

Executive Summary: Road Map for Low Energy Existing Commercial Buildings

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Introduction












The Commercial Building Retrofit Road Map for BC Hydro (‘the Roadmap’) proposes a set of integrated strategies designed to dramatically lower energy use in existing commercial buildings to 2030 and beyond. The overall goal of the road map is to prepare the market for a future which includes ‘performance based’ retrofit regulations that target the most inefficient buildings with the highest potential cost effective savings.

We undertook a qualitative analysis of international best practices, conducted stakeholder consultations, and reviewed quantitative modelling to formulate a set of seven proposed strategies that have a mix of short, medium and long-term actions.

The Roadmap is organized into seven proposed strategies that comprise a mix of short, medium and long-term actions (see Figure 1). Each strategy is designed to address one or more identified barriers to energy conservation, which have been organized into six “A’s”, or six common reasons for inaction on energy conservation:

- **Awareness:** The lack of awareness or cognizance of the potential to realize energy savings on the part of organizations.
- **Availability/Accessibility:** The ability to source, procure, and implement the technologies and services that can be used to realize energy savings.
- **Affordability:** The perceived or actual costs of action, whether these pertain to first costs in delivering energy efficiency projects, or the ongoing costs to maintain and optimize it.
- **Adoption:** The challenge of actually implementing energy conservation measures as a result of competing priorities, lack of leadership, or more systemic issues such as the structure of capital and operating budgets within a given organization.
- **Advocacy:** The need to turn willing participants in energy efficiency programs into motivated advocates for energy conservation.

Figure 1: Summary of Strategies & Barriers

Strategy	Affordability	Availability/ Accessibility	Awareness	Acceptance Advocacy
1. Building Energy Benchmarking & Transparency				
2. Sustaining Energy Performance				
3. Financial Tools				
4. Retrofit Regulations				
5. Increased Marketing				
6. Workforce Development				
7. Development of New Tools				

Strategy 1: Building Energy Benchmarking and Transparency

The foundation of any energy reduction strategy in the existing buildings sector is improved data transparency and reporting. Throughout North American cities and European countries, policies have already been implemented to require owners and/or managers in the commercial buildings sector to track and report their building's energy performance. Several major cities (e.g. Chicago, New York, Seattle, and Philadelphia) now require large buildings to report their energy (and water) consumption on an annual basis, which is then shared publically. Several American utilities have also begun to allow building owners and managers direct access to utility data and automate the transfer of data into Portfolio Manager.

These "energy benchmarking" regulations have already had considerable success in improving building energy performance in Europe and Australia, and are increasing in number across the United States. Benchmarking programs allow comparisons with buildings' own past performance, other buildings in a geographic area, and/or similar buildings in a specific sector. The collection of high quality, actionable data is being found to be crucial to ensure that resources are allocated effectively. The actions proposed in this area therefore focus on supporting the development of a Provincial approach to building energy benchmarking and transparency. Over time, benchmarking programs should be evolved to allow public access to building energy data, ensure its usefulness to actors in the building industry, and eventually use it as the foundation for performance-based retrofit regulation.

Strategy 2: Sustaining Energy Performance

With the exception of lighting, energy savings that are derived from mechanical or electrical systems tend to deteriorate over time. BC Hydro's Continuous Optimization Program was designed to address this issue by monitoring and, where necessary, intervening into building operations. Such a process of continual optimization also helps to identify other opportunities for energy savings as data on energy performance is collected over time.

Sustaining energy performance will be increasingly important as the market for energy conservation matures and the need to sustain energy savings continues to grow. To ensure the continued success of this existing program, a long-term strategy to expand the program and/or offer it to new participants must be developed. In addition, new strategies to sustain good energy performance should be explored. These should include the use of short interval data derived from smart meters to reduce metering costs, as well as the development of partnerships with external organizations that could operate the Continuous Optimization program as a private venture.

Strategy 3: Financial Tools for Comprehensive Retrofits

While many larger organizations and property owners have access to their own sources of financing, B & C class commercial buildings have been repeatedly identified as the key market most in need of financial assistance for energy retrofits. Several government agencies are additionally limited in their borrowing powers or have low access to alternative funding mechanisms, rendering these buildings' access to financing even more challenging.

To address this issue, BC Hydro can improve retrofit financing for B and C Class Commercial buildings by providing a template for the streamlined assessment of energy efficiency projects, as well as alternative means of financing retrofit activities. This can be achieved by working with partners to simultaneously expand the range of providers willing to offer energy efficiency financing, while bringing greater standardization to the industry.

Strategy 4: Retrofit Regulations

The regulation of retrofits poses many challenges to the commercial construction sector, as the equitable application of regulations across a range of building types, uses, and vintages is not easily achieved. Traditional code tools that use prescriptive requirements may not be appropriate in all contexts and can have a wide variety of outcomes that do not always result in lower energy use. Other challenges around enforcement also exist, especially in defining a scope of work or triggering action that could compel energy upgrades.

To remedy this situation, a concerted effort should be made to ensure that local governments are enforcing the current requirements of ASHRAE 90.1 2010. This standard is already used in the BC Building Code, and can be effectively applied to existing commercial buildings. Over the longer term, the Province should move to a performance-based regulation that targets the lowest 40% of energy performers. These recommendations are consistent with those made in a white paper developed by RDH Engineering, which explored a range of retrofit standards and codes, and made recommendations to BC Hydro on preferred scenarios. More than any other in this Roadmap, this strategy helps to move the province toward a performance based retrofit regulation, and relies heavily on the collective impact of all other strategies.

Strategy 5: Improved Marketing

As marketing is the primary means by which DSM projects are developed by BC Hydro, increasing funding and resources to improve the marketing of energy efficiency to commercial customers is one of the most easily-scaled strategies to improve the uptake of energy retrofits. While the Roadmap outlines a number of marketing concepts it does give special focus to the proliferation of Energy managers as a key strategy. Energy managers are currently the most successful marketing program BC Hydro currently offers, and is responsible for the majority of DSM program applications.

Energy Managers are dedicated champions who work with or within organizations to develop and implement energy management programs that encourage higher building performance and lower energy and facilities costs. Energy Managers help to identify operational or technical issues that lead to fiscal inefficiencies, and outline which efficiency and conservation measures can help organizations lower expenses. BC Hydro has offered a number of Energy Manager programs over the last several years: funding has been made available to large energy users and industrial customers to help pay for embedded Energy Managers, while smaller commercial customers have been given access to energy management professionals for short-term engagements. The results of these programs are encouraging, with an estimated three-fold increase in energy savings in organizations with energy managers over those without.

The adoption of energy management practices can be improved by increasing BC Hydro customers' access to Energy Managers and related professionals. Increasing the number of energy management professionals available to customers, and their awareness of the Energy Manager programs BC Hydro has available, are both simple ways of improving the effectiveness of these programs.

Strategy 6: Workforce Development

A critical component of any market transformation strategy is education, engagement, and training. To ensure that the industry is ready for a future that could include regulation of retrofits, investments in the development of skills needed to meet the demand created by any new regulations must be made. These investments in skills development fall into two broad areas. First, executive training can be provided to business owners, Chief Financial Officers, Sustainability Directors, and Maintenance Staff. This form of comprehensive training gives executives the skills to recognize energy saving projects, and familiarizes them with the opportunities and constraints in energy planning could help to address awareness and adoption issues in larger organizations. Second, technical skills development for trades and service providers such as commissioning agents and building operators will facilitate their deliver of energy efficiency retrofits on the ground.

Strategy 7: The Development of New Tools

Finally, as the primary commercial technology innovations of the last decade have been information-based, the exploration and investment in new information tools to catalyze action in the retrofit sector will be undoubtedly crucial. There is an opportunity to use existing data sources to aid customers in discovering energy saving opportunities, simplifying the process of identifying energy systems upgrades, and reducing the costs associated with auditing existing buildings. By using the investments BC Hydro has made into smart metering technology, and/or harvesting the data provided by any benchmarking programs that may be implemented, there is the opportunity to pilot virtual energy audits at scale in commercial buildings.

Modelling of Outcomes

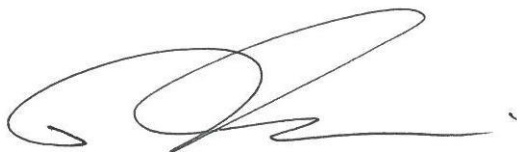
The impact of these seven strategies was modelled in three different scenarios developed in consultation with RDH Engineering, the authors of the Part 3 Existing Building Regulation White Paper. Each of the three scenarios included the escalating enforcement of various ASHRAE standards supported by the broad strategic market transformation approach laid out in this Roadmap. The factors that had the biggest impact were the penetration rate of all of the proposed programs, and the level of enforcement of the recommended regulations. The underlying assumption of the modelling was that higher penetration rates, deeper retrofits and better enforcement would better set up the market for the eventual adoption of performance-based regulations.

Conclusion

The transformation of the existing commercial buildings market will require substantial effort and coordination over the long term. While many factors will be important, a focus on gathering high quality, actionable data while building all of the necessary supports that will make performance based retrofit regulation possible will be the most important areas of focus.

This Roadmap should be read as a network of interrelated, mutually supportive tools. Adopting them piecemeal will not yield the same results as holistic implementation. Support for workforce development, incentive programs and financing tools will enable leaders in the commercial sector to continue innovation in building energy conservation and trickle it down to all segments of the market. Building energy benchmarking and transparency will help prepare the market for retrofit regulations and will be a needed practice for ongoing monitoring of sustained energy performance.

We recommend that this roadmap is reviewed every five years to reflect new market conditions such as utility rates and changes in technology, government policies and regulations, and utility program offers.



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