
Emerging Trends and Electricity Conservation

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Introduction

The *Emerging Trends and Electricity Conservation* project was designed by BC Hydro to identify trends that could impact future electricity consumption. BC Hydro's Integrated Resource Plan assumes specific patterns for the use of electricity by residential, commercial and industrial customers. However, unforeseen shifts in society, technological advancements, or major changes in the utilities sector could all influence BC Hydro's plans. Therefore, it is important that BC Hydro monitors emerging trends that may shape electricity provision and conservation.

Identifying trends can help BC Hydro remain on track to meet its 66% energy savings target, and aid the design and delivery of programs in the future. Trend watching can also help BC Hydro achieve sustainability goals, by identifying promising new technologies and strategies that will reduce greenhouse gas emissions and improve the environmental impact associated with electricity generation.

Methods

The *Emerging Trends and Electricity Conservation* project involved a high-level scan of a range of social, technological and utility trends, followed by an in-depth analysis of two specific trends. The high-level scan was completed by reviewing industry reports, utility sector websites, government reports and academic literature. The twenty-two most relevant trends were identified, and grouped together into broad categories. Two trends were chosen from this list of by a focus group of BC Hydro managers. A detailed report was prepared on each of the two trends that outlined the key challenges, opportunities and critical success factors involved managing each trend in the future. For these reports, information about was gathered from industry reports, academic literature, and interviews with key informants. This document presents a summary of the findings from this study.



Emerging Trends

Twenty-two key trends were identified that may influence electricity generation, consumption, and service provision in the future. These trends were grouped into five broad categories:

Major Global Trends

- A Growing Demand for Resources
- Climate Change as a Major Disruption
- Stronger Environment Policy

A Shift Towards Energy Efficiency

- Efficiency as a Service
- Efficiency Financing
- Efficient Consumer Technology
- Efficient Power Grids

A Data-Driven World

- Big Data and Analytics
- Smart Power Distribution
- Better Information for Consumers

Changing Consumers

- Networked Citizens
- Population Growth
- Aging Population
- Housing Shifts
- Impacts of Rising Income Inequality

Emerging Technologies

- Nanotechnology
- Off-Grid Energy Production
- The 3D Printing Revolution
- Electric vehicles
- Autonomous Transportation
- New Energy Sources for the Grid

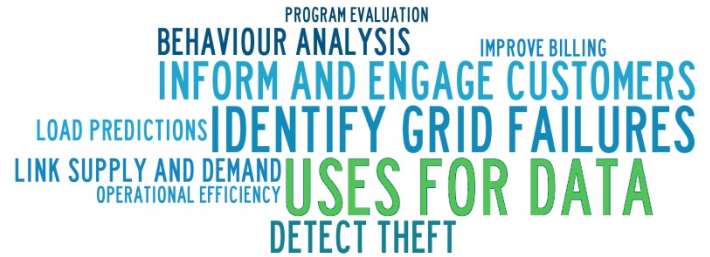
Delivery of Utility Services

- Diverse Program Delivery Models

A small group of managers at BC Hydro helped to review the trends listed above to decide upon two trends for further analysis. Four criteria were used when considering these trends: (1) *Probability* – What is the likelihood that the described trend will occur? (2) *Impact* – What is the likely impact on electricity consumption? (3) *Innovation* – Has BC Hydro already invested effort in studying this trend? and (4) *Relevance* – Is it within BC Hydro's mandate to respond to the described trend? From this discussion, the two trends selected were for in-depth review were: *Big Data and Analytics* and *Networked Citizens*.

Trend 1: Big Data and Analytics

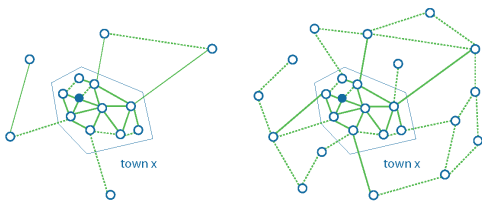
Big Data describes the trend of exponential growth and availability of data for analytics purposes. Advances in computer processing and data storage capabilities have led to large new stores of data being collected. The big data movement revolves around harnessing value from these data stores. Many organisations, including BC Hydro, have been utilizing data analytics in their operations for years. Big data is different from business-as-usual for three reasons: volume, velocity, and variety. The sheer volume of new data created requires rethinking the way data is stored and managed. The speed at which new data is created requires organisations to manage data in near real time. The variety of new data sources requires careful management to allow data linkages to be built, and foresight to recognise the information potential in a range of new data sources. For electricity utilities, the challenge of big data lies in managing new data sources, and in creatively using existing ones.



Big data can be used to build smarter, more efficient energy systems. New and faster sources of data can be used to improve grid performance, engage and educate customers, and gain feedback on organisational performance. This will lead to more successful electricity conservation efforts and greater customer satisfaction. BC Hydro is at the forefront of big data use in the utility sector. Continued investment in data infrastructure, analysis skills, and support for a data-driven culture are critical to retaining this competitive edge.

Trend 2: Networked Citizens

Social networks have always been part of our lives. Friends, family, colleagues and acquaintances are some of the various social networks we are part of. What Social Network Sites (SNS) have changed is how we interact with these networks. Location and time no longer restrict interaction, opening the possibility to strengthen ties weakened by geography and life changes. Although SNS can offer new opportunities for communication, there are some drawbacks. The convergence of various social networks in loosely defined socio-digital spaces compromises privacy and safety. What we share online can be accessed by many and seen by many due to its permanence. Social Networks Site should be regarded as personal-public spaces. In addition, online activity and social interactions be collected as data and used for commercial purposes without consent or without fully understanding what consent will allow. The current privacy and transparency debate will determine what social network sites will be in the future.



Social ties weakened by geography and life changes can be strengthened through social network sites.



Well defined boundaries among different social networks in the analogue world vs. loosely defined boundaries in the digital.

For the purposes of business and energy conservation strategies, social networks sites can be very useful. First, social network sites can decentralize communications. A company or entity no longer has to be the only source for information or resources. Users can create and share content of their own and adapt it to their lives and needs. This active participation can have a larger and more lasting influence on sustainable habits. Second, social networks site can be used to devise energy consumption reduction plans through which customers can bid to reduce their energy loads during peak hours in exchange for convenient prices.

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