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FROM SHORT CIRCUITS TO SMART CIRCUITS

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Across the province, more and more photovoltaic (PV) electricity systems are coming on line. While that's good news for the planet, it can create practical headaches for the managers of Ontario's energy grid.

Because the existing distribution system was designed for a one-way flow of electricity, many transformer stations have a limited capacity to handle short circuit currents. Adding downstream energy generation projects can push the total potential short circuit current above those limits. Unless expensive changes are made to the distribution system, this means that many proposed renewable energy projects have to be turned down.

UW's Magdy Salama believes there's a much cheaper way to solve the problem.

In collaboration with colleagues at the University of Western Ontario, Ryerson University and a number of industry partners, Salama is developing ways to limit short circuit currents by controlling the inverters on the PV systems themselves.

By developing algorithms to detect faults when they occur and then using devices to control the output of the PV system, the investigators hope to limit short circuits before they can damage the grid.

Where this approach alone is not adequate, the researchers will develop coordinated control systems that can marshal fault current limiters and flexible AC transmission system (FACTS) devices for additional protection.

The resulting self-healing "smart circuit" technology will increase the capacity of the grid to handle more photovoltaic systems and, in the process, help make Ontario a global leader in green energy technology.

Researchers: Partners: Hydro One Networks, London Hydro, IESO, Kaco New Energy, Bluewater Power Generation Corporation, Ontario Centres of Excellence

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