



The Heritage of Power Generation

by Sheila Ascroft

Given Canada's abundance of waterfalls and fast-flowing rivers, it was hardly surprising that hydro-electricity would become a mainstay power source. Since the late 1880s, generating electricity has played a significant role in the country's economic and political life. Canada is currently the world's second-largest producer of hydro-electricity, and Canadians' per-capita power consumption is among the highest in the world.

An impressive legacy of unique and purpose-built historic power structures still exists across the country. From small-scale rural installations that illuminated busy streets to large hydro-electric generating plants, dams and substations that transformed industry, power-related structures are an important part of the Canadian landscape.

This year for Heritage Day, the Heritage Canada Foundation is inviting Canadians to celebrate The Heritage of Power Generation.



Photo: Rita O'Toole

Extending across the St. Lawrence River southwest of Montréal, the Beauharnois Generating Station is one of only four run-of-river facilities in Canada.

La centrale électrique de Beauharnois, qui s'étend au travers du fleuve Saint-Laurent au sud-ouest de Montréal, est une des quatre centrales au fil de l'eau au Canada.

Beauharnois Generating Station Melocheville, Quebec

In 1929 the landscape surrounding Melocheville and Beauharnois was completely transformed by the construction of one of the largest hydro generating stations of its kind in the world. Built in three phases, the 38 turbines stretch across the St. Lawrence River for almost 1 km. Located just 40 km southwest of Montreal, Beauharnois is an example of a run-of-river facility, where the station uses the river directly to harness power without modifying its flow.

Operations began with the completion of the first phase of construction in 1932. Today, with three Olympic-sized swimming pools' worth of water flowing through the plant every second, Beauharnois is one of Hydro-Québec's most powerful generating stations.

A monument to human ingenuity, Beauharnois has been designated a national historic site. Recognized as an engineering marvel, it features award-winning Art Deco architecture that lends elegance to its industrial function.

Sensitive to the ecology of the river, Hydro-Québec built a fishway into the structure that allowed 50,000 eels to travel unscathed last year.

An interpretation centre and guided tours are offered on a seasonal basis.

DeCew Falls Generating Station No. 1 St. Catharines, Ontario

Built in 1898, DeCew Falls No. 1 is the oldest continually running hydro-electric power generating station in Canada.

Five prominent Hamilton entrepreneurs pooled nearly \$100,000 in 1896 to form the Cataract Power Company of Hamilton and tap into the power of the DeCew Falls (a drop of over 80 metres) with a plan to generate and transmit electricity 56 km to the city. It was an audacious move, since long-distance transmission of electricity was still in its infancy.

To increase the water flow, the plant design used the geographical features of the Niagara Escarpment. Water was diverted from Lake Erie through the Welland Canal with the construction of a 7.2-km feeder canal that carried it to three storage reservoirs high above on the escarpment. A single penstock supplied water to the turbines that discharged it into Twelve Mile Creek. Along with the plant construction, 56 kilometres of 22,400-volt transmission lines were installed, sending power to Hamilton for the first time on August 25, 1898.

The plant was seen as a monument to Canadian engineering expertise and business enterprise. Today, seven penstocks carry water to the plant, which is now owned by Ontario Power Generation, and it remains

a working piece of Ontario's hydro-electric heritage.

DeCew Falls derives its name from John DeCou, one of the pioneer settlers in the area. In 1788 he secured a number of lots adjacent to the falls, where he built a stone house (the one Laura Secord struggled to reach in 1813 to warn the British of an impending American attack) and several mills, laying the foundation for what became a flourishing settlement.

**Stave Falls Hydro-Electric Installation
National Historic Site
Mission, British Columbia**

Nestled in the mountainous Stave River Valley, just north of the Fraser River, this installation was developed during Canada's most innovative period for hydro-electric technology between 1900 and 1920. With the introduction of alternating current electrical systems, power plants no longer needed to be close to the end user, resulting in a proliferation of hydro-electric installations in this water-rich country.

Construction of the dam and power house at Stave Falls was completed by 1912, and the plant was quickly supplying power to more than a thousand customers in the Lower B.C. Mainland. Expanded in the 1920s, it was the largest source of power in the province's electric generating system.

The design of the power house itself reveals the architectural richness and elegance of power houses of this period with exterior walls carefully detailed with pilasters, cornice lines, stepped parapets and segmented arches. The design of the interior main generator hall is both monumental and elegant, reflecting the circular turbines in its arches, clerestory windows and exposed steel trusses.

Hydro-electric power generation was instrumental in shaping the history and landscape of the Stave Valley as well as the economic development of British Columbia. In order to preserve the heritage of one of BC Hydro's first hydro-electric installations, the original power house was converted into a museum and visitor centre.



Photo: Mark Csele

Built in 1898, DeCew Falls Generating Station No. 1 near St. Catharines was seen as a monument to Canadian engineering expertise, and remains a working piece of Ontario's hydro-electric heritage.

Construite en 1898, la centrale électrique n° 1 des chutes DeCew, près de St. Catharines, a tout de suite été perçue comme un monument témoignant de l'expertise technique canadienne. Aujourd'hui encore elle contribue à la production hydroélectrique de l'Ontario.

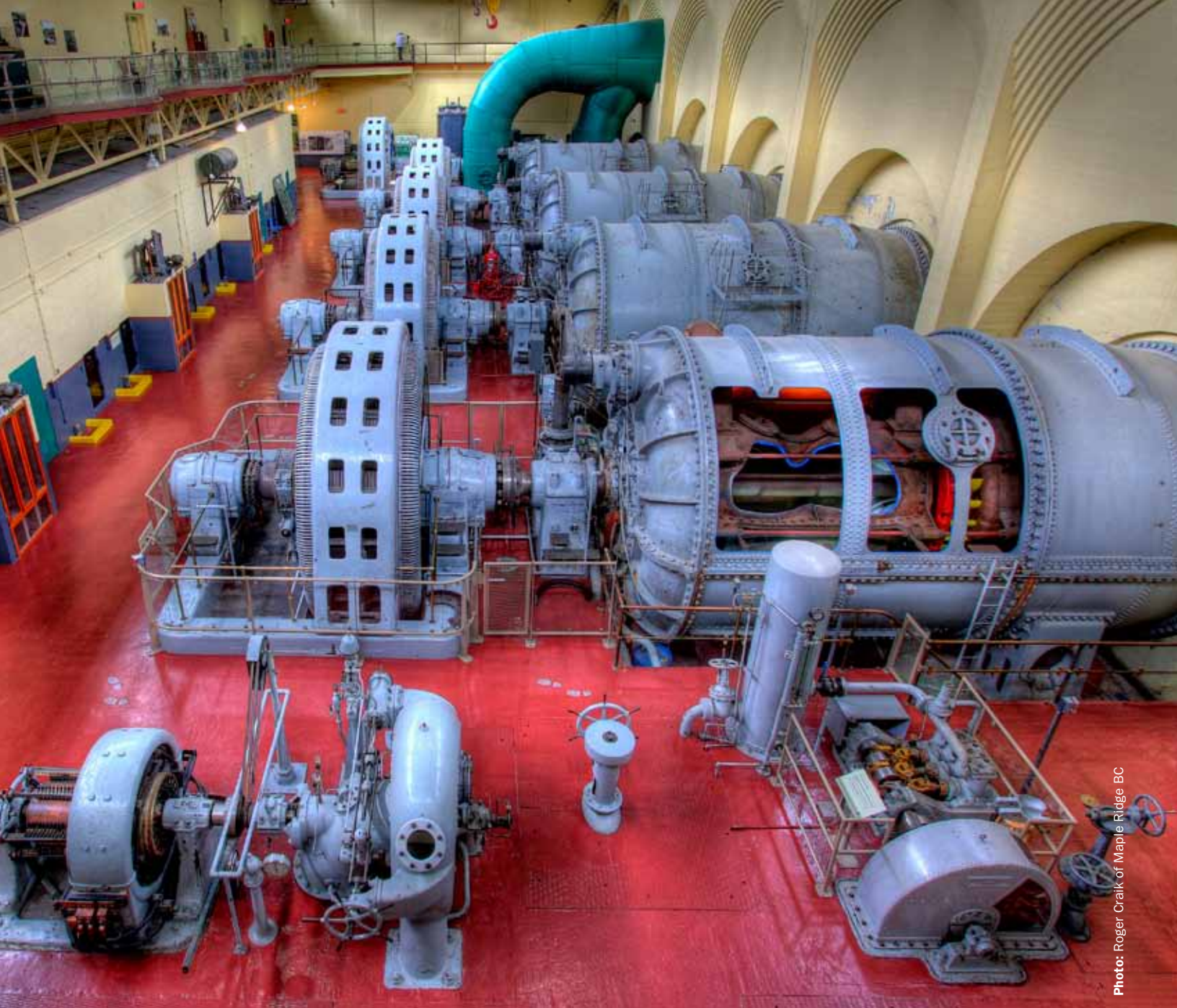


Photo: Roger Craik of Maple Ridge BC

Open to visitors, the interior main generator hall of B.C.'s old Stave Falls power house—a monumental but elegant space—still houses the plant's massive turbines.

Petty Harbour Generating Station Petty Harbour, Newfoundland and Labrador

Newfoundland's first hydro-electric generating station was built at Petty Harbour—a small community just outside the city of St. John's—by the St. John's Street Railway Company in 1898-1900. Its purpose was to supply electricity to the city's homes, businesses, and of course streetcars, which are now long gone.

The generating station's developer, Sir Robert G. Reid, a distinguished bridge builder and railway contractor, built the plant out of

Ouvert aux visiteurs, le local principal des générateurs de la vieille centrale de Stave Falls en Colombie-Britannique – à la fois monumental et élégant – abrite encore des turbines massives.

stone with heavy stone window trim. Concrete modifications in the 1920s increased the building's wall height above its original stonework.

The first wooden flume traversed a steep open slope to the plant. In 1921 an avalanche swept away 23 metres of it, cutting off all power to the city. According to the *Evening Telegram*, instead of "well-lighted thoroughfares ... not a light could be seen anywhere save where, in occasional windows, the glimmer of an oil lamp or the faint flame of flickering candles could be seen." A work crew—helped by a shipload of lumber and labourers from

St. John's—restored power four days later.

Designated a provincial heritage site in 1985, the station still contains its original turbines and generators. In 1920 it was incorporated as the St. John's Light and Power Company. A strong surviving example of one of the oldest hydro-electric plants in the country, it is still in active use.



Photo: Melfort and District Museum

Saskatchewan's Power House Museums: Melfort and Weyburn

In the early days of rural electrification in Saskatchewan, utilities were scarce. With the rapid growth of the province's population in the first decades of the 20th century, small utilities began to pop up. They were either owned privately or by municipalities, and none were interconnected.

The Town of Melfort built a one-and-a-half-storey brick power house for its first power generator in 1913. Ten years later, with demand still growing, the community voted to sell it to Canadian Utilities Limited, whose larger system could better meet its electrical needs. In 1948, Canadian Utilities sold the power house to Saskatchewan Power, a newly created crown corporation, for amalgamation into its provincial electrical generation and transmission system.

Melfort has recognized the heritage value of the power house—both for its status as a long-standing public building and its architectural attributes—with a formal municipal designation. The solid utilitarian red brick structure, highlighted with lighter brick around the windows and doors, symbolizes the “strength and permanency” typical of early power production facilities built during this era. It remains a landmark in the community.

In 1973, the building became home to the Melfort and District Museum.

Another former one-and-a-half storey, red brick power house, complete with smokestack, can be found in Weyburn. The arrival of the Soo Line, the Canadian Pacific Railway (CPR) component of the Minneapolis, St. Paul and Sault Ste. Marie Railway, established Weyburn as a prominent centre in southeastern Saskatchewan.

Electric utility came into being in 1905 when the Weyburn Electric Light and Machine Company was formed by a group of CPR employees. The power house was constructed in 1909 when the municipality took over the utility to help attract business and industry to the community. It consisted of a 75-kilowatt generator serving no more than 50 customers. When SaskPower purchased it in 1960, the plant served more than 2,500 people.

The power plant and smokestack are constructed entirely of Estevan brick. Their utilitarian design is typical of larger power

Dating from 1913, the former Melfort power house has been home to the Melfort and District Museum since 1973.

L'ancienne centrale de Melfort, datant de 1913, abrite aujourd'hui un musée régional depuis 1973.

In 1978, the plant was entered into the Canadian Engineering Heritage Record as a model reflecting progressive adaptation to emerging technology. In 2003, the Petty Harbour Hydro-Electric Plant was inducted into the Hydro Hall of Fame by Hydro Review, and it was honoured by the National History Committee of the Canadian Society for Civil Engineering in 2009.

plants constructed during this period in Saskatchewan.

In 1967, the Soo Line Historical Society rented the municipal heritage property and has been operating the power house as a museum ever since.



Photo: Rae McLeod

The former Soo Line power house was built in 1909 and started out as a 75-kilowatt generator serving 50 customers in Weyburn, Saskatchewan. Today the Soo Line Historical Society operates it as a museum.

La centrale électrique de la ligne Soo a été construite en 1909. Elle produisait initialement 75 kilowatts au service de 50 clients de Weyburn, en Saskatchewan. Aujourd'hui, la Soo Line Historical Society l'a transformée en musée.

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**Substation House
555
Spadina
Road**



**Substation House
Scarborough**



**Substation House
640
Millwood
Road**



**Substation 29
Nelson
Street**

Photos: Derek Flack BlogTO

Hidden in Plain View—Toronto's hydro substations

Here is a small sampling of Toronto Hydro's 277 substations—the city's urban imposters. Is there one hiding out on your street?

Send us your imposters!

Let us know about interesting substation designs in your town or city by emailing heritagecanada@heritagecanada.org or by posting on our Facebook page. Join our Heritage Day 2012 group on Flickr to post your photos.