Electrification Study Backgrounder

METROLINX

An agency of the Government of Ontario

#5 Power Supply Options

When considering whether to electrify specific rail corridors or the system in its entirety, an important consideration is how to supply and distribute electricity to the trains and the network they run on.

ELECTRIFICATION STUDY – WHAT HAS BEEN DONE?

In order to understand the power supply options available to Metrolinx, the electrification study team conducted a comprehensive review of power supply and distribution technologies used in North America and around the world. Generally, rail network operators use variations on three types of power supply and distribution systems:

- **Overhead Catenary** – trains are powered by overhead wires
- **Third-Rail** – trains are powered via electrical infrastructure placed on the ground alongside or in between railway tracks (e.g. Toronto Transit Commission subway)
- **Alternative System Technologies** – trains are provided with power using hydrogen fuel cell technology or from batteries that store energy

Once the list of available power supply and distributed options was compiled, the study team consulted with Hydro One – the local power distribution utility – and considered several "screening" questions, including:

- Is the technology **proven**?
- Is the technology **technically and commercially viable**?
- Is the technology **compatible with the "Reference Case" infrastructure and service levels?** (The "Reference Case" describes existing attributes and planned enhancements of GO's rolling stock, rail infrastructure and service levels – as a basis for identifying and comparing rolling stock technologies that could be used for future rail services.)

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FINDINGS TO DATE

Following the initial assessment of the power supply options, a number of technology alternatives were eliminated from further consideration. As an example, wayside energy storage devices and the hydrogen fuel cell power generation were eliminated because they are not proven power supply options, nor are they commercial viable or technically feasible. Also, third-rail supply was dropped as a potential power supply option due safety concerns and technical challenges relating to implementation across the rail network.

The recommended power supply option for GO and/or the ARL is the use of an overhead catenary system. This type of system is used extensively around the world and in North America. Currently, rail system operators in Quebec, New York, Connecticut, New Jersey, and Pennsylvania use overhead catenaries to power their commuter rail services.

FOR MORE INFORMATION

Background report: **Power Supply and Distribution Systems Technology Assessment**

Available for download at: **www.gotransit.com/estudy**