



A foundation for improved protection and automation

BC Hydro is transformed into a digital company, connecting its electric grid with Cisco® networking, security, and smart grid solutions.

“With near real-time access to distribution system data, we can reduce the number and duration of outages for our customers.”

– Sol Lancashire, Senior Telecom Architect, BC Hydro

In the past, a storm could take out power to a community or a motor vehicle accident could affect power for an entire city block. Residents depend on the utility company to restore power as quickly as possible.

Challenges

- Deliver reliable, high-quality services
- Enable remote automation and monitoring
- Connect applications over a common, secure network infrastructure

As the main electric utility for British Columbia, BC Hydro prides itself on providing its 1.9 million residential, commercial, and industrial customers with safe, reliable, efficient, and clean energy. With population growth and demand for electricity projected to increase significantly in the next 20 years, BC Hydro has invested in a scalable technology infrastructure to help automate processes, connect the unconnected, and improve control and access to the information now available from the modern grid.

With smart grid initiatives already underway, BC Hydro needed to ensure that its infrastructure could support the anticipated growth as efficiently as possible, while delivering the better and more responsive services that customers were accustomed to.

Case Study | BC Hydro and Power Authority

Size: 5,000 Employees

Location: Vancouver, British Columbia

Industry: Electric utility



“We needed a flexible, open architecture to support our evolving smart grid,” says Sol Lancashire, senior telecom architect at BC Hydro.

“Cisco provided an architecture, the necessary infrastructure, and ongoing support to bring the diverse elements together. The Connected Grid products are optimized for the electric utility industry and give us a reliable telecommunications foundation to be able to support increasingly challenging energy delivery requirements.”

Automating and analyzing the electric grid.

Solutions

- Designed a smart grid based on Cisco Field Area Network (FAN) architecture and Advanced Meter Infrastructure (AMI)
- Deployed Cisco Identity Services Engine (ISE) and Cisco connected firewalls, mobile devices, and systems

Designing smart architecture

BC Hydro based its overall smart grid design on the Cisco FAN architecture, an open-standards and IP-based communications architecture that provides network connectivity between field devices throughout the utility grid and also to the grid control centers.



“We’ve had a strong relationship with Cisco for many years. Cisco Services helped us in the lab environment to go through our specific use-case scenarios, conduct performance testing, and to optimize the design of the solution,” says Lancashire.

Simplifying utilities in Vancouver

BC Hydro recently enhanced the technology infrastructure in the City of Vancouver by embarking on a program to replace the overhead power lines with a new underground cable infrastructure. After extensive testing, the first phase of the new distribution open loop system for the fault location, isolation, and service restoration smart grid application was launched in downtown Vancouver.

The newer distribution open loop system in Vancouver simplifies operations and improves reliability. This streamlining means BC Hydro can operate at an efficient pace and scale as Vancouver continues to grow.

Enabling near real-time data analytics

Device and system connectivity gives BC Hydro better and faster access to data. The utility uses Cisco connected grid routers and operating software to manage data and plans to migrate to the Cisco IOx software platform, bringing it closer to connecting people, processes, and data. Cisco IOx offers the potential to enable a distributed architecture for distribution automation.



"With Smart Grid, we are now starting to experience the benefits of a digital infrastructure," says Lancashire. "Much more data is available, and with Cisco's new network and analytics solutions, such as Cisco IOx, we are able to efficiently collect and gain insight from the data."

Using smart energy information

BC Hydro used to collect the majority of the revenue meter data manually once every two months. Now the meters automatically send hourly interval usage data twice a day. This gives more visibility to customers, allowing them to lower costs. BC Hydro can proactively identify voltage discrepancies and some power quality issues.

"With our new smart meter infrastructure, we learn a lot more from the meter at every customer endpoint and are now able to gain a better understanding of the quality of the electricity delivered," says Lancashire.

Restoring power faster

The new system is improving process and safety for customers on the grid. Now BC Hydro can automatically detect power faults and can dispatch repair crews in a timely manner. Faults are isolated to the smallest possible area, keeping the power on for more customers.

Fortified security

BC Hydro has Wi-Fi in all offices, stations, remote substations, and line trucks in the field. BC Hydro ensures that data and equipment are protected on the network. "We have used Cisco ISE for years to secure our wireless network," says Lancashire. "Cisco ISE is incredibly scalable, enabling us to extend secure access throughout our smart grid. Adding ISE for our underground fibre network in the open loop system in Vancouver was a natural fit."

Results

- Increased data collection from once every two months to twice a day
- Controlled power outages
- Improved visibility for remote devices across the grid

"Now, using International Electrotechnical Commission (IEC) 61850-based digital relays, Cisco Ethernet switches, and fibre optic cables we can achieve high-speed fault protection, allowing us to significantly improve the power quality and reliability to the residents of the City of Vancouver," says Lancashire.



Transforming to a digital business

The Cisco RF mesh network has improved visibility to remote devices across the grid, enabling improved safety, reliability, power quality, and services throughout British Columbia. BC Hydro plans to enhance and expand its Cisco RF mesh network to accommodate additional distribution automation devices. Other services under consideration or being planned include automated demand response, smart street lighting, and insightful analytics.

“We’re laying the foundation for a common, secure network infrastructure to enable grid automation applications that will improve the safety and reliability of the power system for our customers,” says Lancashire.

Products & Services

Wireless

- Cisco Wireless LAN Controller
- Cisco Wireless Access Points

IoT System Management and Automation

- Cisco IoT Field Network Director

IoT System Physical and Cyber Security

- Cisco Identity Service Engine (ISE)
- Cisco ASA 5500-X Next-Generation Firewalls
- Cisco Secure Access Control Server

Smart Grid: Cisco IoT System Network Connectivity

- Cisco Field Area Network (FAN) solutions
- Cisco 1240 Connected Grid Router
- Cisco 2010 Connected Grid Router
- Cisco IP Version 6 (IPv6) grid endpoints

- Cisco Industrial Ethernet 3000 Series Switches

- Cisco 500 WPAN Industrial Routers
- Cisco Industrial Operations Kit (IOK)

Routing and Switching

- Cisco ASR 1000 Series Aggregation Services Routers
- Cisco Catalyst 6500 Series Switches
- Cisco 500 Series WPAN Industrial Routers (planned deployment of IR500 model)

Services

- Cisco IOT Planning, Design and Implementation (PDI) Advanced Services
- Cisco IOT Network Optimization (NOS) Advanced Services

Other Products

- Itron OpenWay CENTRON Smart Meters



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