SMART GRID
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SMART GRIDS

Presented by SGIN

SGIN Energy Leadership Series

The SGIN Energy Leadership Series delivers accessible understandings concerning our continuing need to drive clean energy implementation and at and at scale. In this series our industry network of leaders share insights and understandings as to the major issues we face and break down the myths and noise that can be barriers to achieving clean beneficial energy for our subsequent generations.

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What are Smart Grids and What Are They Used For?

Smart grids are advanced electrical grids that incorporate digital communication technology to monitor, manage, and efficiently distribute electricity. They use sensors, smart meters, and automation technology to gather and analyze data in real time and then control devices in the field to manage the grid.

Why Smart Grids?

Enhanced Reliability

For instance, if a tree falls on a power line, sensors can detect the fault immediately and reroute power to prevent outages.

Efficiency

Smart grids can optimize energy distribution by adjusting the flow of electricity based on demand patterns, reducing energy losses.

Integration of Renewable Energy

hey allow for the seamless integration of solar panels and wind turbines into the grid, balancing intermittent energy sources with demand.

Consumer Control

Smart meters enable consumers to see their energy usage in real time, allowing them to adjust their habits to save money and reduce energy consumption.

What Can a Smarter Grid Offer You?

Cost Savings

With smart meters, consumers can take advantage of time-of-use pricing, using electricity during off-peak hours when rates are lower.

Reliability

Advanced sensors and automated switches can quickly isolate problems and restore power faster than manual systems.

Sustainability

By efficiently integrating renewable energy, smart grids reduce reliance on fossil fuels, decreasing overall carbon emissions.

Personalized Energy Management

For example, controllable thermostats can be set to reduce energy consumption during peak hours, lowering energy bills.

Why Does It Matter for Climate Change?

Efficiency

By minimizing energy waste, smart grids lower the overall demand for electricity, reducing emissions from power plants.

Renewable Integration

They make it easier to incorporate renewable energy sources, which produce no greenhouse gases, into the power grid.

Demand Response

Smart grids can manage electricity demand more effectively, reducing the need for high-emission peaking power plants that are often used during peak demand times.

Electric Vehicle Integration

They support the charging infrastructure for electric vehicles, which helps reduce emissions from the transportation sector.

How Does Canada Fit in This Puzzle?

Canada is actively working towards modernizing its power grid to become smarter and more sustainable. Here are some specific examples of Canadian implementations:


Ontario - Smart Meters

The province has implemented smart meters across all residential and small business customers. These meters provide real-time data on electricity consumption, allowing users to adjust their usage and save on energy bills.

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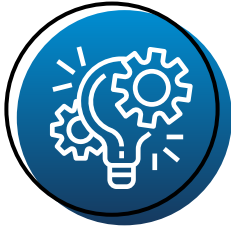
British Columbia - Smart Substations

BC Hydro has deployed smart substations that use advanced sensors and communication technologies to monitor and manage electricity flow more efficiently. These substations can detect and respond to issues quickly, improving reliability.
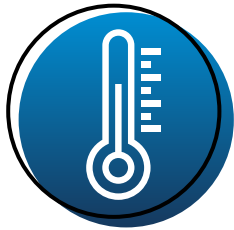
Quebec - Controllable Thermostats

Hydro-Québec has introduced a program offering smart thermostats to its customers. These devices allow users to control their home heating remotely and optimize energy usage, particularly during peak demand periods.

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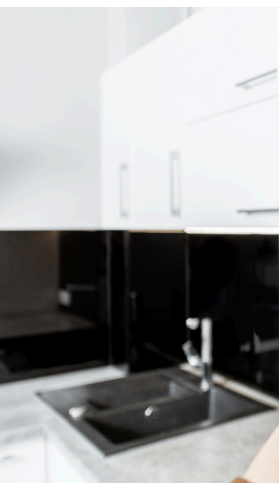
What Can a Smarter
Grid Offer You?

Alberta - Renewable Energy Integration

The province has been integrating wind and solar power into its grid using smart grid technology. This helps balance the intermittent nature of these renewable sources with the steady demand for electricity.

Newfoundland and Labrador - Microgrids

Advanced sensors and automated switches can quickly isolate problems and restore power faster than manual systems.

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National Initiatives

Electric Vehicle (EV) Charging Infrastructure

Canada has been expanding its EV charging infrastructure, supported by smart grid technology. This allows for efficient management of the increased demand for electricity from EVs, ensuring that the grid remains stable and reliable.

Canada has a number of pilot programs funded by NRCAN to progress on the knowledge and understanding of what Smart Grids can contribute to grid providers, consumers and to society.

Summary

Smart grids enhance the efficiency, reliability, and sustainability of electricity distribution by using advanced technology to monitor and manage the grid in real-time. They play a significant role in combating climate change by facilitating the integration of renewable energy and reducing emissions. Canada is actively implementing smart grid technologies across the country, contributing to a more sustainable and resilient energy future.

This paper is brought to you by the Smart Grid Innovation Network. We foster Canada's transition to clean energy, helping build stronger, more resilient communities and a sustainable economy. To learn more about us, please visit us at SGIN.ca.