Electrifying Bonners Ferry

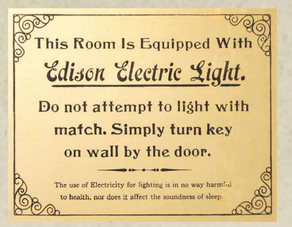
Harnessing water for power

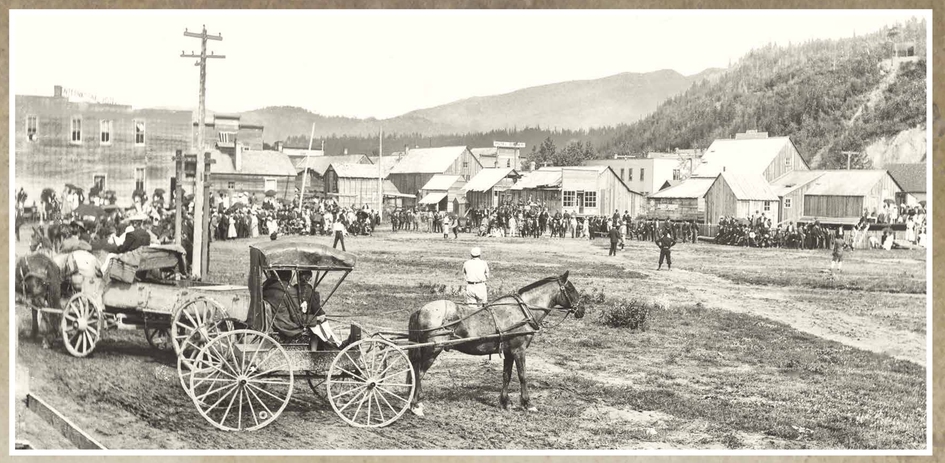
Electricity and fast-flowing rivers are inseparable in the Pacific Northwest. In the early 1900s, harnessing the power of water to supply Bonners Ferry's ever-increasing demand for electricity was challenging. Low river flows and winter ice often brought power production to a halt. Electrical power in the city's early years, was sporadic, at best!

Private ventures light up the village

The area's first power plants were small private ventures. In 1902, local pharmacist, J.F. Cook, installed a turbine on the Moyie River, but never completed the project. The Newport Electric Light Company on Myrtle Creek provided the city's first electricity in 1905. In 1907, a new owner made improvements to the plant, added domestic water service, and renamed the business the Bonner Water & Light Company. One of these improvements was a Pelton wheel which generated electricity from 1906–1921.

By 1917, the power plant was over-taxed. The continual demand for more reliable electricity led to the city's 1921 purchase of the Myrtle Creek plant and formation of the Bonners Ferry Water and Light Department, marking the transition from private to public power.





Above: This 1906 photograph shows power poles in downtown Bonners Ferry, but it would be years before the city had reliable power.

Above: In this 1928 photo of John Chevrenell's bakery, look closely for signs of modernization made possible by electrical power.

In with the new…

Between 1900 and 1920, the town's population grew from 349 to 1,236. Technological advances ranging from water pumps to electric irons created new uses for electricity in homes and businesses. Pumping floodwater out of farmlands and electrifing sawmills created enormous new industrial energy demands.

…but not quite out with the old!

When electricity was in short supply, each section of town had power just a few hours a day. Residents kept candles and kerosene lamps on hand for back-up when the lights went out.

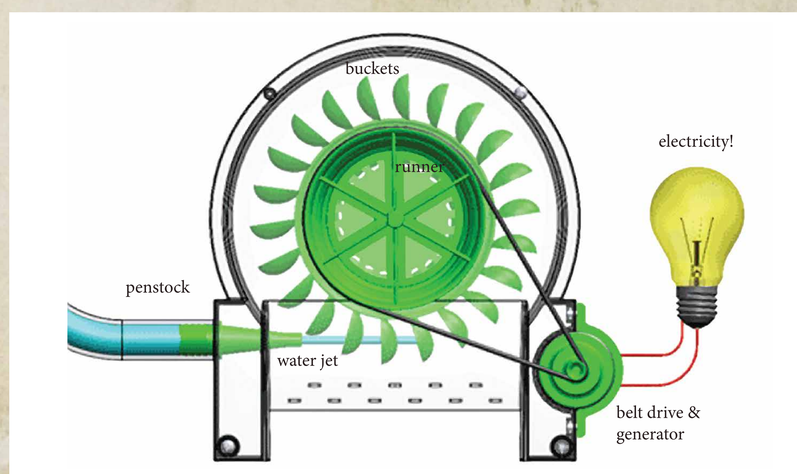
Pumping the city's water from the Kootenai River to storage tanks above town also required electricity. During power outages, people reverted to using rain barrels and carrying water from the river in buckets.

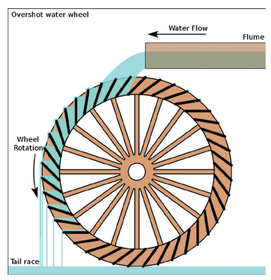
Pelton wheel from the Myrtle Creek power plant.

Pelton's powerful wheel

A new twist on an old idea

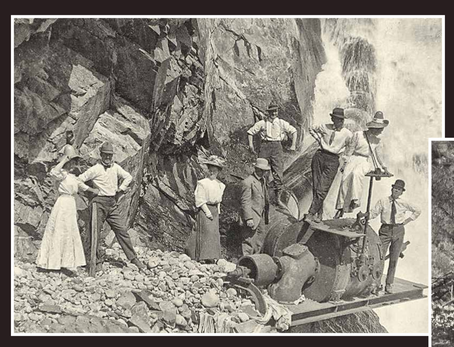
The Pelton wheel, invented in the 1870s, extracts energy from moving water, as opposed to water's dead weight like traditional overshot water wheels. A high-speed jet of water shoots into cup-shaped buckets, turning the Pelton wheel. The wheel extracts almost all of the water's "impulse energy," transferring energy to the wheel and then to a turbine which generates electricity.

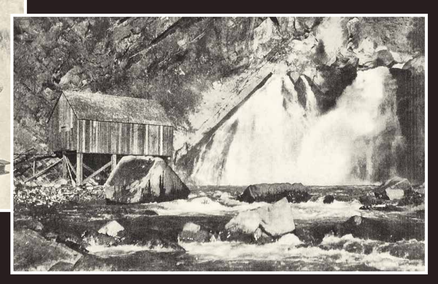




To see an animated version of this diagram, scan this QR code with your smartphone's camera, or go to this link: http://www.sciencelabsupplies.com/Powerwheel-Water-Turbine-Hydro-Generator.html

Left: Much of the falling water's energy was lost with traditional "overshot" mill wheels like this one.





Above & right: Pharmacist J.F. Cook's turbine and power plant was the first attempt at getting power from the Moyie River (1902). For some reason, Cook's electrifying vision never quite became a reality.

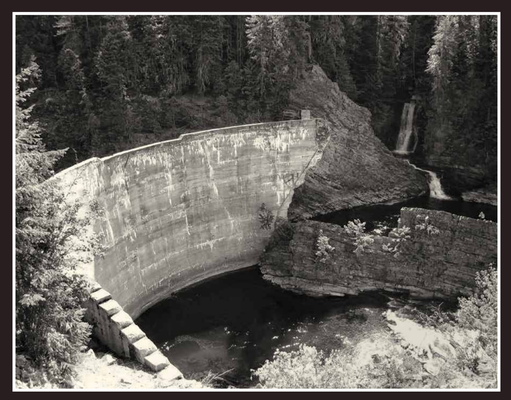
Right: Harry (far right) and his father, Edward (second from right) Gale with their family at the privately-owned power plant on Myrtle Creek (c. 1907). The village of Bonners Ferry purchased this plant in 1921.

Right: The Cynide Gold Mining Company built the Eileen Dam and power plant on the Moyie River in 1923 to provide power to nearby mines. A flood in 1925 overtopped the 52-foot dam, washing out the shale rock on the east side, destroying the spillway canal, and leaving the dam shell intact.

When the rock gave way, there was a 10-foot rise in water level four miles downstream at the Bonners Ferry power plant.

Unable to finance repairs, the company sold the salvageable equipment, abandoning the project.

In 1931, needing additional power, the city considered—and rejected—the idea of buying this dam and power plant. The remnants of these structures pose an obstacle to whitewater rafters to this day.



The International Selkirk Loop

BOUNDARY COUNTY Historical Society

Photos: Pelton wheel by Jane Robling, historical photos courtesy Boundary County Historical Society.

Solving Power Problems

During the 1920s, the Bonners Ferry Water and Light Department made multiple improvements to the Moyie River and Myrtle Creek power plants, but relying on hydroelectric power alone had its drawbacks. Generating electricity depended on river flows, which along with other problems, closed plants for extended periods, leaving the community without power.

The city's solution to its perpetual power problem can be seen through these windows. In 1931, after deciding not to buy the failed Eileen Dam and power plant, Bonners Ferry purchased a 360 horsepower (HP) Fairbanks Morse diesel generator, capable of providing as much power as the Moyie River plant. It would help carry peak loads and provide backup when needed. The city also upgraded the Moyie and Myrtle Creek plants to increase production.

By 1938, however, the "backup" diesel generator was running almost continually, and the Moyie plant was operating at full capacity. Once again, upgrades were needed. The city developed plans for a new 92-foot Moyie dam with two 1500 HP generators. Unfortunately, World War II delayed dam construction and one generator was redesigned for use with the old dam. The powerhouse and generator #1 were completed in 1941. The new dam was finally completed and the second generator added in 1950, bringing the plant's capacity to 3000 HP.

In October 1953, Bonners Ferry contracted with the Bonneville Power Administration (BPA), becoming part of the Pacific Northwest regional power system and eliminating the need for the diesel generator. Now, when the city has a surplus of electricity it is fed into the BPA system, earning the city kilowatt hour credits. When the city is using more electricity than it is producing, power is supplied by BPA. This combination of local and BPA power provides the people of Bonners Ferry with some of the lowest-priced electricity in the country.

Conserving the "juice"

In 1929, when the Moyie plant was closed for repairs, the remodeled Myrtle Creek plant carried the load. H.M. Buroker asked the citizens to conserve power during this period.

"Users of electricity are asked to cooperate with the city light and power department in conserving the juice," Buroker told the Bonners Ferry Herald.

"...The Myrtle Creek plant, a much smaller unit...will be enough for all local needs if the load is distributed over the 24-hour day," he said.

"Early morning or daylight use of power for household work will equalize the consumption sufficiently to insure the continued operation of all motors in Bonners Ferry.

"The Saddler sawmill at Moyie Springs, which is operated by electricity from the municipal plant, will close down today for a 30-day period."

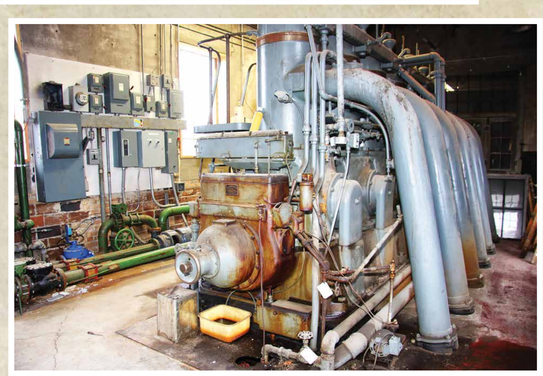
Bonners Ferry Herald
August 8, 1929

Fairbanks Morse Generator

The 51,000-pound generator (above) was shipped to Bonners Ferry by rail car from Beloit, Wisconsin. On arrival, it was transferred to a concrete pad on this site, and the brick building was constructed around it.

The 1925 Model 32 Style VA, 6 cylinder, generator produced 230 kilowatts of electricity—nearly equal to the Moyie plant.

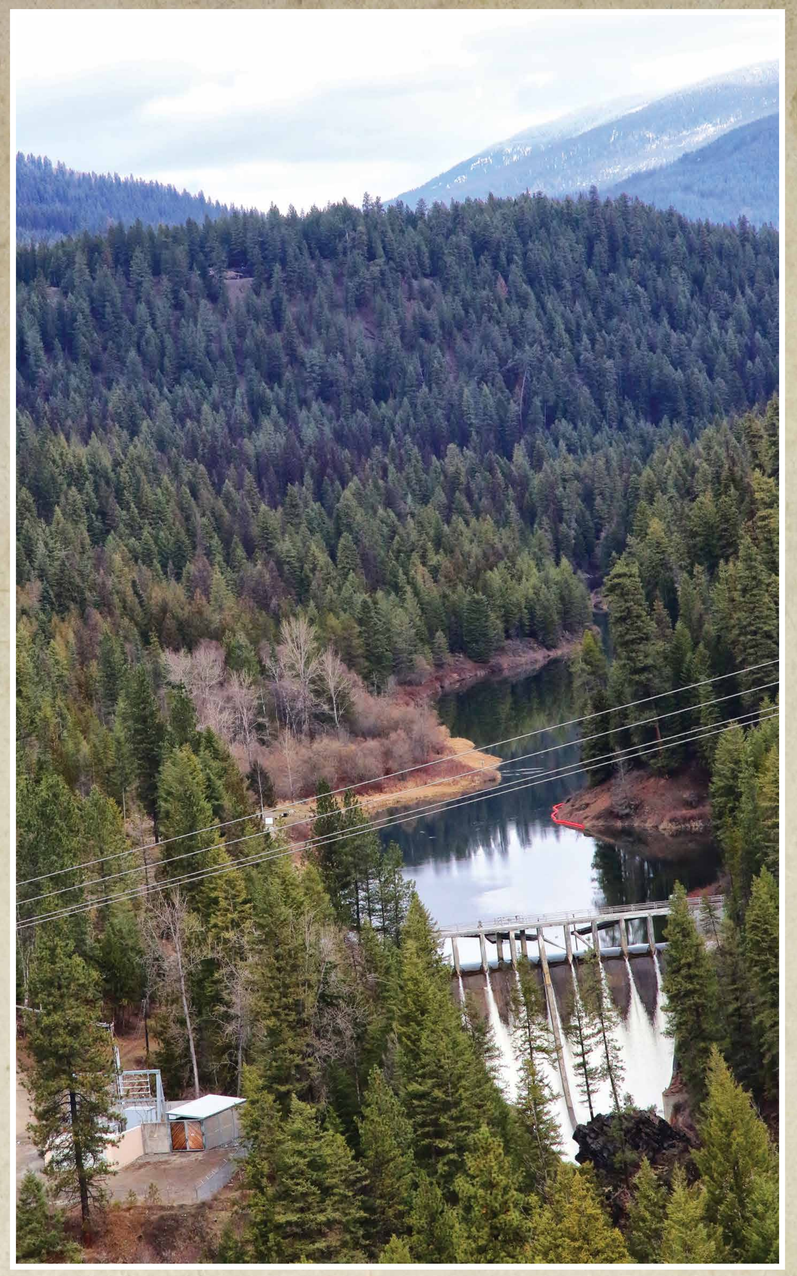
The generator's only moving parts are the pistons, rods, oil pumps, fuel pumps, flywheel and governor. It has no intake or exhaust valves; air is compressed by the pistons and burnt gases expelled under the concrete floor through large pipes (right).



Backup Plan

"The new [diesel] plant... can be operated separately or synchronously with the Moyie plant, and will be ready to start up at a moment's notice. It will be available at any time that the city is asked to furnish additional power to industrial concerns."

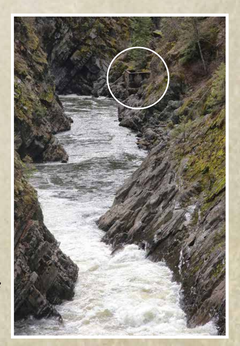
H.M. Buroker
Bonners Ferry Herald
October 1, 1931



The Moyie River Hydroelectric Project

Bonners Ferry is one of the few Idaho cities with a municipally-owned hydropower source. The Moyie River Hydroelectric Project includes three powerhouses, a combination penstock/pressure tunnel system, a substation, and transmission line. While the majority of the city's electricity now comes from the Bonneville Power Administration, the Moyie plant still generates a significant amount.

Above: The Moyie Project's substation, power lines, and the Highway 2 bridge.

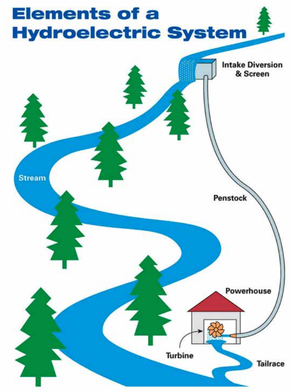


Right: The abutment of the old coffer dam remains above Moyie Falls.

The Northwest's Clean Power

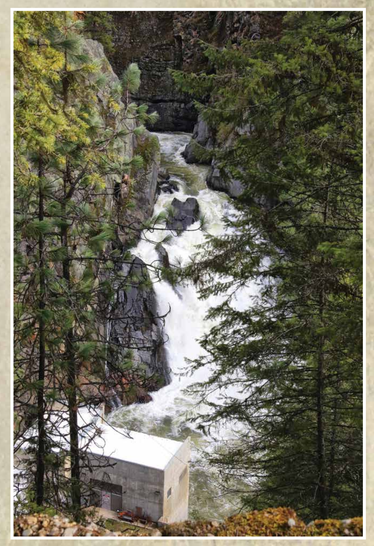
Efficient run-of-the river (RoR) hydroelectric plants generate electricity with no waste or carbon dioxide emissions. Plants vary in size and design, but generally have the components shown below.

RoR plants make use of the river's available flow and natural elevation drop. This system requires little or no water storage so there is no reservoir flooding, major landscape change, or displacement of wildlife.



How waterpower works

1. Water is diverted into the intake and through the penstock. A control gate can let in more or less water.
2. In the powerhouse, flowing water powers turbines with shafts connected to the generator. As the turbine and shaft spin, the generator's copper coils rotate, producing a steady flow of electrons and adding electricity to the grid.
3. The water passes into the tailrace and back into the river system.

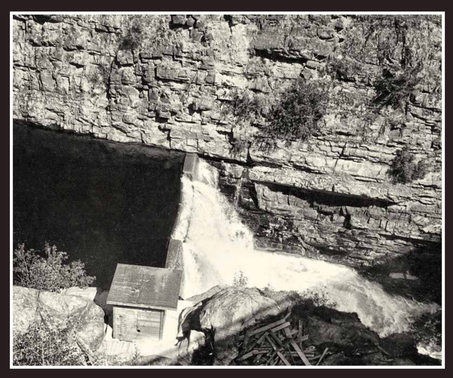


Above: Three powerhouses were built about 1000 feet downstream from the dam in 1921, 1941, and 1982. Their combined output totals over four megawatts.

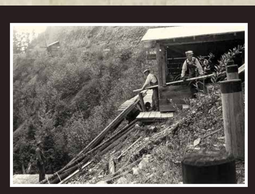
The International Selkirk Loop

BOUNDARY COUNTY Historical Society

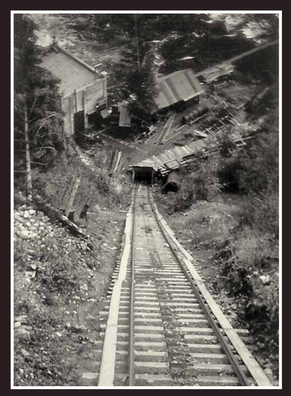
Photos: Color photos by Jane Rohling, historical photos courtesy Boundary County Historical Society.

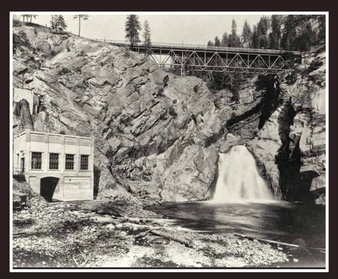


Left: The Bonners Ferry Water & Light Department completed a 20-foot-high diversion dam in Moyie Canyon in 1922. Water shot through a long rock tunnel to the new hydroelectric plant's 530 HP turbine.

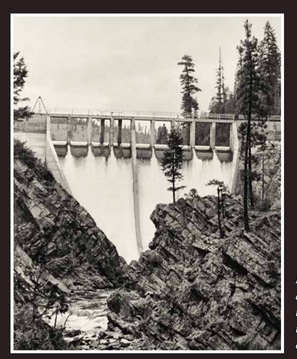


Above & right: Building power plants on the steep walls of Moyie Canyon wasn't easy. Materials were lowered to the site in carts on a steep tram. (1941 photos)





Above: To avoid falling rock, the steel girder Highway 2 bridge over the Moyie River was built in 1923 before construction on the new dam started.



Left: Thanks to the 92-foot dam and its 160-foot head, the 600 HP turbine installed in 1958 used less than half the water required by the original 550 HP unit.

Above: The sawmill in Moyie Springs is one of the largest users of power from the Moyie River plant today.