Along with other Canadian utilities, Manitoba Hydro adopted POWER SMART as the theme name for a variety of programs designed to reduce the growth in demand for electricity. The POWER SMART programs identify energy-efficient products that can be used, and provide energy-efficient guidelines that residential, agricultural, commercial, and industrial customers can adopt to reduce energy use and therefore costs.

LIMESTONE GENERATING STATION OFFICIALLY OPENED on September 5. With five of 10 units in operation, the station was ahead of schedule and below budget. Over 200 guests — including construction workers, representatives of the provincial government, local aboriginal leaders, and major contractors and suppliers attended the opening celebrations. Limestone, which is 23 km downstream from Long Spruce Generating Station, dams the Nelson River, located 750 km north of Winnipeg.

CROSS LAKE WEIR CONSTRUCTION COMPLETED in the fall of 1991. The \$9.5-million project was built by Cross Lake Constructors, a joint venture between Midnorth Development Corporation (the construction arm of the Cross Lake Indian Band) and Vector Construction Limited of Winnipeg. The weir created a water regime on Cross Lake that reduced or eliminated most of the adverse effects caused by the Lake Winnipeg Regulation project. Of the 108 jobs created by the project, 100 were filled by northern residents of aboriginal ancestry.

THE PAS INDIAN BAND, CORMORANT COMMUNITY ASSOCIATION, AND GRAND RAPIDS FIRST NATION reached settlement agreements with Manitoba Hydro to compensate the people for the impacts of the flooding that occurred when Grand Rapids Generating Station was completed.

The Pas Indian Band received \$4.56 million; the Cormorant Community Association \$1.198 million; and the Grand Rapids First Nation \$5.05 million.

NORTHERN REGION ESTABLISHED to manage the customer service operations northwards of the 53rd parallel. Headquarters for the Northern Region was in Thompson. Previously, the operations for the northern part of the province were the responsibility of the Eastern Region headquarters in Selkirk.



HEADCOVER BOLTS OF UNIT ONE AT GRAND RAPIDS FAILED in March, temporarily putting the 472-MW generating station out of service.

The headcover, a large steel plate installed above the turbine blades, prevents water from rising into the generator assembly at the top of the turbine shaft. When the headcover bolts failed, within minutes water flooded the lower portions of the powerhouse to the level of the tailrace. This was the first incident of its kind in Manitoba Hydro's history.

NORTH CENTRAL PROJECT (NCP) AGREEMENT was signed by four parties — the federal government, provincial government, local communities, and Manitoba Hydro. The electrification project will result in nine communities, each served by diesel generation, being linked to the provincial power system.



Limestone Generating Station was Manitoba Hydro's fifth and largest station to be built on the Nelson River. Completed in the fall of 1992, it was the first such project to incorporate environmental concerns into every aspect of its planning, designing, and building stages. Limestone can produce a total capacity of 1,330 MW.

The North Central Project agreement was signed by representatives of the communities involved — the federal and provincial governments, and Manitoba Hydro. Signing for Manitoba Hydro was Mr. Bob Brennan, President and Chief Executive Officer (seated, far right).



The communities are Wasagamack, God's Lake, God's River, Red Sucker Lake, Garden Hill, Oxford House, St. Theresa Point, Island Lake, and God's Lake Narrows. The costs are to be shared by the federal and provincial governments and Manitoba Hydro.

in compensation for adverse impacts of the Churchill River Diversion Project.

An \$8-million settlement was achieved with the Cross Lake First Nation regarding their claim for loss of recreational opportunities.

Agreements were also reached with the Nelson House First Nation regarding domestic fishing, and the operation and maintenance of the Nelson House Arena.

The compensation payments assist the people in adjusting to the economic, social and cultural adverse effects of the projects, and in changing from a traditional way of life to a modern way of life.



50TH ANNIVERSARY OF FARM ELECTRIFICATION was celebrated from April to September with special events, including the making of a new parade float to honour the occasion. The float was seen in many festivals held in the province throughout the summer. The special events culminated with a day-long program staged by retired utility employees, many of whom had worked on Farm Electrification. Attending the event was 97-year old Douglas Campbell, who served as the premier of Manitoba during the Farm Electrification era.

THE NORTHERN BUSINESS INSTITUTE, a new educational facility, was established in The Pas. The intent of the facility — which received funding from Manitoba Hydro, other corporations, and the First Nations of the Swampy Cree Tribal Council — was to take an innovative and cooperative approach to business development training and education in the north.

COMPENSATION AGREEMENTS SIGNED. The Split Lake Cree First Nation, along with the federal and provincial governments and Manitoba Hydro, signed an historic agreement to meet outstanding obligations to the Split Lake Cree under the terms of the 1977 Northern Flood Agreement. The agreement provided for total financial compensation of \$47.37 million for the adverse effects of Lake Winnipeg Regulation and the Churchill River Diversion Project. Manitoba Hydro's portion of the compensation was \$29.92 million.

LIMESTONE GENERATING STATION FULLY OPERATING when the 10th and final unit was placed in service. The construction project was completed ahead of schedule and about \$1 billion under budget, which put the project in rare company — only two per cent of such projects worldwide are completed ahead of schedule and under budget. Credit was given to the workers for having no work stoppages, and for achieving the best safety record of its type on any previous Manitoba Hydro project.

The South Indian Lake Housing Authority and the Community Association of South Indian Lake (on behalf of the residents of South Indian Lake) received \$18 million from the province of Manitoba and Manitoba Hydro

1,000-MW SALE OF ELECTRICITY TO ONTARIO HYDRO CANCELLED.

In December, Ontario Hydro terminated a 1,000-MW power sale agreement with Manitoba Hydro, resulting in the indefinite postponement of Conawapa Generating Station and its associated transmission line facilities. Ontario Hydro was liable to pay certain costs for cancelling, as outlined in the terms of the original agreement.



CONSTRUCTION OF KELSEY TO SPLIT LAKE 138-kV TRANSMISSION LINE COMPLETED.

The construction project, carried out by workers of Split Lake-Comstock Joint Venture, provided employment and training opportunities for members of the Split Lake Cree First Nations. For the first time ever on a Manitoba Hydro transmission line construction project, a Community Assessment Officer was hired to monitor the environmentally sensitive aspects of the project — aspects documented during the planning and licensing stages of the project.

ENVIRONMENTAL STUDIES AND SITE SELECTION PROCESS BEGAN for the new Neepawa to Brandon 230-kV transmission line. The line was required to meet the forecasted growth in demand for southwestern Manitoba and to improve system reliability for the area. The 245-km, \$40-million line is routed from Dorsey Converter Station

at Rosser, through Neepawa, to Cornwallis Terminal Station near Brandon.

MAJOR POWER SALE TO NORTHERN STATES POWER BEGAN in May, pushing the total export sales to over \$200 million in the fiscal year of 1993-94. A 12-year sale allows Manitoba Hydro to export a maximum of 500 MW of firm power to the Minneapolis utility until 2005. The sale necessitated the beginning of the Limestone Generation Station's construction in 1985.

NO RATE INCREASE SOUGHT IN 1993 for General Consumer customers. This was made possible because of Manitoba Hydro's implementation of spending restraints, together with lower interest and inflation rates, which resulted in the costs being lower in 1993 than were previously estimated. Manitoba Hydro also took into consideration the difficult economic times that many customers were experiencing.

HERB LAKE LANDING RECEIVED ELECTRICAL SERVICE in December, becoming another northern community to be connected with the provincial power system. It was made possible as a result of a cooperative effort between Manitoba's Department of Northern Affairs, Manitoba Telephone System, and Manitoba Hydro.



Workers of Split Lake-Comstock Joint Venture (photo above) assemble foundations for one of the tubular steel towers used on the new 138-kV transmission line from Kelsey Generating Station to Split Lake (photo right). It was cold for the workers, but work could be carried out and equipment could be moved in and out of the area more easily in winter because the ground was frozen.





LOUIE'S PLAY IT SAFE CLUB was introduced for children, its purpose being to educate children about electricity and the importance of being careful at home and at play. The club was named after Louie the Lightning Bug, a mascot adopted by Manitoba Hydro to promote safety. Initially, 3,000 children aged three to 10 signed up. By 1996, membership had grown to over 10,000.

1994 MANITOBA HYDRO UNDERGOES MAJOR STAFF REDUCTIONS

due to several circumstances: the termination of a major power sale with Ontario Hydro; the suspension of generation and transmission projects related to the sale; a forecast of a low load growth in the domestic market; and the objective to keep future rate increases to customers below inflation. A reduction of about 11 per cent of total staff took place, including a 40 per cent reduction at the senior executive level.

FIRST EVER SUSTAINABLE DEVELOPMENT REPORT PUBLISHED, which guides the utility's commitment to addressing environmental issues. The report provided a comprehensive and detailed examination of the activities and events that shaped the utility's sustainable development practices in 1993. The report will be updated every two years.

CORPORATE HUMANIST AWARD PRESENTED FOR BEST PROJECT to Manitoba Hydro by the Canadian Federation for the Humanities in Ottawa. The award was in recognition of the utility's work during the construction of the 138-kV transmission line from Kelsey Generating Station to Split Lake. Environmental and local community concerns were an integral part of the project.



With the Corporate Humanist Award: (left to right) Messrs. Roy Bukowsky, Dave Gittins and Barry Rindall, three of the large team that worked on the Kelsey to Split Lake transmission line project.

1995 MANITOBA HYDRO'S CURTAILABLE SERVICE RATE PROGRAM

first established as an experimental program in 1993, was offered to large industrial customers in Manitoba. Through it, when the utility's capacity of electricity becomes constrained, Manitoba Hydro can notify customers when it needs to interrupt — or curtail — delivery of power for a period of time previously specified and agreed to by customers. In return, customers receive a discount in rates, and they are guaranteed replacement energy during an off-peak period when demands for electricity become fewer.

FUNDING APPROVAL FOR NORTH CENTRAL PROJECT (NCP) was received from the federal and provincial governments. The project — the construction of a 138-kV transmission line about 360 km in length — provided electrical service to nine isolated communities located on the northeastern side of Lake Winnipeg. Previously, the communities received limited electrical service provided by diesel generation. Major activity on the project began in the summer.

ROADWAY, SENTINEL LIGHTING CONVERSION PROGRAM, one of Manitoba's first POWER SMART initiatives, was completed. In four years, about 57,000 street lights and 17,000 sentinel lights in the province were converted from mercury vapour lighting and incandescent lighting to the energy-efficient High Pressure Sodium (HPS) lighting. The new HPS lighting contributed to a reduced energy use of 10 MW.

NETRECORDEXPORTSALES, achieved for the third year in a row, boosted Manitoba Hydro's revenues. For the fiscal year of 1995-96, sales reached \$253.1 million, which was 26.8 per cent of the total revenues.

YORK FACTORY FIRST NATION SETTLED with Manitoba Hydro for the outstanding issues and claims related to the Northern Flood Agreement. Key elements of the settlement were the allocation of \$24 million in cash and HydroBonds, and new reserve lands. Other issues involved land and resource management.

10-YEAR FOREST ENHANCEMENT PROGRAM WAS LAUNCHED to improve and sustain the province's forest environment by supporting tree planting, public forest education, and innovative forest projects. Aimed at offsetting the loss of forest cover that occurs when Manitoba Hydro develops new facilities and transmission lines, the program attracted the participation of 55 non-profit, non-government groups in the first full year of the program.



Soon after the introduction of Manitoba Hydro's forest enhancement program — designed to promote a healthy and aesthetically pleasing forest environment in Manitoba's communities — participants planted trees in areas like school playgrounds, sports parks, and community clubs. In Brandon, Ms. Edith Poole, a long time member of the city's Horticultural Society, planted the first of several trees to beautify a residential park. An inscription on a nearby plaque captured the essence of the program — "community spirit and trees growing together".

1996

MANITOBA HYDRO ENTERED INTO POWER EXCHANGE AGREEMENTS FOR THE FIRST TIME with

two U.S. power marketers. As a result of changes occurring in the electrical industry — one of which is increased access to transmission systems in neighbouring jurisdictions — Manitoba Hydro has the opportunity to trade with many new utilities. This includes indirectly interconnected utilities and power marketers, such as Heartland Energy Service, and Cenerprise.

MANITOBA HYDRO BECAME FULL MEMBER OF MID-CONTINENT AREA POWER POOL (MAPP) in November. Previously, the utility was a liaison member of MAPP. In response to the U.S. Federal Energy Regulatory Commission's order pertaining to open transmission line access, MAPP was reorganized. The new MAPP opened membership to anyone involved in the electrical industry, including power marketers.

As part of Manitoba Hydro's membership, it was obligated — under certain conditions — to provide transmission line access within Manitoba to other MAPP members. MAPP's new membership consisted of 57 utilities, potentially giving access to 16 million people.

RECORDS WERE SET FOR PRODUCTION AND CONSUMPTION of electricity during Manitoba Hydro's fiscal year of 1995-96. With good water conditions existing in the province, generation reached 29.3 billion kW·h and consumption reached 19.1 billion kW·h — the highest amounts ever.

During a deep freeze period, Manitobans demanded a new record system peak of 3,588 MW on February 1, when temperatures dipped to -41°C . The total energy used that day was 81 million kW·h, nearly three per cent higher than the previous record set on December 20, 1989.

NET INCOME REACHED HIGHEST LEVEL IN HISTORY. For the fiscal year of 1995-96, Manitoba Hydro's earnings reached \$70.1 million. The improved financial performance was due mainly to exceptional weather conditions during the year, but also to employees operating the system more efficiently.

MANITOBA HYDRO AND CENTRA GAS MANITOBA INC. FORMED A PARTNERSHIP when they agreed to create a jointly owned energy service that will offer opportunities to seek out new revenue opportunities. They also agreed to identify cost savings related to combining certain operations of both the gas and electricity companies. One venture already underway was joint-use trenching, whereby the utilities placed their underground cables in the same trench during the construction of new buildings.

MANITOBA HYDRO ANNOUNCED A NEW CORPORATE FRAMEWORK. To prepare and position itself for a more competitive future in the electrical utility industry, Manitoba Hydro established three distinct business units — Power Supply, Transmission and Distribution, and Customer Service and Marketing. Each unit was to be accountable for its own respective business plans and operations.

MANITOBA HYDRO'S WORLDWIDE WEBSITE OFFICIALLY LAUNCHED in August. Web surfers around the world can visit at www.hydro.mb.ca to find customer service information, and also general information about the utility's generation and transmission of electricity, and advice on the safe and efficient use of electricity.

NELSON HOUSE FIRST NATION SETTLED with Manitoba Hydro for the outstanding issues and claims related to the Northern Flood Agreement. Key elements of the settlement were the allocation of \$62.375 million in cash and HydroBonds, and new reserve lands. Other matters settled included land use and resource management.

CUSTOMER CALL CENTRE OPENED IN WINNIPEG to provide in the city and surrounding areas one phone number for service, plus extended hours for customers. Customers could call this one number Monday to Saturday about everything from electricity bills to POWER SMART information. The centre also provides a 24-hour emergency service during outages in the City of Winnipeg area.



NEW INDUSTRIAL LOAD RATE OPTIONS APPROVED by the Public Utilities Board (PUB) after Manitoba Hydro sought approval for changes to its industrial rate programs. The programs offer the sale of surplus interruptible energy to qualifying customers in Manitoba. The Industrial Surplus Energy rate allows the utility to supply up to 25 per cent of a customer's total new industrial load at surplus energy rates.

The PUB also approved a new rate program — known as the Surplus Energy Service to Self-Generators program — which extends most of the terms and conditions found in Manitoba Hydro's existing Dual Fuel Heat-



Members of Nelson House First Nation on the day the compensation agreement was signed.



Some of the 19 steel towers that collapsed when tornado-like winds hit the Grosse Isle area were replaced temporarily by wood poles in order to get the electricity flowing again. In about seven weeks, all steel towers were replaced and the Bipoles 1 and 2 transmission line systems were back to normal.

ing program, offered to customers who are backed-up by self-generators, such as those running on diesel fuel.

LOSS OF BIPOLE 1 AND 2 DURING LATE SUMMER STORM on September 5. Tornado-like winds crumpled 19 steel towers located in the Grosse Isle area — a few kilometres north of Dorsey Converter Station — collapsing sections of the two major HVDC transmission lines which deliver 75 per cent of the province's power from three northern generating stations. The supply of electricity was not interrupted during the five days it took to place one of the lines back in operation. In this period, all generating stations in the province were producing at maximum capacity, and power was imported from neighbouring utilities. As well, for the first time in history, Manitobans

were asked to voluntarily reduce their non-essential use of electricity while restoration was in progress. They responded with an eight per cent drop in demand.

The estimates for storm damage costs were pegged at just under \$10 million. Both lines were running at normal capacity by mid-September, and by October's end, permanent structures were back in place.

1997

SEVERAL NEW RECORDS ACHIEVED IN FISCAL YEAR 1996-97. Manitoba Hydro's net income of \$101 million was the

highest in history — almost \$40 million higher than the previous year's record.

New records were also set in the production and consumption of electricity.

DUBBED "THE BLIZZARD OF '97", a spring storm bringing winds gusting up to 96 km/h, downed poles and conductors during the first weekend of April in central and eastern Manitoba. The ice and snow storm did most of its damage in a diagonal line from the Altona-Winkler-Morden area across to Letellier then Steinbach. Dozens of power outages occurred in several areas. Repair crews were often stranded as they attempted to reach these areas. Service was restored to customers in extremely challenging conditions — some within minutes or hours, the last during the early hours of Monday, April 7.



Letellier Substation following the April 5 to 7 snow storm.

MANITOBA HYDRO'S OPERATIONS STAFF HEADED SOUTH ON A RESCUE MISSION. The same April weekend, an ice and snow storm also hit the province's U.S. neighbour, North Dakota, badly. For about 40 hours Manitoba Hydro was the only power source available to supply Minnkota Power in Grand Forks. In addition, because the U.S. utility needed help to rebuild over 500 poles and 99 towers damaged by the storm, Manitoba Hydro sent 110 pole and line staff, and over 100 pieces of equipment to assist in the restoration of service.



Letellier Substation on April 27 at the start of the Red River flood.

FLOOD OF THE CENTURY HITS MANITOBA. With two to three times the average amount of snow falling south of the Manitoba border during the 1996-97 winter, followed by the severe April storm, the resulting quantity of water in the Red River in Manitoba spilled over its banks as it made its way from the U.S. border to the river's outlet at Lake Winnipeg. Manitoba Hydro staff worked alongside provincial, municipal, and City of Winnipeg officials, as well as thousands of members of Canada's military forces, to assist wherever necessary to ensure the safety of people living and working in flooded areas. And, in southern Manitoba — primarily the hardest hit area — in addition to protecting the utility's facilities with dykes, conducting line patrols in boats, turning off power at flooded buildings, or removing meters threatened by rising water, staff also delivered sandbags to beleaguered communities, supplied equipment and vehicles needed to fight the flood, or helped to build dykes.

PIKWITONEI AND THICKET PORTAGE RECEIVE FULL ELECTRICITY SERVICE FOR FIRST TIME. These two communities were linked to the provincial power system in early summer when a new 95-km long, 25-kV transmission line was completed. Previously, the residents received only 15-amp service.

MANITOBA HYDRO AND THE TOWN OF CHURCHILL signed a settlement agreement in July to address low water levels in the Churchill River upstream from the town. The settlement related to the adverse effects of the 1970s' Churchill River Diversion, the project which diverted water from the Churchill River to generating stations on the Nelson River, thus reducing flows on the Lower Churchill River. Components of the \$26-million settlement included financial compensation to the town, the construction of a weir that raises water levels to enhance recreational use of the river and to improve aquatic life, and a trust fund to address unmitigated adverse effects.

50 YEARS OF LINEMEN TRAINING WAS CELEBRATED in Brandon by about 450 linemen, both formerly and currently employed in Manitoba. The lineman training program was developed in 1947 during the years of the Farm Electrification program. During the three-day reunion, they watched demonstrations featuring the changes in tools, equipment, and line building methods over the 50 years.

NORTHERN COMMUNITIES CONNECTED TO PROVINCIAL POWER SYSTEM. The First Nation communities of Oxford House, God's Lake Narrows, and God's River,

and the non-reserve community of God's Lake — all located in a remote area northeast of Lake Winnipeg — received full electricity service in 1997 as part of the North Central Project. Previously, the residents received only a 15-amp supply of electricity produced at their community-based diesel generating stations. Four more communities affected by the project would be connected in 1998.

Following the completion of the North Central Project, only four communities in Manitoba will be supplied with electricity produced by diesel fuel — Brochet, Lac Bochet, Shamattawa, and Tadoule Lake.



In September, linemen past and present gathered in Brandon to mark Manitoba Hydro's 50th Anniversary of the utility's lineman training program.



MANITOBAHYDRO ANNOUNCED NO CHANGE IN ELECTRICITY RATES for the fiscal year of 1998-89. The utility decided it could still achieve its long term financial goals without increasing the 1997 rates charged to Manitobans. Good water conditions during previous years, coupled with a continuing strong market for electricity export sales, allowed Manitoba Hydro to achieve higher-than-forecast net incomes.

CHANGES TO THE MANITOBAHYDRO ACT WERE INTRODUCED and passed in the Manitoba legislature in June. The revisions to the Act primarily focused on two major areas. One, providing for wholesale competition in the electrical energy market in Manitoba. Two, allowing the Corporation to offer new products and services and to create subsidiaries, joint ventures, and business alliances.

NORWAY HOUSE SIGNED HISTORIC AGREEMENT. A comprehensive agreement, effective December 31, to implement the Northern Flood Agreement (NFA) was signed by Manitoba Hydro, the Norway House Cree Nation, and the governments of Canada and Manitoba. The agreement settled claims and other outstanding issues that arose under the NFA, which was signed by Norway House and four other bands in 1977.

Key features of the agreement included payment of approximately \$78.9 million in cash and Hydro bonds, about 24,300 hectares of new reserve lands, and the creation of a resource co-management board with the province.

1998

MANITOBAHYDRO ADOPTED THE CANADIAN ELECTRICITY ASSOCIATION'S ENVIRONMENTAL COMMITMENT AND RESPONSIBILITY PROGRAM (ECR). The ECR program created a framework for evaluating and reporting the electric utility industry's environmental performance as a whole. To ensure credible and standardized reporting, the ECR program required utilities to implement an Environmental Management System based on standards set by the International Organization for Standardization (ISO) for managing the processes that have an impact on the environment. The standards are known as ISO 14,001.

SELKIRK GENERATING STATION SUFFERED FIRE DAMAGE in March when a fire started on the conveyor system, near the top of the powerhouse. Over \$100,000 in damages occurred. The generating station was shut down for repairs for approximately one month.

AT HERITAGE CEREMONIES IN NELSON HOUSE, Manitoba Hydro, the Museum of Man and Nature, and the provincial Historic Resources branch were honoured for their involvement in the recovery, analysis, replication, and return of heritage artifacts to the Nisichawayasihk (Nelson House) Cree First Nation of northern Manitoba. Surveys revealed evidence of large communities situated along the Churchill River and other streams and lakes, indicating that northerners had as rich and advanced a culture as southerners.

NEW STANDARDIZED MANITOBAHYDRO LOGO DESIGNED. The new logo would replace those used on vehicles, signs, print applications and other materials that publicly identify Manitoba Hydro. The m-h graphic symbol was retained, but a new typeface and placement of the company name was used.





The control room at Manitoba Hydro's new System Control Centre completed in 1998.

NEW SYSTEM CONTROL CENTRE.

Control of Manitoba Hydro's generation, transmission, and distribution system was transferred from the old facility at 820 Taylor Avenue to a \$67 million stand-alone centre. The new centre was a product of Manitoba Hydro's decision in the mid-1990s to replace the computer system that was used to oversee the province's power grid. Originally adopted in the 1970s, the existing system was not Year 2000 compliant and could no longer handle some of the new applications, such as operator training simulations, made necessary by changes in the electrical utility industry.



MANITOBAHYDRO SIGNED LETTER OF INTENT WITH WESTCOAST ENERGY INC. OF VANCOUVER to acquire

Centra Gas Manitoba Inc. In March, Manitoba Hydro announced plans to become a world class energy provider by combining two key sources of energy — electricity and natural gas. The purchase followed the trend of electrical and natural gas utilities around the globe to provide one-stop energy services. The purchase of Centra Gas Manitoba Inc. for \$245 million was finalized in July 1999 following approval by the Public Utilities Board.

NORTH CENTRAL PROJECT COMPLETED in April, when the last of nine remote northern communities received full electrical service for the first time. Previously, most of the residents had only 15-amp electrical service, produced by local diesel-fueled generating

stations. The \$154 million project involved the construction of four substations and over 500 km of transmission and distribution lines. The cost was undertaken by the federal and provincial governments and Manitoba Hydro. Oxford House was first to be linked to the provincial power system in 1997, followed over the next few years by God's Lake Narrows, God's River, God's Lake, Red Sucker Lake, Garden Hill, Wasagamack, St. Theresa Point, and Island Lake.

CHURCHILL WEIR, MARINA, AND GOOSE CREEK ENHANCEMENT COMPLETED.

By backing up river flows, the weir raised the water level 10 kms upstream on the Churchill River, enhancing fish habitat, and increasing recreational and business opportunities for the community. The project was designed to resolve the water levels in the river, which dropped after construction of the Churchill River Diversion Project was completed in the 1970s.

WEST LYNNE AREA RECEIVED NATURAL GAS SERVICE during last week of September.

Centra Gas Manitoba Inc., the Town of Emerson, and individual residents contributed about \$125,000 in capital costs to fund the expansion for gas service to the west side of the Red River at Emerson.

MANITOBA HYDRO RECOGNIZED FOR COMMITMENT TO ENVIRONMENT.

The Pembina Institute, a leading Canadian environmental think tank, named Manitoba Hydro the top performer among Canadian electrical utilities in the fight against climate change. As well, Canada's Climate Change Voluntary Challenge and Registry presented the utility with a Gold Champion award for its 1999 voluntary Climate Change Action Plan Update in recognition for the highest level of achievement in the organization's Champion Reporting System. Manitoba Hydro joined the voluntary National Action Program on Climate Change for Managing Greenhouse Gas Emission in 1995. National businesses and governments were challenged to take action voluntarily to limit and reduce greenhouse gas emissions, including a commitment to regular reporting.

Addressing the impacts of hydro development

Manitoba's rivers represent a clean and renewable source of energy — one capable of providing an abundant and affordable supply of electricity. However, the construction and operation of hydroelectric developments has had an impact on the province's waterways and the communities who use them, in particular, First Nation communities.

In the 1990s, Manitoba Hydro made a concerted effort to work with affected communities to find resolutions for past effects and to build cooperative relationships for the future. During the decade, Manitoba Hydro signed a total of 14 agreements, with some of the largest settlements falling under the Northern Flood Agreement (NFA), which provides the framework for resolving issues with five First Nations regarding the effects of the hydroelectric projects on the Churchill and Nelson rivers.

When development of Manitoba's northern rivers was first considered in earnest in the 1960s, proposals and plans were drawn up with little community consultation. Construction was already underway in 1974 when five affected First Nations formed the Northern Flood Committee to negotiate commitments from the governments of Canada and Manitoba, along with Manitoba Hydro to provide compensation and take steps to limit the impact of development.

The result of that effort was the Northern Flood Agreement, signed in 1977 by Cross Lake, Nelson House, Norway House, Split Lake and York Landing, together with the governments of Canada and Manitoba, and Manitoba Hydro.

The NFA provided for mitigation works, compensation, training, employment and for community planning. But, by the mid-1980s, it was apparent the arbitration process set out in the NFA was an inefficient mechanism to resolve outstanding issues.

At the initiative of First Nations, negotiations to achieve implementation agreements began in the mid-1980's. During the 1990s, the First Nations and Manitoba Hydro signed Implementation Agreements in four of five NFA communities; Split Lake in 1992, York Factory in 1995, Nelson House in 1996, and Norway House in 1997.

The four comprehensive implementation agreements provided significant financial resources, land in exchange for reserve land lost to hydroelectric projects (at a ratio of 16:1), and other benefits, such as resource co-management boards with the province and joint planning processes for future hydroelectric projects. The total value of the comprehensive implementation agreements amounted to \$223 million.

These new agreements were a major step forward in the relationship between Manitoba Hydro and northern First Nations. They not only compensated those bands affected monetarily, but more importantly, the First Nations were empowered to make their own decisions with regard to the use of funds and the development of their communities.

Manitoba Hydro also undertook projects to mitigate the impacts of its operations, such as the Cross Lake Weir. Completed in 1991, the \$9.5 million weir was built across one of Cross Lake's four outlet channels to maintain higher summer water levels and moderate seasonal water level fluctuations. In addition, a long term fish restocking program was undertaken to return the fish population in Cross Lake to pre-development levels. Between 1992 and 1999, Manitoba Hydro arranged for 100 million whitefish from the Grand Rapids fish hatchery to be released into the lake.

Separate agreements were also reached with the communities along the Churchill River who were adversely affected by the diversion of river flows into the Nelson River system. Discussions with representatives from the community of South Indian Lake reached a successful conclusion in 1992 with a settlement of \$18 million. Further downstream, the Town of Churchill signed an agreement in 1997 which included \$3 million in compensation, a \$2.8 million mitigation trust fund, and a \$5 million capital payment to conclude Manitoba Hydro's previous ongoing obligation for the town's water supply. As part of the agreement, the town and Manitoba Hydro initiated construction of a rock weir in the Churchill River. The \$15 million project created a 10 kilometre long reservoir with fishing and boating opportunities.

Manitoba Hydro also reached settlements with communities affected by the operation of facilities on rivers in the central and southern regions of the province. In 1997, the Sagkeeng Nation agreed to a \$2.5 million settlement which recognized the impact of hydroelectric developments on the Winnipeg River. In the early 1990s, five settlements were reached related to the Grand Rapids Generating Station, built on the Saskatchewan River. Agreements totalling \$31.8 million were signed with Easterville/Chemawawin, Moose Lake, The Pas Indian Band, Grand Rapids First Nation, and Cormorant communities. The former residents and families of Pine Bluff who were affected by the project agreed to a settlement in 1996.

By the end of the decade, Manitoba Hydro had spent or committed approximately \$400 million on comprehensive community settlements, resource sector or remedial work settlements, and settlements with individuals to remedy problems and offset losses. But, more importantly, the Corporation had forged new relationships with Manitoba's First Nation's people. The process of negotiation and discussion associated with reaching settlements produced, in many situations, a mutual understanding and respect that lay the foundation for further cooperation. These new relationships were clearly exemplified in 1997 when Manitoba Hydro began collaborating with both the Nisichawayasihk (formerly Nelson House) and Tataskweyak (formerly Split Lake) Cree Nations to evaluate potential hydroelectric sites in their resource management areas.

2000

THE YEAR 2000 ARRIVED IN MANITOBA, and Manitoba Hydro's generation, transmission, and distribution system performed flawlessly. The utility had spent three years working on the Y2K problem — ensuring its power system would continue to operate normally through the Year 2000 changeover. It was realized in the early 1990s that many computers and microchips had been designed to read only two digits for a year's date, meaning computers could potentially interpret the year 2000 as 1900.

NATURAL GAS COMBUSTION TURBINE FACILITY AT BRANDON ANNOUNCED. The new facility would add a new power source to the provincial power system, allowing Manitoba Hydro to expand its profits on the export market while improving reliability. The two turbines are capable of generating up to 260 MW of electricity. The facility was built at the site of the Brandon Generating Station at a cost of approximately \$180 million.

NORTHERN STATES POWER COMPANY (NSP) of Minneapolis announced the selection of Manitoba Hydro and two other energy providers, to provide 900 MW of electricity, pending regulatory approvals. The purchase involved 500 MW from Manitoba Hydro for a duration of 10 years beginning May 1, 2005. The sale was effectively an extension of Manitoba Hydro's previous 500 MW sale to NSP, with modifications to various terms and conditions, including pricing.

Members of Manitoba Hydro's Y2K Task Force marked a new century with the flawless changeover of the utility's systems.



PREPARING FOR NEXT GENERATION. Manitoba Hydro moved forward with preparations for the possible development of one or more of three potential hydroelectric sites in northern Manitoba. Two of the sites, Wuskwatim and Notigi, are on the Burntwood River system, and the third site, Gull, is on the Nelson River.

INTERLAKE NATURAL GAS EXPANSION PROJECT began after enough customer sign-ups were achieved to make the project feasible. The \$7.3 million project installed nearly 200 kms of transmission and distribution pipeline and expanded natural gas service to the communities of Arborg, Teulon, Warren, and Riverton.

TATASKWEYAK AND MANITOBA HYDRO SIGNED HISTORIC AGREEMENT-IN-PRINCIPLE in October. The new agreement created a model of partnership between First Nations and the utility for future developments in the Tataskweyak Cree Nation's resource area. Specifically, the agreement provided the Tataskweyak, and potentially other Cree Nations within the Split Lake resource management area, the opportunity to invest in the proposed Gull Generating Station.

2001

THE ISO 14001 ENVIRONMENTAL STANDARD was achieved by employees from the Long Spruce Generating Station, Brandon Generating Station, and Selkirk Generating Station. The certification of the three stations means that they meet the criteria set by the International Organization for Standardization (ISO) for managing processes that have an impact on the environment.

AN AGREEMENT IN PRINCIPLE WAS SIGNED, to develop new hydroelectric facilities between the Nisichawayasihk Cree Nation (NCN) and Manitoba Hydro, at a ceremony in Nelson House. The Agreement in Principle allows the First Nation to obtain an equity position by investing in the proposed Wuskwatim and Notigi generating stations, which are located in the NCN Resource Management Area.

THE MANITOBA ELECTRICAL MUSEUM AND EDUCATION CENTRE was officially opened. The new museum building, located at 680 Harrow Street in Winnipeg, incorporates some of the highest energy efficient



Natural gas combustion turbine plant at the Brandon Generating Station.

In 2002, Manitoba Hydro became the sole provider of electricity in the province with the acquisition of Winnipeg Hydro from the City of Winnipeg.



features available with current technology. Established in 2001 by the Manitoba Electrical Museum Inc., an organization of retired Manitoba Hydro employees (Hydro X) and retired electrical industry employees, the Museum shows everyone who visits the marvels of electrical history. Six main themes portray the Story of Electricity in Manitoba from the 1870s to the present as well as a view into the future.

MANITOBAHYDROPURCHASEDWINNIPEG

2002

HYDRO from the City of Winnipeg. On September 3, the official transfer of ownership of Winnipeg Hydro to Manitoba Hydro was completed. As of

that date, the Corporation officially took over the responsibility for generating, transmitting, and distributing electrical energy throughout all parts of the province.

MANITOBA HYDRO'S SELKIRK GENERATING STATION WAS CONVERTED to burn natural gas, one of the cleanest forms of thermally generated power. The project involved the conversion of the station's two boilers to natural gas, and a new gas supply pipeline from Landmark.

THE NATURAL GAS COMBUSTION TURBINE PLANT at the Brandon Generating Station was officially opened in December. Built over two years at a cost of \$177 million, the new 260 MW plant will help Hydro maximize export revenues while strengthening the security of the electricity system in southern Manitoba. The first of the Brandon Combustion Turbine's two generating units went on-line at the end of the June. The occasion represented the first time the unit was remotely operated from the System Control Centre.

A decorative graphic for the year 2003, featuring the number '2003' in a stylized, bold font with a grid pattern behind it.

MANITOBA HYDRO ERECTED its first 60-metre wind-monitoring tower near Minnedosa – one of seven towers across the province that would eventually be built to provide information about favourable

wind conditions. Data recorded from various sensors and instruments on the towers contributed to a better understanding of the best locations for future wind power development in the province.

A NEW DIESEL GENERATING STATION was officially opened in Shamattawa in October — substantially expanding the capacity of the existing diesel plant. Shamattawa, which is located approximately 800 km north of Winnipeg, is one of four remote Manitoba communities that continues to rely on diesel generation for its power supply.

MANITOBA HYDRO'S NEW DOWNTOWN OFFICE location in Winnipeg was unveiled in December. It was announced the site would encompass an entire city block on the south side of Portage Avenue between Carlton and Edmonton streets and north of Graham Avenue.

A decorative graphic for the year 2004, featuring the number '2004' in a stylized, bold font with a grid pattern behind it.

THE FOX LAKE CREE NATION, PROVINCE OF MANITOBA, AND MANITOBA HYDRO agreed to the terms of a settlement agreement to address the adverse effects

of past hydroelectric development in the Lower Nelson River area.

A NET LOSS OF \$436 MILLION was reported in Manitoba Hydro's 53rd annual report for the fiscal year ending March 31, 2004. The loss was primarily due to the prolonged drought conditions that affected normal electricity production at the utility's 14 hydroelectric generating stations.

MANITOBA'S CLEAN ENVIRONMENT COMMISSION released its final report on the proposed Wuskwatim Generating Station and Transmission Projects – concluding that the mega-project was both viable and economic. The project still required ratification from the Nisichawayasihk Cree Nation (NCN), a potential partner on the development with Manitoba Hydro, before construction could proceed.

PREMIER GARY DOER announced that AirSource Power would invest \$187 million to develop Manitoba's first wind farm near St. Leon. The 99-megawatt (MW) project, located in the rural municipalities of Lorne and Pembina near St. Leon, would use technology developed by Vestas Wind Systems. AirSource Power will sell the wind-generated power to Manitoba Hydro as part of a 25-year Power Purchase Agreement.

THE CANADIAN ENERGY EFFICIENCY ALLIANCE (CEEAA) gave Manitoba an A for efficiency in its fifth annual National Report Card on Energy Efficiency – the highest grade in the country. A variety of Power Smart programs and initiatives contributed to the overall rating.



Using the world's tallest crane, the first wind turbine's 80 metre high steel tower was raised, followed by the blades, which are longer than a 747 jet airplane.



The building will be connected to the downtown elevated walkway system and provides street level retail activity, as well as offering a landscaped public courtyard on its southern exposure along Graham Avenue.

2005

THE MIDWEST INDEPENDENT TRANSMISSION SYSTEM OPERATOR (MISO) launched the largest competitive energy trading market in the United States in

April, responsible for dispatching all generation resources from participating members and setting real-time prices across 15 states. As the only Canadian member of MISO, Manitoba Hydro maintains control of its own generation and operates as an external participant.

MANITOBA'S FIRST WIND TURBINE, standing nearly 80 metres tall, was erected in April in St. Leon as part of AirSource Power's wind energy project. An additional 62 towers were constructed over the next year within a 93.8-kilometre radius to complete the 99-megawatt wind farm.

THE FINAL DESIGN for Manitoba Hydro's 22-storey downtown office was unveiled in July. The final design, which included public participation, incorporated a splayed twin office tower resting on a podium that varies from two to three storeys. The unique building targets a 60 per cent energy saving compared to conventional offices.

2006

**THE NISICHAWAYASIIHK
CREE NATION (NCN)
AND MANITOBA HYDRO**

formally signed the historic Wuskwatim Project Development Agreement in June, following the results of a positive ratification vote in the community of Nelson House. The ratification authorized chief and council to sign the agreement with Manitoba Hydro to share in the ownership and development of the 200-megawatt (MW) Wuskwatim Generating Station. Construction on Wuskwatim got underway in August, with the start of a 48 km gravel access road to the site of the future generating station.

MANITOBA HYDRO ANNOUNCED AN R&D PROJECT to review the potential of plug-in hybrid electric vehicles (PHEVs) and the possible impact that the new technology could have on future Manitoba Hydro electrical load growth and energy markets. One of Hydro's fleet vehicles (a 2005 Toyota Hybrid Prius) was converted so that it has a battery pack that can be conveniently plugged in and charged at any standard 120-volt outlet.



*After years of negotiation, the Nisichawayasihk Cree Nation (NCN) and Hydro announced a finalized Project Development Agreement for the Wuskwatim Project in March. Standing with a copy of the historic document are, from left: W. Elvis Thomas, NCN Councillor; Jerry Primrose, NCN Chief; **Bob Brennan** (President and CEO), and **Ed Wojczynski** (Division Manager, Power Planning and Development).*



***Bob Brennan** and **Greg Selinger**, minister responsible for Manitoba Hydro, announce Hydro's PHEV research and development project at a press conference on October 10.*

2007

THE OFFICE AT 480 MADISON STREET in Winnipeg closed after 50 years. Initially the St. James District office, the

building also once housed a transformer shop, welding and repair shops, and the meter shop. The Long Plain First Nation Trust assumed ownership at that point, and took possession of it on July 1, 2007.

FOX LAKE CREE NATION AND MANITOBA HYDRO signed a process agreement for the Conawapa Generating Station. The agreement set out a process and funding mechanism for Fox Lake Cree Nation's participation in the planning and consultation for the development of Conawapa.

HYDRO BEGINS TO INSTALL ADVANCED METERING INFRASTRUCTURE (AMI) technology in the homes of residential customers in Winnipeg and Landmark for a pilot project. The first of its kind in Canada, the new technology uses power lines to communicate automatic meter readings and other data back to Hydro.

THE 2007 CANADIAN ELECTRIC UTILITY RESIDENTIAL CUSTOMER SATISFACTION STUDY showed that Manitoba Hydro ranked highest among medium-large utilities and ranked highest overall in satisfying residential electric utility customers in Canada.

HYDRO ANNOUNCED THAT THE CORPORATION WOULD MOVE FORWARD with plans to build a new high voltage direct current (HVDC) transmission line, known as Bipole III, on the west side of the province. This line will act as a back up to the current system as well as being able to carry power from new generating stations, such as Conawapa, to the south and export markets. The proposed line would originate near Gillam, run to the west of Lake Winnipegosis, and terminate at the Riel Converter Station near Winnipeg.



Fox Lake Chief George Neepin and Bob Brennan (CEO) signed a process agreement for the Conawapa Generating Station on February 28, 2007 in Gillam.

2008

MANITOBA HYDRO SIGNS A TERM SHEET WITH WISCONSIN PUBLIC SERVICE to provide up to 500 megawatts of clean, renewable hydro power over 15 years, starting in 2018. The long-term sale – which would mean \$2 billion of revenue over 15 years – will require the construction of the Bipole III transmission line as well as new hydroelectric facilities in northern Manitoba. It will also require a major transmission line to be built between Canada and the United States.

A decorative graphic for the year 2009, featuring the number '2009' in a stylized, bold font. The numbers are filled with a grid of small squares, and the entire graphic is set against a background of larger, faint squares.

THE FIRST CONCRETE IS POURED AT THE WUSKWATIM GENERATING STATION CONSTRUCTION SITE.

The pour marks a turning point in progress from preparing site infrastructure to building the station itself. Wuskwatim is the first generating station to be built in Manitoba since the completion of Limestone in 1992. It is also the first time in Canada that a First Nation — Nisichawayasihk Cree Nation — and an electric utility have entered into a formal partnership arrangement to develop a major hydro generation project, resulting in the Wuskwatim Power Limited Partnership.

MANITOBA HYDRO PLACE, THE NEW CORPORATE HEADQUARTERS located at 360 Portage Ave. in Winnipeg, officially opened. The building, which features a 100 per cent fresh air ventilation system, operable windows and bright, open floor spaces, is a testament to Manitoba Hydro's continued commitment to the environment. Manitoba Hydro Place is constructed to meet the corporation's present and future business needs while serving as a model for superior energy-efficient sustainable building design and operation. The building is expected to use 65 per cent less energy than a comparable office tower built to current standards and every aspect of Manitoba Hydro Place is designed to work in harmony with the natural habitat and the people in it.

A decorative graphic for the year 2010, featuring the number '2010' in a stylized, bold font. The numbers are filled with a grid of small squares, and the entire graphic is set against a background of larger, faint squares.

MANITOBA HYDRO AND XCEL ENERGY IN MINNEAPOLIS

enhanced and extended, by 10 years, a significant power purchase agreement worth about \$3 billion. This is another boost for Hydro's export markets. Additionally, a 350-MW seasonal diversity agreement allows for an exchange of electricity between the utilities based on a summer peak on the U.S. side and a winter peak for Manitoba. The power sale, which starts in 2015, will extend contracts through 2025. Under the agreement, Xcel Energy will purchase between 375 and 500 MW of power from Manitoba Hydro.

CONSTRUCTION OF A 138 MW WIND FARM NEAR ST. JOSEPH

begins after the signing of a 27-year power purchase agreement between Manitoba Hydro and Pattern Energy. The St. Joseph wind farm will be the second major operation of its kind in Manitoba. It is expected to be fully operational in the spring of 2011 with 60 wind turbines each producing up to 2.3 MW and covering an area of 125 square kilometres in rural Manitoba.

Past Commissioners, Chairmen and General Managers of the Manitoba Power Commission

Terms refer to annual reports, year-ending November 30:

- J.M. Leamy**, Commissioner — 1920
- J. Rocchetti**, Acting Commissioner — 1921-1923
- C.A. Clendening**, Commissioner — 1924-1926
- D.L. McLean**, Commissioner — 1928-1930
- D.L. McLean**, Commissioner and Chairman — 1931-1932
- H. Cottingham**, Chairman — 1933-1945
- W.D. Fallis**, General Manager — 1946

Terms refer to annual reports, year ending March 31:

- W.D. Fallis**, General Manager — 1947-1961
- R.C. Smellie**, Chairman — 1948-1961

Chairmen, Vice-Chairmen, General Managers and Presidents of the Manitoba Hydro-Electric Board

Terms refer to annual reports, year-ending March 31:

- D.M. Stephens**, Chairman and General Manager — 1952-1956
- D.M. Stephens**, Chairman, President and General Manager — 1957-1961
- D.M. Stephens**, Chairman — 1962-1967
- W.D. Fallis**, General Manager — 1962-1967
- W.D. Fallis**, Chairman and General Manager — 1968-1969
- W.D. Fallis**, General Manager — 1970-1971
- D. Cass-Beggs**, Chairman — 1970-1972
- L. Bateman**, Chairman — 1973
- G. Reid**, General Manager — 1973
- L. Bateman**, Chairman and Chief Executive Officer — 1974-1978
- L.M. Wedepohl**, Vice-Chairman — 1979
- C.E. Curtis**, Vice-Chairman — 1980
- K. Kristjanson**, Chairman — 1981
- L. Blachford**, President and Chief Executive Officer — 1980-1982
- S. Cherniak**, Chairman — 1982-1984
- J. Arnason**, President and Chief Executive Officer — 1983-1986
- M. Eliesen**, Chairperson — 1984-1988
- G.H. Beatty**, President and Chief Executive Officer — 1986-1990
- A.B. Ransom**, Chairman — 1988-1990
- J.S. McCallum**, Chairman — 1991-2000
- R.B. Brennan**, President and Chief Executive Officer — 1990 to present
- V.H. Schroeder**, Chairman — 2000 to present

General Managers of Winnipeg Hydro

- J.G. Rossman**, City Power Manager — 1911-1912
- J.G. Glassco**, General Manager — 1912-1944
- J.W. Sanger**, General Manager — 1944-1951
- H.L. Briggs**, General Manager — 1952-1955
- T.E. Storey**, General Manager — 1955-1960
- D.C. Bryden**, General Manager — 1960-1969
- R.T. Harland**, General Manager — 1969-1978
- K.H. Hallson**, General Manager — 1978-1988
- R.J. Linton**, General Manager — 1988-2001
- I.H. McKay**, Director — 2001-2002

Historical Development of Manitoba's Electrical Utilities

Starting with the Winnipeg Gas Company, a supplier of gas for lighting, many more gas, electricity, and transportation companies evolved in Manitoba during the following century until Manitoba Hydro became the sole supplier of electricity and distributor of Natural Gas.

Year	Utilities	Page
1873	Winnipeg Gas Company	2
1880	Manitoba Electric & Gas Light Company	2
1881	Winnipeg Gas Company merged with Manitoba Electric & Gas Light Company	2
1882	Winnipeg Street Railway Company	2
1883	North West Electric Light and Power Company (Ltd.) (NWEL & P.Co.)	3
1889	North West Electric Company Ltd.	4
1889	Brandon Electric Light Company Ltd.(formation date unknown) built steam station in Brandon	4
1892	Winnipeg Electric Street Railway Company (WESR.Co.)	5
1894	Winnipeg Street Railway Company purchased by WESR.Co.	5
1898	Manitoba Electric & Gas Light Company purchased by WESR.Co.	5
1900	Winnipeg Selkirk & Lake Winnipeg Railway Company	8
1900	North West Electric Company Ltd. purchased by WESR.Co.	8
1902	Winnipeg General Power Company	8
1904	Winnipeg General Power Company merged with WESR.Co. and became Winnipeg Electric Railway Company (WERCo.)	8
1905	Suburban Rapid Transit Company became subsidiary of WERCo.	8
1906	Winnipeg Selkirk & Lake Winnipeg Railway Company became subsidiary of WERCo.	9
1906	City of Winnipeg Hydro Electric System (City Hydro)	9
1911	Winnipeg River Railway Company, financed by WERCo., affiliated to Winnipeg River Power Company	
1913	Winnipeg River Power Company became associate company of WERCo.10	
1913	Minnedosa Power Company (formation date unknown) built Minnedosa Hydro Plant	10
1919	Manitoba Power Commission (MPC)	10
1920	Manitoba Power Company, a subsidiary of WERCo., took over Winnipeg River Railway Company and Winnipeg River Power Company	13
1921	Canada Gas & Electric Corporation of Brandon formed with consolidation of Brandon Electric Light Company Ltd. and Brandon Gas & Power Company Limited	13
1924	WERCo. changed name to Winnipeg Electric Company (WECO.)	14
1924	Northwestern Power Company	14
1927	Northwestern Power Company merged with WECO.	14
1931	Canada Gas & Electric Corporation of Brandon purchased by MPC	16
1936	Winnipeg Electric Company's Plan of Consolidation and Readjustment reorganized WECO. and its associated companies (Northwestern Power Company, Suburban Rapid Transit Company, Winnipeg Selkirk & Lake Winnipeg Railway Company)	16
1949	Manitoba Hydro-Electric Board Development Act passed in Manitoba legislature	21

Historical Development of Manitoba's Electrical Utilities (continued)

1951	Manitoba Hydro-Electric Board (MHEB)	24
1952	National Utilities Corporation Limited acquired by MPC	24
1952	WECO. transferred its gas and transit assets to newly incorporated companies, Greater Winnipeg Gas and Greater Winnipeg Transit Company	24
1953	MHEB amalgamated with WECO.	24
1955	City of Winnipeg Hydro Electric System (City Hydro) became sole distributor of electricity in City of Winnipeg	25
1955	Manitoba Power Commission (MPC) became sole distributor of electricity in suburban Winnipeg and all of Manitoba	25
1958	The Pas Electrical Utility purchased by MPC	26
1959	Cranberry Portage Distribution System purchased by MPC	26
1959	Town of Selkirk Electrical Distribution System purchased by MPC	26
1961	Manitoba Hydro	29
1964	City of Winnipeg Hydro Electric System (City Hydro) became Winnipeg Hydro	31
1970	Laurie River generating stations, owned by Sherritt Gordon Mines Limited, taken over by Manitoba Hydro	34
1999	Manitoba Hydro purchased Centra Gas from West Coast Energy Inc.	62
2002	Manitoba Hydro purchased Winnipeg Hydro from the City of Winnipeg	66
2003	Manitoba Hydro erected wind-monitoring tower	67
2004	Manitoba Hydro, Fox Lake Cree Nation and Province of Manitoba reach agreement	67
2005	MISO launched largest competitive energy trading market in the United States	68
2006	Manitoba Hydro and Nisichawayasihk Cree Nation signed Wuskwatim Agreement	69
2007	Manitoba Hydro office at 480 Madison Street closed	70
2008	Manitoba Hydro signs term sheet with Wisconsin Public Service	70
2009	Manitoba Hydro Place, the new corporate headquarters located at 360 Portage Ave. in Winnipeg, officially opened.	71
2010	Manitoba Hydro and Xcel Energy in Minneapolis enhanced and extended, by 10 years, a significant power purchase agreement worth about \$3 billion.	71

ABBREVIATIONS FOR UNITS OF MEASUREMENT AND ELECTRICAL TERMS

AC	alternating current	km	kilometre(s)
amp	ampere(s)	kV	kilovolt(s)
DC	direct current	kW	kilowatt(s)
EHV	extra high voltage	kW·h	kilowatt hour(s)
h.p.	horse power	m	metre(s)
HVDC	high voltage direct current	MW	megawatt(s)

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