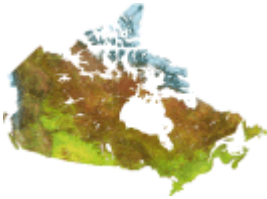




Français	Contact Us	Help	Search	Canada Site
Home	About Us	Subject Listing	NRCan Subsites	Products and Services



2003/60 (a)

BACKGROUND

THE ELECTRICAL SYSTEM IN BRIEF

Newsroom

- [News Releases](#)
- [Speeches](#)
- [Articles](#)
- [Media Advisories](#)
- [Archives](#)

The electrical industry is the best example of "just-in-time" delivery. Since electricity cannot be stored, electricity must be generated, transported and delivered to the customer almost instantaneously. To do this, electrical power systems have four major components:

- generators, which convert fuels used to produce electricity;
- transmission lines to transport electricity over long distances;
- distribution lines to deliver the electricity to substations; and
- control centres to coordinate operations.

Before generated electricity enters the transmission system, it is stepped up to a higher voltage. The higher voltage minimizes power line losses and allows electricity to flow over a longer distance. In many cases, the transmission network has built-in redundancies to provide alternate paths for the power to flow to the various distribution networks. In addition, it is common practice for electric utilities to connect their transmission networks to provide mutual support in emergency situations caused by major system disturbances as well as to enable utilities to buy, sell and wheel electricity to other systems for mutual economic benefits.

A transmission system consists of a group of transmission lines connected by substations. Most, but not all, control equipment is located within the central centres and the substations. Each substation typically has its own backup battery power supply so that control equipment can continue to function for several hours in the event of a power failure.

There are many types of power generation facilities in North America. The most common are fossil-fuelled (oil, natural gas and coal-fired), hydroelectric (storage, run-of-river or pumped storage) and nuclear plants. A small but growing amount of power is generated from emerging renewable resources, including wind, biomass, geothermal and solar power. A generating station typically contains a complex set of controls and computers to manage many of the critical plant operations. British Columbia, Manitoba and Quebec are predominantly hydro-based; Alberta, Saskatchewan, Nova Scotia and Prince Edward Island are mainly fossil fuel-based; Newfoundland and Labrador is hydro/thermal based while Ontario and New Brunswick have a mix of fossil/nuclear and hydrogeneration.

Coordinated operation of the power system is implemented through control areas. A control area is a geographic area with a control centre responsible for operating the power systems within that area. Control centres employ a variety of equipment and operating procedures. They include communications equipment to inform the centre of generator output and system conditions, and computer-based analytical and data processing tools to assist system operators with the management of generator and transmission lines.

In effect electric power systems are often referred to as operating in a state

of "unstable equilibrium." Sudden mismatches of generation to load, caused by the tripping of large generating units or industrial loads, could result in electrical system disturbances. Because of the nature of the electric utility industry, rapid response is an inherent part of daily operations. Systems and procedures have been in place since the grid was initiated.

For more information, media may contact:

Alexandra Muir
Director of Communications
Office of the Minister
Natural Resources Canada
Ottawa
(613) 947-8246

Ghyslain Charron
Media Relations
Natural Resources Canada
Ottawa
(613) 992-4447

[top](#)

Last Updated: 2003-08-26

[Important Notices](#)