

Real-Time GIC Simulator

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A Real-Time GIC Simulator is being developed by the Geomagnetic Laboratory, Natural Resources Canada and the Finnish Meteorological Institute with the industrial partner, Hydro One, the operator of the power transmission network in Ontario, Canada.

The GIC Simulator will use real-time geomagnetic data feeding into earth and power system models to produce real-time displays of GIC flow throughout the power system. The first step in the process is to calculate the electric fields experienced by the power system. A layered conductivity model will be used to calculate the surface impedance of the earth. This surface impedance will be used with the incoming magnetic field data to calculate the electric fields at the earth's surface.

The next stage of the process is to use the calculated electric field as input to a power system model. This model will be interfaced with the system configuration information so that the model is automatically updated when power lines or equipment are taken in or out of service. The model output will be GIC values for all the high voltage lines and transformers throughout the network.

Hydro One has several GIC monitors on its system and is in the process of installing more GIC monitors. When this work is completed the Ontario power system will be one of the most widely monitored systems in the world. GIC data from these monitoring points will be used to verify the GIC model calculations.