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THINKING SMALL: ASSESSING THE VIABILITY OF MICROGRIDS

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For decades, North America's electricity systems have relied on just a handful of mega-generating stations to provide electricity for millions of homes and businesses. Today, however, more and more renewable energy projects are coming on board. This makes the grid more decentralized and, as a result, far more complex to manage.

The solution, according to UW power expert Magdy Salama? Thinking small. Dividing the grid into self-sufficient units called microgrids makes it easier to handle the challenges of integrating renewable energy. Microgrids are also more efficient: because the electricity travels shorter distances, less energy is lost in transmission.

Salama is part of a team of researchers studying the feasibility of such a system in London, Ontario. The proposed 5-7 MW microgrid will include a mix of renewable energy sources such as solar, biogas and geothermal.

The researchers will develop control systems that will let power grid operators quickly ramp up and down different energy sources to meet fluctuating levels of demand. These new devices will also help power grid operators regulate voltage, stabilize frequencies and smooth out harmonics - damaging distortions in the voltage waveform that can be created by small-scale generating systems.

Ultimately, the team will create a detailed implementation plan for designing, building and operating a microgrid in the northeast corner of London. Once it's up and running, this system will showcase an efficient and dynamic approach to managing power systems and making optimal use of renewable energy.

Partners: London Hydro, Bluewater Power Distribution Corporation, Hydro One, the Independent Electricity System Operator, Omniwatt Inc., Schweitzer Engineering Laboratories, Ontario Centres of Excellence

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