



How the Electricity System Works

HOW THE ELECTRICITY SYSTEM WORKS

1. Reservoirs

A reservoir is a lake used to store water. Some are natural with structures in place to control the flow of water and others are artificial. Dams and dykes contain water that flows naturally in streams and rivers, and allow the water to be released when needed for electricity generation. Nature controls the amount of water in reservoirs - rain and melting snow provides the source of the water in the reservoir.

If the reservoir becomes full before water can be used for electricity generation, the water will spill, meaning it will bypass the plant and not be used to generate power.

2. Surge Tank

A surge tank is a water reservoir used to absorb sudden rises or drops in pressure within a hydroelectric penstock that result from normal operation of a hydro turbine.

3. Generating Station

In the generating station there are turbines (some are shaped like big propellers) that spin when the water passes through them. The turbine is connected to the rotating part of the electric generator called a rotor.

The generator rotor acts as a large magnet. When the turbine spins, the rotor spins. As the magnet spins, they pass over copper wires called the stator. The movement of the magnetic field across the stator causes electrons in the copper wire to move. This movement of electrons is electricity!

Hydroelectricity is considered renewable because after water is used to make electricity, it is returned to the river.

TRANSMISSION

4. Transformer

After electricity is generated at a power plant, it travels by wire to a transformer that is located in a terminal station, which converts it to a higher voltage, allowing it to travel over long distances, as required for transmission.

5. Transmission Lines

The high voltage electricity is carried by transmission lines which are usually supported by metal towers.

6. Terminal Stations

Terminal stations control the flow of power on transmission lines and reduce the voltage for supply to substations and large industrial customers.

7. Industrial Customers

Some large industrial customers in Newfoundland and Labrador receive power from terminal stations.

DISTRIBUTION

8. Substations

Once electricity reaches a substation, the voltage is reduced to a level that can be used to power homes and businesses. Electricity is delivered from a substation to your home through a distribution line.

9. Distribution lines

Before electricity can be used in your house, the voltage is reduced again at another transformer attached to the top of a utility pole near your home or business. The distribution line is connected to your home by a circuit box, which distributes electricity to the outlets in your house.

Newfoundland and Labrador Hydro has over 3,700 km of high-voltage transmission lines and 3,300 km of low voltage distribution lines.

Newfoundland Power maintains approximately 11,000 km of transmission and distribution lines.

The time it takes for electricity to travel from a power plant to turning on a household appliance is a tiny fraction of a second.

10. Control Centres

At control centres, generation, transmission, terminal station and distribution equipment is monitored, regulated and controlled to manage the flow of power in the electricity system.