Backgrounder on Distributed Energy Resources

Ontario's electricity system is changing. It used to be a simple matter of large generators transmitting power over long distances down into communities. And while that still happens, the electricity system of today is much more complex. New technologies, along with more engaged consumers and communities, has led to a much more diverse and decentralized system. This is creating a lot of opportunities for businesses and communities to get involved.

The provincial grid vs. local distribution networks

Ontario's electricity system comprises a provincial grid that spans the province, and many local distribution networks ("local hydros") within it – Hydro Ottawa or Utilities Kingston, for example. While local distribution networks mostly draw power from the provincial grid, there are an increasing number of electricity resources connected directly to local distribution networks.

Distributed Energy Resources

Sources of electricity that are connected to a local distribution system are known as distributed energy resources, or DERs. They can either store or generate electricity, or can adjust their electricity consumption. Examples of DERs include small-scale generation such as solar panels on rooftops, battery storage and consumers that adjust their energy use based on electricity price and other signals. These resources make up roughly 10 per cent of the province's electricity capacity, or approximately 5,000 megawatts.

Benefits of DERs

DERs can contribute to the reliability and affordability of Ontario's electricity system. They give communities more choice in how their growing energy needs are met, and can provide alternatives to traditional electricity infrastructure. Businesses who invest in DERs also have the potential to earn revenue by selling electricity services to the grid.

Two factors are making DERs more cost-effective:

- Innovation is creating new technologies and driving down costs
- Supply shortfalls are emerging later this decade, providing an opportunity to use DERs as alternatives to new or upgraded transmission and generation infrastructure, or to make room for more businesses to connect to existing infrastructure

How are DERs being used today?

There are thousands of DERs operating in Ontario – solar panels, batteries and demand response capability that provide supply to local communities. But there is likely more – as businesses increasingly use these technologies for their own needs. This supply eases the need to rely on transmission lines or large power plants to serve local needs.

Local supply options are already making an impact on the system. For example, the Independent Electricity System Operator (IESO) takes advantage of batteries located within distribution networks to provide services that fine-tune frequencies on the system.

More recently, the IESO is conducting a pilot project in the Alectra Utilities service area (York Region) which allows local DERs to compete to provide local supply over the summer period for 2021 and 2022. The auction attracted wide participation from various different types of participants – including supermarkets, a district energy facility and companies that aggregate home consumers with smart thermostats.

To learn more, visit the IESO's DER webpage.

The Future of DERs in Ontario

After a period of strong energy supply, the IESO is forecasting a growing need for new energy sources. Meeting these emerging needs will require a proactive effort to enable the new kinds of supply options to participate in the Ontario electricity system and market.

The IESO has and will continue to embark on a number of initiatives to better understand the role of DERs and how to integrate them in the electricity system. This includes addressing technical and regulatory barriers that stand in the way of these energy providers fulfilling their potential.

Through its Grid Innovation Fund, the IESO is partnering with local utilities and service providers to explore these barriers and their solutions. A new pilot project between two utilities (Newmarket-Tay Power and Elexicon Energy) and software solutions providers Powerconsumer and NODES, will simulate DERs providing different services in a local electricity market. Another example is this announcement today of the new joint, targeted call with the OEB's Innovation Sandbox later this year, which will provide support to projects and research testing the capabilities of DERs in providing services at both the local and provincial levels.

This work to enable DERs will be a key focus for the IESO over the coming year. A DER Roadmap is being developed with input from the sector, to provide clarity on objectives, initiatives and timing for integrating DER into the electricity system. To learn more, visit the DER Roadmap engagement webpage.