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# Accelerating Energy Efficiency in *BC's Built Environment:*

# Lessons from Massachusetts and California

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## EXECUTIVE SUMMARY

Buildings account for approximately 29 per cent of energy used in the Province of British Columbia (BC) and 12 per cent of greenhouse gas (GHG) emissions. In major urban centres these proportions are even greater. Studies show that considerable cost-effective opportunities exist for reducing the carbon and energy intensity of buildings in British Columbia while at the same time maintaining or improving upon the existing service qualities of these buildings.

Improved efficiency in BC's built environment contributes to: i) the creation of thousands of long-term jobs throughout the province; ii) enhanced competitiveness of BC businesses and communities; and iii) strengthened environmental performance of the province's energy system. Despite such benefits, many measures that would seize these opportunities are not being actively pursued in BC at the present time.

This white paper recommends steps the province should take to increase the energy efficiency of buildings over the next 20 years. The report examines how energy efficiency in buildings is being pursued in BC compared to Massachusetts (MA) and California (CA). These jurisdictions are widely regarded as North American leaders in energy efficiency and, like BC, they have set ambitious long-term greenhouse gas reduction targets.

At one level BC has adopted a number of overarching targets and policies similar to those adopted by MA and CA: ambitious GHG reduction goals; specific energy intensity targets for buildings; a commitment to adopting leading national energy performance standards for new buildings; and a requirement that energy utilities demonstrate that they are pursuing all cost-effective demand side measures. However, at another level, the political commitment and institutional capacities that allow the two states to make significant progress towards meeting their energy savings objectives, and track their results to date, are for the most part missing in BC.

Several recommendations are offered that will help the province strengthen its institutional commitment and capacity to pursue energy efficiency in the built environment:

1. Revisit and expand the existing BC-wide energy efficiency vision for the built environment.

2. Create multiple institutional triggers for ensuring energy efficiency objectives are kept on track.

3. Appoint an expert, permanent, and broad stakeholder representative Energy Efficiency Advisory Council to work with the province to develop, implement and ensure the delivery of an ambitious 20-year building energy efficiency strategy.

4. Empower local communities via legislative changes, to become super-efficient buildings niches.

5. Establish a transparent, deliberative process for setting utility energy savings targets that align with the province's mitigation and market transformation goals.

## 1. INTRODUCTION

In 2007, the Province of British Columbia adopted ambitious, legislated targets that require it to reduce greenhouse gas (GHG) emissions 33% from 2007 levels by 2020, and 80% by 2050. A key contributor in reaching these goals must be a decarbonisation of energy use by the building sector.

Buildings in the residential, commercial, and institutional sectors account for about 29% of energy used in the province[1] and 12% of GHG emissions[2]. In major urban centres these proportions are even greater. For example, in Vancouver, the use of energy in buildings accounts for 55% of the city's GHG emissions[3]. Over the coming decades, unless major efficiency gains are achieved, the total energy demanded from the built environment will grow as urban populations continue to grow (e.g. Metro Vancouver's population is expected to increase by 50% by 2041)[4]. What is more, the lifespan of buildings crosses decades. So decisions made today directly influence the level and types of energy required and used in the built environment for the next half-century or more.

In British Columbia, where at least 93% of electricity is clean or renewable energy by law, there are two overarching strategies for decarbonizing the province's building sector: 1) a switch from fossil-based energy sources to "clean" sources of energy, including electricity, and 2) a significant reduction in the energy intensity of buildings. This paper focuses exclusively on the second strategy because, although its potential is great, far less attention has been paid to it to date.

For buildings that use fossil-based energy, the link between reducing energy intensity and decarbonisation is a direct one – every unit of fuel saved means a corresponding unit of GHG is not emitted. For buildings already using "clean" electricity, every unit of energy saved effectively makes available an existing clean energy source for fuel switching purposes. Given the many costs and uncertainties associated with developing new electricity generation, this GHG co-benefit should be viewed as a particularly attractive feature of pursuing advanced electricity efficiency in BC's buildings sector.

Fortunately, considerable cost-effective opportunities to reduce carbon and energy intensity in the built sector are at hand. The provincially appointed Climate Action Team released a report in 2008 that promoted the pursuit of an aggressive, integrated and prolonged energy efficiency strategy that had the potential to see the province's built environment transformed. For new buildings, the report recommended, for example, that net-zero GHG emissions be set as the provincial standard by 2020[5], meaning that the total amount of GHGs emitted by operating the building annually is roughly equal to the amount of GHGs sequestered or offset annually on the site. For existing buildings, mandatory building energy labeling, a scaled-up carbon tax, and sustainable land-use planning were cited as measures appropriate for encouraging major efficiency gains.

An assessment completed by BC Hydro for its 2013 Integrated Resource Plan (IRP) showed that significant cost-effective energy efficiency opportunities exist throughout BC[6]. The plan noted however that exploiting such opportunities would require strong and ongoing provincial leadership and action; BC Hydro indicated that it cannot do it on its own.

The findings from these provincial reports are supported by international trends. For example, the Intergovernmental Panel on Climate Change (IPCC) climate mitigation scenarios for 2050 show that major improvements in energy intensity are the most cost-effective option for reducing global greenhouse gas emissions by 80% over the next 40 years[7]. Similarly, a 2012 report by the International Energy Association found that 80% of the cost-effective energy efficiency potential in buildings remains untapped[8].

It is also worth noting the significant impact on economic growth and job creation that also comes with pursing more ambitious levels of energy efficiency in the building sector[9]. A recent report commissioned by Natural Resources Canada estimates that every $1 spent on energy efficiency programs in Canada generates between $5 and $8 of GDP, and; every $1 million investment in energy efficiency creates between 30 and 52 job years[10]. BC Hydro estimates that its Demand-Side Measurement (DSM) Plan for 2008 through 2028 would create some 60,000 direct and 133,000 indirect jobs over a 30-year period or 6,450 jobs annually[11].

Given the enduring nature of buildings and the demonstrated cost-effectiveness of pursuing energy efficiency in the sector as a climate mitigation strategy, the purpose of this white paper is to recommend steps the province should take over the next 20 years to realize the existing and future potential. To help identify these steps, the report compares the policy framework for advancing energy efficiency in buildings in BC, Massachusetts (MA) and California (CA). Although different in terms of size, climatic and energy profiles, these jurisdictions share three characteristics that are important here. First, each has legislated ambitious medium-and-long-term GHG reduction targets. Second, in each case, retrofitting or constructing high-efficiency buildings was identified as an important strategy for realizing the targets. And third, a significant portion of the human and financial resources needed to achieve the desired outcomes are currently supplied by utility-administered energy efficiency programs.

## 2. TRANSFORMING THE ENERGY INTENSITY OF BUILDINGS

Since the 1990s, governments in a number of North American jurisdictions have worked to improve the efficiency of entire technologies and processes within the marketplace by reducing market barriers. Attention has expanded from improving the efficiency of discrete technologies (e.g., light bulbs and furnaces) to improving it for entire building stocks. Given the number of technical systems and actors involved in designing, building, operating, living and working within buildings and the communities that host them, this shift marks a considerable increase in the level of complexity associated with market transformation.

Although market transformations are usually driven by government bodies with authority to standardize technologies and practices, rate-payer funded programs also play an integral role in transforming energy use and efficiency approaches. In North America, such programs are typically structured in one of three ways: utility-delivered with regulatory oversight, state administered, or non-profit administered with oversight by a Board of Directors[12]. Some variation of the utility-delivered model is in use in each of three jurisdictions reviewed by this paper.

A central tenet of utility-administered energy efficiency initiatives is that spending to encourage demand reduction is justified when the per-unit cost of reducing the demand for energy is less than the per-unit cost of supplying additional energy to fulfill the demand. Although different economic tests are used to determine the cost-effectiveness of demand-side measures versus new supply options, the Total Resource Cost (TRC) test is arguably the most influential. In its simplest form, the TRC weighs the costs of different demand-side measures (DSM) to reduce consumer energy demand borne by both the administrator (e.g., utilities) and participants (e.g., customers) against the avoided supply-side cost that DSM are intended to displace[13]. In addition to accounting for the direct energy benefits associated with DSM, many jurisdictions, including BC, also include the cost of other benefits into their TRC calculations such as associated reductions in utility electrical capacity costs as well as a range of other avoided energy and non-energy costs realized by participants[14]. A TRC score of 1.0 or higher indicates that it is more cost-effective to fulfill incremental demand with a demand-side measure than with new supply.

The three jurisdictions reviewed in this paper require utilities to demonstrate that they are pursuing all available cost-effective DSM approaches. To assess the potential for gains, all also require a TRC test that includes some measure of non-energy benefits. As is shown in the following case studies however, the vigour with which these requirements are pursued is closely tied to the level of urgency that state or provincial governments give to transforming a particular market.

## 3. CASE STUDIES OF MARKET TRANSFORMATION FOR BUILDINGS

### 3.1 British Columbia

In British Columbia, the supply of energy for buildings is dominated by two utilities: British Columbia Hydro and Power Authority (BC Hydro) which services electricity to over 94% of the province's population and FortisBC which services about 96% of the province's natural gas customers. Since the early 1990s, utility-administered DSM has been a cornerstone of energy resource planning in British Columbia. Every three to five years each major utility develops a new DSM Plan. The appropriateness of each utility's plan is typically debated through a quasi-judicial public hearing process and reviewed for approval by the BC Utilities Commission (BCUC) after a more-or-less complete plan is submitted. However, since 2013 BC Hydro's Integrated Resource Plan is no longer submitted to the BCUC but is instead submitted directly to the BC Ministry of Energy and Mines for review and approval.

By 2003, the province started to layer onto these utility efforts some of its own market transformation objectives. In 2008, it released the Energy Efficient Buildings Strategy[15] (EEBS), which included specific targets for improving the energy intensity of the province's building sector (see Table 1). However, the strategy did not include any specific targets for GHG reductions nor specify the degree to which energy intensity improvements would help reach the legislated GHG targets.

Energy efficiency initiatives announced in the EEBS included a strengthened building code, setting a LEED Gold building standard for all new provincial public sector buildings, strengthening energy performance standards for appliances and equipment, establishing a province-wide whole-building audit and incentive program through LiveSmart BC, piloting several time-of-sale home energy labeling projects, and permitting municipalities to set higher efficiency building standards for designated new construction projects. Many of these initiatives were funded either in whole or in part through the province's general revenue stream. Since 2010 a number of the measures announced in the province's 2008 buildings strategy have been delayed by years or cancelled.[16]

A number of regulatory changes in 2008 and again in 2011 also effectively increased the potential savings that could be delivered by utility DSM programs. These include:

- A requirement for all new electricity to come from clean sources. This effectively doubled the avoided cost of supply from about $60/MWh for natural gas generation in 2006 to $129/MWh in 2012 for mid-scale renewable projects[17].
- A policy objective for electricity utilities to meet a minimum of 66% of their forecasted electrical load growth with DSM by 2020.
- A requirement for utilities to demonstrate that all cost-effective DSM strategies were being pursued before new supply could be acquired.
- The number and type of benefits utilities could attribute to their DSM programs beyond the avoided cost of energy was increased.

Table 1 - Energy Intensity Targets included in the 2008 Energy Efficient Buildings Strategy

| Building Sector | Energy Efficient Target |
|---|---|
| Residential | Reduce average energy demand per home by 20 per cent by 2020. |
| Commercial and institutional buildings | Reduce energy demand at work by a total of 9 per cent per square metre by 2020. |
| All Government Buildings | Reduce government's electricity demand by 20 per cent by 2020, reduce natural gas demand and promote alternative energy options.<br>Government will become carbon neutral by 2010 through efficiency measures combined with offsets |
| New Government Buildings | All new government buildings and facilitates will meet the standards of LEED Gold or equivalent certification, including BC wood products. |
| Communities | Set targets for new buildings' energy needs to be delivered from community-based, clean energy sources<br>Complete energy conservation plans for all BC communities |

The cost-effectiveness of longer-term market oriented measures (such as education, training, community engagement, technology innovation, and standards development) were to be tested against a utility's entire DSM portfolio rather than on an individual program basis .[18]

A "modified" TRC test that permits 10% of an electric utility's DSM portfolio and 33% of a natural gas utility's DSM portfolio to adhere to a more permissive TRC test.

These policy changes have had a far more profound impact on FortisBC (natural gas) as than on BC Hydro (see Table 2), in part because they required the natural gas utilities to pursue energy savings practices similar to what electricity utilities had used for some time already. They also allowed utilities to include in their TRC calculations the direct GHG reduction benefits attributed to their energy savings programs. The impact of this was significantly greater for natural gas utilities because every cubic metre of natural gas conserved results in avoided GHG emissions. Comparatively each kilowatt of avoided electricity has minimal GHG savings, because the vast majority of BC Hydro's electricity is already considered "clean" from a GHG perspective.

A significant factor negatively impacting the scale of BC Hydro's DSM objectives was that fact that in late 2012 the utility started to project a 10-year supply surplus. To account for this surplus, BC Hydro adopted what it calls a "moderation strategy". This strategy lowers the utility's DSM expenditures in the near-term to reduce upward rate pressures but still maintains the flexibility to ramp up savings at a later date to achieve its long-term targets.[19] Prior to the projection of the supply surplus in late 2012, BC Hydro was planning to spend upwards of $750 million on DSM from 2014-2016[20].

Table 2 – A Comparison of the Growth in DSM Savings Sought by FortisBC and BC Hydro

| | FortisBC | | BC Hydro (3 year totals) | | |
|---|---|---|---|---|---|
| **Year(s) of Plan** | 2006[i] | 2013[ii] | 2006-2008 | 2009-2011[23] | 2014-2016[24] |
| **DSM Savings** | 102 GJ/yr | 498GJ/yr | 1,600 GWh[25] | 1,695 GWh | 2,300 GWh |
| **DSM Budget** | $2million/yr | $27.8 million/yr | $226.2 million[26] | $376.5 million | $433 million |

With the exception of its New Home and Low Income programs, all of the DSM programs included in BC Hydro's current plan have a TRC ratio of at least 1.0 (using an $85/MWh long-run marginal cost, or LRMC). Portfolio wide, the TRC is 2.7 when an $85/MWh long-run marginal cost (LRMC) is assumed, and as high as 3.1 with a $100/MWh LRMC[27]. By way of contrast, the portfolio TRC for FortisBC's 2013 DSM Plan was 1.1.

One major factor influencing BC Hydro's portfolio-wide TRC score is an indication by the BCUC that other than the small number of programs specified in the DSM regulation (e.g., education, training, and community engagement) all individual DSM programs should only be pursued up to their avoided costs. In other words, savings cannot be shared across programs as a way to smooth out the cost of the portfolio as a whole. Other reasons listed by the utility for not pursuing more DSM include: concerns about overreliance on a single resource type - in this case DSM - for meeting incremental demand growth; lack of experience both within the utility as well as across the North American electric-utility sector with some of the measures needed to achieve higher-levels of savings; and uncertainty about whether various levels of government would implement the kinds of actions needed to capture the full potential of savings identified by the utility, in a timeline that is consistent with its service obligations. In short, when BC Hydro looked beyond the TRC, it perceived the risk of falling short on a more ambitious plan to be too high.

Given the actions taken by the province in recent years, is it now on track to achieve the 2020 energy performance targets for buildings listed in Table 1? Unfortunately, the answer appears to be no or, at best, we don't know. This is because the province has no procedures in places to regularly track and publicly report on their progress[28].

This review suggests that the province is failing to provide the monitoring, oversight and accountability needed if the building-sector market transformation strategy of 2008 is to succeed. While some initial building efficiency standards have been introduced, and a number of regulatory changes have been made that give utilities increased justification to pursue ambitious energy savings, far more action is needed before potential energy savings and GHG reductions can be fully realized within the building sector in British Columbia. In contrast, Massachusetts and California are making considerable progress, and their approaches, as described below, provide pathways that BC would do well to consider.

### 3.2 Massachusetts

In 2008, Massachusetts (MA) announced its intentions to reduce its state-wide greenhouse gas emissions to between 10 per cent and 25 per cent below 1990 levels by 2020, on the way to an 80 per cent reduction in emissions by 2050. Two years later in its Massachusetts Clean Energy and Climate Plans for 2020, the 2020 target was later adjusted to a more rigorous minimum of 25% below 1990 levels[29]. Included in the plans are eight specific building energy efficiency and conservation policies that are projected to account for 36% of the emission reductions needed to achieve the state's 2020 target.

A key piece of the state's legislation for accelerating energy efficiency in buildings is the Green Communities Act enacted in 2008 which enables cities and towns to take steps to reduce their energy use and carbon footprints. Interestingly, much of the Act is focused less on empowering local governments directly and more on providing stable and predictable policies and programs to help them achieve these outcomes. The American Council for an Energy Efficient Economy (ACEEE), which has ranked Massachusetts number one in the United States (US) for energy efficiency every year since 2011, indicated that a key reason for this ranking is the state's "continued commitment to energy efficiency under its Green Communities Act" [30]. Specific policies in the Act include:

i) A requirement for electric and gas utilities to procure all cost-effective energy efficiency;

ii) The creation of a stakeholder-based Energy Efficiency Advisory Council (EEAC)

iii) A commitment to adopt within one year of its release the latest International Energy Conservation Code (IECC) for buildings (it is updated every three years); and

iv) A Green Communities program that municipalities can opt in to, that most notably requires the local adoption of the Massachusetts performance-based "stretch" building energy code.

The first of these measures represents a serious ramping up of utility-led energy efficiency programs. Although programs are administered by nine separate utilities, they are marketed under a single state-wide brand called MassSave and overseen by the Department of Public Utilities (DPU). For natural gas utilities, program funding is provided exclusively through two separate energy efficiency surcharges on customers' bills. Electricity energy efficiency programs are also primarily funded through two ratepayer sources: a legislated systems benefit charge of approximately $0.0025 per kWh (28% of funding) and a utility cost-recovery mechanism (58% of funding). The direct ratepayer contributions are supplemented by revenues from the auctioning of GHG pollution allowances under the Regional Greenhouse Gas Initiative (RGGI) (11% of funding), and revenues from energy efficiency demand side resources from the New England Forward Capacity Market.

As per the Green Communities Act, all electric and natural gas utilities are required to file a single state-wide energy efficiency plan with the DPU every three years. The DPU then rules on whether the plan captures all available cost-effective efficiency opportunities. This ruling is guided by whether the different elements of the plan pass a Total Resource Cost (TRC) test as well as the level of support it has from the stakeholder-based EEAC.

Although each program included in the plan is expected to pass the TRC test, measures which "might not have immediate energy savings or whose energy savings may be difficult to quantify" (such as pilot programs and general administration expenses) are not subject to this program level test. Instead, they are aggregated for each sector (e.g., residential, commercial and industrial) and as long as the total cost of each sector is less than the benefits attributed to them, the aggregated sets of measures are considered to be cost-effective. The TRC scores for MA's 2013-2015 energy efficiency plan were 3.69 for electric utilities and 1.92 for natural gas utilities and included a total DSM budget of $1,687 million over three years[31]. The state's first three year plan (2010-2012) achieved 91% of the targeted electric savings, 88% of the targeted natural gas savings, and 94% of the targeted oil savings.

As the bulk of Massachusetts' energy efficiency measures are borne by utility-administered programs, there is a recognized strong public interest associated with their success, hence the creation of the EEAC. Voting members of the EEAC include representatives from several state-government departments, industry, environment, union, energy efficiency service providers, and residential interests. Utilities actively participate, but do not have a voting seat on the council.

The EEAC plays an integral role in designing, approving, and monitoring the MassSave energy efficiency programs, and with developing a longer-term vision to maximise economic and environmental benefits through ongoing efficiency gains. Supporting its work are technical consultants (DPU-approved and paid for via the RGGI fund) who also act as a go-between the EEAC and the utilities in to order to achieve the EEAC's goals[32]. A final plan is negotiated between the utilities and the Council and submitted for public hearing before the DPU.

To achieve the state's ambitious GHG and energy savings targets, Massachusetts is planning nothing short of a building-sector market transformation over the next decade: "The state is working to transform energy use in old and new buildings, moving toward super-efficiency and zero net energy renovation and construction."[33]. For new buildings, the Green Communities Act requires the state to update its building code every three years to ensure that it is consistent with the most recent version of the International Energy Conservation Code. The state estimates that this measure in conjunction with the stretch building code will account for 6% of the GHG emissions reductions needed to achieve its 2020 target.

"Stretch" energy efficiency building codes require new buildings to meet a higher level of energy efficiency performance (at least 20 percent) than what is required by a state's or province's base building code. To encourage its use, municipalities are permitted to adopt it over the standard building code. To date, more than 140 municipalities that house over 50% of the state's population have done so.  Important co-benefits attributed to this uptake include accelerated skills upgrading and a decline in resistance by the building sector to installing efficiency measures that are specified in the standard building code.

The state is also leading by example by imposing internal targets including: reducing GHG emissions from state government operations by 25% by 2012, and 40% by 2020; reducing overall energy consumption from state owned and leased building by 20% by 2012 and 35% by 2020 (using 2004 as a baseline); and requiring all new construction and major renovations to be at least 20% more efficient than the base building code, as per the Massachusetts LEED Plus building standard[34].

For existing buildings, the bulk of utility measures (such as incentives, energy assessments and education) are marketed through MassSave[35]. Included under the MassSave banner is a utility-funded, whole-house energy audit and incentive program. MassSave also administers a 0% interest HEAT Loan Efficiency Financing Program that targets building envelope and heating upgrades. Although utilities were initially skeptical of this program, it has proven beneficial for customers, lenders and the utilities themselves. In 2006, 10 lender institutions closed 191 loans worth $3.65 million. By 2013, annual participation had grown to 53 institutions, which closed 9,084 loans worth $88.4 million[36].

Despite its success to date, the Department of Energy Resources emphasizes that Massachusetts must maintain a long view of energy efficiency, particularly for existing buildings. For example, two policy measures included in the state's Clean Energy and Climate Plan for 2020 – 'deep' Energy Efficiency Improvements for Buildings, and Building Energy Rating and Labeling – are expected to contribute very little to the state's 2020 GHG emissions reductions and energy savings targets because of the lead time required to establish them. However, the state continues to advance them because they help to set the groundwork for achieving its more ambitious 2050 goals.

### 3.3 California

In 2006 the State of California enacted the California Global Warming Solutions Act which outlines the state's major initiatives to reduce its GHG emissions to 1990 levels by 2010 (a reduction of approximately 30%) and 80% below 1990s levels by 2050[37]. Among the key strategies was accelerated energy efficiency through the expansion and strengthening of existing programs and building and appliance standards[38]. The plan also includes state-wide annual demand reduction targets of 32,000 GWh for electricity and 800 million therms for natural gas, relative to business-as-usual projections for 2020[39]. These efficiency goals were formally adopted by the California Air Resources Board (CARB) and are required by legislation to be updated every three years. The most recent Scoping Plan Update was completed in 2014.

Responsibilities for achieving the Act's energy efficiency targets are split between the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC). The CEC is responsible for most of the state's overarching energy policy and planning[40]. The CPUC, meanwhile, regulates California's four major investor-owned energy utilities (IOU) that collectively supply more than two-thirds of the state's electricity demand[41,42]. For energy customers serviced instead by one of the state's many locally-based public-owned utilities, policies are developed (including energy efficiency initiatives) and rates are regulated by locally elected boards and/or city councils[43].

According to the CPUC[44], California's energy efficiency goals, along with a slew of new energy efficiency legislation in recent years "create an environment where energy efficiency efforts must not only continue to thrive but scale up to unprecedented levels". In response to this pressure, in 2007 the CPUC developed a long-term strategy to coordinate utility rate-payer funded energy efficiency programs with the state's emerging mandates and market changes[45]. The result was the California Long-Term Energy Efficiency Strategic Plan, released in 2008[46], which set forth a roadmap through the year 2020 and beyond. It articulates multiple goals for each economic sector (i.e., residential, commercial, industrial and agricultural) and identifies specific near-term, mid-term and long-term strategies to assist in achieving the goals. Every three years, a formal review and update of the entire plan is conducted to track progress and establish any necessary course changes.

For residential buildings the plan sets out the following vision:

> Residential energy use will be transformed to ultra-high levels of energy efficiency resulting in Zero Net Energy new buildings by 2020. All cost-effective potential for energy efficiency, demand response and clean energy production will be routinely realized for all dwellings on a fully integrated, site-specific basis.

The plan's vision for commercial buildings, meanwhile, is as follows:

> Commercial buildings will be put on a path to zero net energy by 2030 for all new and a substantial proportion of existing buildings.

The implementation of the strategic plan requires close cooperation between the CPUC and California's four major IOUs that through their DSM programs. To help strike a balance between shorter-term avoided cost considerations and longer-term market transformation objectives, the CPUC evaluates the energy efficiency plan of each utility on a portfolio basis[47]. It is acceptable if some individual measures as well as programs within a portfolio do not pass the TRC test, as long as the complete portfolio demonstrates appropriate cost-effective merit[48].

Each three-year utility planning cycle is preceded by a CPUC-conducted state-wide energy efficiency potential study, which provides the basis for negotiations between the CPUC, the IOUs and others that set specific energy savings targets. These targets are in turn used by the utilities to develop their energy efficiency plans, each of which is submitted to the CPUC for approval and examination in a quasi-judicial public hearing process.

In the year following the strategic plan's release in 2008, the CPUC approved nearly $3.2 billion in IOU ratepayer-funded energy-efficiency programs from 2010-2012 (42% higher than the previous three-year program cycle)[49]. This was followed by an approved two-year budget of $1.9 billion for the 2013-2014 state-wide utilities' energy efficiency plans, which together have an ex ante anticipated TRC score of 1.25. During this time, a host of new measures and programs were introduced, including state-wide residential whole-house (comprehensive) energy audit and incentives programs and the establishment of partnerships with local governments. The expanded IOU resources have also been instrumental in developing and upgrading efficiency codes and standards in California, in establishing whole-building pilot projects, in upgrading skills and engagement with users, and in advancing financing options.

California, like Massachusetts, updates its buildings codes approximately every three years to ensure that they remain among the most stringent in the United States. Together with appliance standards, these codes and standards also apply to the renovation of existing buildings or to the replacement of existing building equipment and systems, such as HVAC, and water heating (i.e. whatever aspect of a building is renovated or replaced is supposed to meet current code or standard). To help it obtain its aspirational net-zero energy vision, the unofficial goal of every code release is to try to achieve a 15% performance improvement.  California also supports several voluntary tiers of performance standards that go beyond the code. These are offered for adoption by local governments, who want their communities to lead in energy efficiency, and are synchronized with utility offerings to local governments and developers and used as performance standards for government owned buildings.

California is also moving toward a more comprehensive set of strategies for improving efficiency in existing buildings. State Assembly Bill (AB) 758, passed in 2009, directed the CEC in collaboration with the CPUC and stakeholders to "develop a comprehensive program to achieve greater energy savings in the state's existing residential and non-residential building stock"[50]. The first draft of this program, was released by the CEC in early 2013[51] and followed by significant public input. Based on this input, the CEC undertook a substantial redraft of the 10-year plan to make it more market-driven and responsive to stakeholders. The redraft was released in March 2015 for further public comment and is expected to be adopted by mid-2015.[52]. It contains a breadth of measures including government leading by example, improved market supports (such as education and data), expanded voluntary and financing measures and moving toward more mandatory regulations such as energy use reporting and building energy labeling.

California's approach is characterized by a close partnership across a wide variety of stakeholders— including the CEC and CPUC, IOUs and publicly owned utilities (POUs), local governments, builders and contractors, commercial building owners and managers, technology manufacturers, efficiency provider trade associations, environmental organizations, and others.  While the CPUC provides arm's length regulatory authority and supports that advance the ambitious agenda, it is the IOUs, Regional Energy Networks (RENS), and third-party providers that direct the programs, designs, and financial and technical resources needed to get things done. Although an evaluation of the entire three-year 2010-2012 program cycle is pending, a preliminary assessment of its first two years confirmed that the IOUs appear to be on track to achieve their electricity commodity (kWh) savings targets for 2010 and 2011 and were on track to achieve them for 2012[53]. However, it appears they are falling below targets for gas commodity (therms) and electric peak load (kWh). Despite these mixed results, the ACEEE, ranks California second in the US for energy efficiency.

# 4. COMPARING GOVERNANCE APPROACHES

## 4.1 Jurisdiction-wide climate and efficiency targets

BC, Massachusetts and California have set a variety of legislated ambitious GHG reduction objectives for the years 2020 and 2050, summarized in Table 3. In addition to expanding use of renewables[54], energy efficiency is acknowledged in all three jurisdictions as an important strategy to achieve the targets. However, only Massachusetts and California have set specific GHG targets for efficiency improvements. These have led in turn to the development of state-wide GHG reduction plans with the energy efficient component overseen in part by arms-length government organizations[55].

The closest BC comes to a single province-wide efficiency plan is the 2007 BC Energy Plan and the 2008 Energy Efficient Buildings Strategy (EEBS). Unlike California and Massachusetts, the

Table 3 - Comparison of jurisdiction-wide climate and energy efficiency policies

| Jurisdiction-wide climate change & energy efficiency objectives | BC | MA | CA |
|---|---|---|---|
| Ambitious, legislated jurisdiction-wide greenhouse gas reduction targets for 2020 and 2050. | ✓ | ✓ | ✓ |
| Specific renewable energy requirements | ✓ | ✓ | ✓ |
| Climate plan includes specific amounts of GHG reductions to come from energy efficiency measures. | | ✓ | ✓ |
| Jurisdiction-wide energy efficiency strategic plan developed and updated regularly[56]. | | ✓ | ✓ |
| Energy efficiency measures of state-wide GHG plans formally overseen by a blend of government interests and public utilities commission processes. | | ✓ | ✓ |

EEBS contains no requirement for updating or oversight by anyone other than staff within the province's Electricity and Alternative Energy Division. Thus, there are no non-political triggers for driving BC's strategy forward, and not surprisingly, it has received very little attention since the idea of deep energy efficiency slipped off the province's political agenda in 2010. Although similar shifts in political focus occurred in Massachusetts and California following the 2008 global recession, both states had deeper institutional drivers in place that have helped to maintain the momentum of their energy efficiency strategies.

## 4.2 Energy efficient building standards

All three jurisdictions reviewed here have adopted nation-leading energy efficiency standards for buildings, summarized in Table 4. Although British Columbia's 2008 Energy Efficient Buildings Strategy provides a snapshot of the province's ambitions, the lack of follow-up reporting and the sharp decline in programs to support the strategy has rendered it inert. In contrast, both Massachusetts and California have established construction of super-efficient, net-zero energy buildings as an aspirational long-term market transformation objective. Toward this end, each state requires its energy efficiency building code to be updated every three years. This stipulation offers signals to the building sector what to expect over what timeline, while providing near-continuous review of the appropriateness of existing standards. In BC, the province has committed to updating its building code for new buildings every five years to be synchronized, more or less, with scheduled updates of the model national building codes. Assuming that these national updates are in keeping with the province's own energy efficient targets for buildings, this synchronized approach represents an efficient way to advance standards. However, careful and ongoing analysis needs to ensure that this is in fact the case.

Table 4 - Comparison of building energy performance standards

| Energy efficiency building standards | BC | MA | CA |
|---|---|---|---|
| Adopted energy efficiency requirements for new buildings | ✓ | ✓ | ✓ |
| Energy efficiency building codes are required to be among the most stringent in their country | ✓ | ✓ | ✓ |
| Energy efficiency building codes must be updated every three to five years. | ✓ | ✓ | ✓ |
| The stated market transformation objective is to standardize net-zero energy buildings | | ✓ | ✓ |
| Beyond-code energy efficiency is explicitly required for all state-owned buildings | | ✓ | ✓ |
| Local governments are permitted to adopt standardized "stretch" energy efficiency building requirements | | ✓ | ✓ |

Massachusetts and California have also developed standardized opt-in "stretch" energy efficiency building codes that require new buildings to meet a higher level of energy performance than what is required by each state's base building code. Local governments are then empowered to adopt the stretch code requirements as their local standard. Where applied, these not only provide opportunities to leap-frog existing technologies and skills but they demonstrate to the broader building sector, which typically takes an adversarial position on advanced energy efficiency, the feasibility of accelerating market-wide standards.

Other than the City of Vancouver, which operates under its own provincial legislation, there is no clear cut way for local governments in BC to adopt across the board building bylaws that go beyond the basic energy performance standards required by the provincial building code. The closest BC comes to empowering all the province's local governments to adopt stretch requirements is its Solar Hot Water Ready Regulation. This gives local governments the authority to "opt-in" to a requirement that all new single-family homes be built to accommodate future installation of a solar hot water system. About 26 communities in the province have so far opted-in to this requirement. But while a good start, BC's program is far more limited than the whole-house approach being taken in MA and CA.

### 4.3 Utility administered energy efficiency programs

All three jurisdictions discussed here rely heavily on utilities' ratepayer funded DSM programs to provide the material and human resources needed to develop and implement energy efficiency strategies. All have adopted similar guiding policies for utilities to ensure these strategies are ambitious and in line with broader market transformation objectives, as summarized in Table 5. But amongst the similarities lie differences. For example, in every three-year planning cycle state-wide reviews of conservation potential are conducted in Massachusetts and California by legislatively recognized non-utility bodies (the Energy Efficiency Advisory Council in MA and the Public Utilities Commission in CA). The reviews form the basis for public deliberations about potential "cost-effective" energy efficiency gains, and utilities are then required to adopt resource plans to reflect publicly agreed upon targets. In BC, energy efficiency planning is more utility-driven and public deliberations are generally limited to fulfilling utility resource planning requirements. It is likely that this narrower approach allows for utilities in BC to pursue far more conservative levels of energy savings than seen in MA and CA.

Table 5 - Comparison of utility-administered energy efficiency programs

| Utility administered energy efficiency programs | BC | MA | CA |
|---|---|---|---|
| The vast majority of energy efficiency programs are administered by energy utilities. | ✓ | ✓ | ✓ |
| Utility energy efficiency plans are required to be updated on a regular basis | ✓ | ✓ | ✓ |
| Utility supply and demand revenues are decoupled[i] | ✓ | ✓ | ✓ |
| Utilities are legislated to pursue all cost-effective energy efficiency | ✓ | ✓ | ✓ |
| Energy efficiency is legislated to be the first priority for fulfilling a projected energy supply gap. | ✓ | ✓ | ✓ |
| Broad public benefits are attributed to energy efficiency | ✓ | ✓ | ✓ |
| Special rules exist for demand-side measures (e.g., education, community involvement, technology innovation, and codes and standards research) that indirectly support the goals of reducing building energy intensity. | ✓ | ✓ | ✓ |
| An independent efficiency potential study is conducted every planning cycle by a non-utility interest | | ✓ | ✓ |
| The amount of "all cost-effective" energy efficiency that utilities are required to pursue is established through deliberative transparent public processes which are in part focused on achieving state-wide market transformation objectives | | ✓ | ✓ |
| A portion of energy efficiency resources is used to support the ongoing development of state-wide energy efficiency plans. | | ✓ | ✓ |
| Jurisdiction-wide utility programs are coordinated with "stretch" requirements to incent adoption | | ✓ | ✓ |
| A utility-funded and jurisdiction-wide, whole-home audit and incentive program for existing buildings[ii]. | | ✓ | ✓ |
| Multi-year commitments made to pilot projects to give local markets time to mature (e.g., financing, building labelling) | | ✓ | ✓ |
| The use of ratepayer funded DSM to pursue non-utility, public-benefits is generally supported. | | ✓ | ✓ |

In support of this view, a few basic DSM measures are compared among the three jurisdictions to see if any significant difference exists between the level of DSM sought by BC Hydro and that sought by electricity utilities in MA and CA (Table 5)[59]. Comparison of the TRC scores is instructive, as they show that CA is aggressively pursuing DSM. Comparing planned DSM savings relative to total sales indicates that MA's state-wide plan is arguably the most ambitious[60]. In terms of dollars spent to pursue cost-effective DSM, BC Hydro plans to spend between 70% and 77% less on DSM per gigawatt hour sold than Massachusetts, and about 50% less than California. Although some of the difference can be attributed to BC Hydro's decision to pursue moderation strategy as a means to mitigate short-term rate increases associated with a previously unanticipated supply surplus, the fact of the matter is that the underlying scope of the current DSM Plan has changed little since 2008.

As provincial and international studies show, achieving the level of GHG reductions legislated in BC, California, and Massachusetts will require major gains in energy savings from new and existing buildings. Given how DSM planning is structured in each of these jurisdictions, utilities will very likely play an integral role in achieving these savings for the foreseeable future. Based on experiences in California and Massachusetts, this is likely to result in higher utility rates but overall lower energy bills than what will be realized if such ambitious DSM Plans are not used. For example, a 2010 report of Massachusetts' new "aggressive energy efficiency program" predicted that despite persistent rate increases associated with the implementation of this program, it will ultimately result in an $11.2 billion (present value) reduction in aggregate customer energy bills from 2009-2020. Massachusetts' former business-as-usual energy efficiency portfolio, on the other hand, was predicted to lead to only $4.1 billion (present value) in energy bill savings over the same period of time.[61]

In British Columbia, where a more opaque link exists between the province's climate objectives and utility DSM planning (particularly for the province's electricity utilities), a major consideration of the DSM component of BC Hydro's 2013 IRP was to remain consistent with the province's policy to keep short-term electricity rate increases to a minimum. Although BC Hydro acknowledges in the IRP that a trade-off exists between the "potential impact on near term and long-term rates, and revenue requirements" (i.e., aggregate customer bill impacts), it does not provide any significant detail about what the longer-term aggregate bill impacts would be if it pursued a more ambitious DSM plan[62,63]. This omission is regrettable because as the Massachusetts and California case studies demonstrate although pursuing more ambitious levels of energy savings will likely result in higher energy rates, it can also lead to considerable energy bill savings for customers.

This simple comparison suggests that even with BC Hydro's expenditure moderation strategy taken into account it has adopted a noticeably less ambitious plan than utilities in MA and CA, where strategic-level energy efficiency planning is more directly tied to statewide climate targets and influenced by non-utility interests. Energy efficiency authorities from MA and CA contacted for this paper pointed out that strong and coherent direction from non-utility stakeholders ensures that an appropriate balance is struck between the long-term climate and market transformation goals of the states and the shorter-term resource goals of the utilities.

But just how far should utility-administered DSM be used as a policy tool to advance broader social agendas, such as the environment, health and well-being, employment and poverty reduction? Energy efficiency stakeholders from MA and CA with whom the author spoke were careful to point out that while not everyone agreed with their positions, the current level of intervention in both states was well within the bounds of what is acceptable. In BC, on the other hand, the idea of using ratepayer money to pursue non-utility objectives is generally not as widely accepted. The dominant BC perspective was captured well by one senior BC utility manager who likened California's more deliberative approach to setting utility energy savings targets to the "tail wagging the dog". Of course who is the dog and who is the tail is all a matter of perspective. In BC, the utility is widely viewed as the dog with its focus on resource acquisition, while in MA and CA the dog is more readily assumed to be the state with its focus on market transformation. The ways in which utility energy efficiency planning is carried out in each jurisdiction reflects these differing perspectives.

Table 6 - Comparison of electric utility demand-side measure programs

| Jurisdiction | Domestic Sales (GWh) | Avoided Cost of Supply | TRC (Benefits to Costs) | DSM Savings as % of Sales | DSM Budget (millions of dollars) |
|---|---|---|---|---|---|
| BC (BC Hydro)[64,65] | 51,837 | $85/MW - $100/MW | 2.7 - 3.1 | 1.5% | $151 (2014)<br>$150 (2015)<br>$131 (2016) |
| MA[66,67] | 55,313 | $131/MWh | 3.69 | 2.55% | $528 (2013)<br>$560 (2014)<br>$602 (2015) |
| CA (IOUs)[68,69,70] | 194,275 | $100/MWh - $190/MWh | 1.25 | 1.3% | $950 (2013)<br>$951 (2014) |

## 5. CONCLUSION AND RECOMMENDATIONS

This review suggests that approaches used in MA and CA are yielding a more sustained market transformation for super efficient buildings than is the case in BC as well as significant aggregate energy bill savings for customers despite rate increases. Key measures include establishment of new energy efficiency standards every three years, voluntary stretch building codes, subsidized energy audit and incentive programs, and customer-based financing options for retrofits and upgrades in addition to requirements for energy labeling and construction of super-efficient and/or net-zero buildings.

While BC does share a number of similar targets and policies with CA and MA, including ambitious GHG reduction goals, specific energy intensity targets for buildings, a commitment to adopting leading national performance standards for new buildings, and a requirement for energy utilities to demonstrate that they are pursuing all cost-effective demand side measures, the comparisons presented in this paper show that at a more tactical level, British Columbia's commitment and capacity to achieve these objectives is demonstrably weaker. There are three specific contrasts:

- BC lacks ongoing processes to track and publicly report on progress made toward its goals for achieving greater energy efficiency in new and existing building stock
- Other than Vancouver, local governments that want to go beyond BC's adopted building energy efficiency performance standards are constrained by the limited opportunities to do so.
- Utilities are ordered to pursue all cost-effective energy efficiencies but given the prudence required in utility resource planning, they are unwilling to extend themselves beyond the limited commitment of the province to transform the energy performance of buildings old and new.

In short, British Columbia was enthusiastic about building energy efficiency between 2008 and 2010 but failed to build the direction and capacity in the marketplace needed to transform its building stock and see that enthusiasm realized.

But it is never too late to take action, and the steps taken by Massachusetts and California offer a template for British Columbia. To this end, five sets of recommendations are offered that would support and accelerate a building sector market transformation throughout the province:

**1. Set and monitor a "big, bold" energy efficiency vision for BC's built environment.**

Realizing BC's energy efficiency potential will not only reduce GHG emissions and help fulfill energy services in a cost-effective manner, it will also create tens of thousands of new jobs, save consumers money over the long run, and improve the economic competitiveness of the province's businesses. It is high time to make a serious commitment to achieving this potential. Toward that end the following steps should be undertaken:

i. Require BC Hydro and FortisBC to complete a province-wide, multi-fuel energy demand and conservation potential review by early 2016.

ii. Legislate a new ambitious 20-year province-wide energy efficiency vision no later than Spring 2016. The vision should act on the findings of the province-wide, multi-fuel review and seek to capture all economically feasible energy savings identified by utility planning. Included in the legislation should be a requirement for utilities to demonstrate the compatibility of their DSM Plans with achieving this vision.

iii. Set specific energy intensity commitments for buildings and a timeline for achieving the required savings.

iv. Allow shorter-term energy savings and intensity goals to adapt to prevailing market conditions, while still maintaining the viability of achieving the overall 20-year vision.

**2. Create multiple institutional triggers for advancing BC's energy efficiency objectives:**

At present, the only legislated trigger for an energy efficiency review in British Columbia is the utility resource planning requirement included in the BC Utilities Commission Act. Utility commitments to demand-side measures in BC are heavily influenced by the ups and downs of medium-term energy supply imbalances and wholesale energy prices that displace long-term planning. To institutionalize a long-term perspective on energy efficiency four steps should be taken:

i. Publish a province-wide energy efficiency strategy by the summer of 2016.

ii. Legislate reviews and updates of the strategy every two years.

iii. Continue to synchronize updates of the province's energy efficient building requirements with the timing of federal updates (e.g., every five years) provided they are consistent with the rate of change needed to achieve the province's energy intensity commitments for buildings (recommendation 1.iv). If they are not consistent, the province should adopt and adequately resource an independent code and standards schedule that is.

iv. Grant the responsibility for overseeing the progress of the province's energy efficiency targets to an arms-length government entity (e.g., BC Utilities Commission) that will solicit and receive direct input from an energy efficiency stakeholder advisory committee.

**3. Nurture strong policy-oriented energy efficiency networks in British Columbia**

Although a building sector market transformation will ultimately require the input of countless interests and organizations, from the provincial perspective this report recommends the creation and ongoing support of three key partnerships:

i. Appoint immediately a permanent multi-stakeholder Energy Efficiency Advisory Council to advise on matters related to efforts by the province and utilities to advance energy efficiency.

ii. Establish a permanent cross-ministerial green buildings committee that includes senior representatives from all branches of government with responsibilities connected to building energy consumption and GHG emissions.

iii. Develop an action-oriented and innovation-centred partnership with local governments that seek to lead the market for low energy and carbon intensive buildings in BC (the Pembina Institute's Municipal Green Building Leaders provides an example of how this might be done).

**4. Create and grow local market niches for high-efficiency buildings:**

The market for high-efficiency building needs to be accelerated. Five specific actions are recommended:

i. Set 2020 as the required date for building energy labels to be "displayed" for all new buildings and at the time-of-sale for existing buildings.

ii. Develop by February 2016 "stretch" energy efficiency performance requirements for new residential and commercial buildings and empower local governments to "opt-in" to adopting these requirements.

iii. Establish specific and more stringent energy efficiency performance requirements for new and existing provincial public sector buildings that align with the "stretch" energy efficiency performance requirements made in recommendation 4.ii.

iv. Amend the Community Charter to give more flexibility to a small number of communities that want to lead the province's high-efficiency buildings marketplace.

v. Collaborate with the leading communities who participate in item 4.iv. to act as living laboratories for developing and testing new energy efficiency programs and measures.

**5. Ensure utilities align their resource plans with BC's "big, bold" energy efficiency vision:**

As currently structured, accelerating a market transformation of BC's building sector will require close coordination with the province's energy utilities. To encourage this, four steps are recommended:

i. Direct the BC Utilities Commission to permit utilities to use a portfolio TRC test as their measure of cost-effectiveness for their DSM Plans.

ii. Use a transparent, public deliberation process to set the appropriate level of "all cost-effective" energy savings that utilities are to pursue via their multi-year resource plans.

iii. Amend the Demand-Side Measures Regulation to include the funding of the province's Energy Efficiency Stakeholder Advisory Committee (Recommendation 3.i) as a "specified demand-side measure" for utilities to help ensure both the committee's political independence as well as to provide it with secure and predictable funding.

## ENDNOTES AND REFERENCES

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12. For more information see: 1) Blumstein, C., Goldman, C., & Barbose, G. (2005). Who should administer energy-efficiency programs? Energy Policy, 33, 1053-1067, and 2) Eto, J., Goldman, C., & Nadel, S. (1998). Ratepayer-funded energy-efficiency programs in a restructured electricity industry: Issues and options for regulators and legislators (No. LBNL-41479). Berkeley, CA: Lawrence Berkeley National Laboratory

13. On pages 17-18 of the July 2013 version of the California Public Utilities Commission's Energy Efficiency Policy Manual (which is widely recognized in North America as the industry standard for jurisdictions where utility-delivered energy efficiency programs are provided), the TRC is described as follows: "The TRC measures net costs as a resource option based upon the total costs for the participants and the utility. The benefits are the net present value of avoided costs of the supply-side resources avoided or deferred. The TRC costs encompass the net present value of the net costs to participants for installed measures over the measure life plus all the costs incurred by the program administrator. The net benefits and net participant costs exclude the benefits derived from and costs paid by free-rider participants. The net cost to participants is the actual costs minus any rebates from the program administrator.

14. BC Hydro (2013). Integrated Resource Plan, pp 3-39.

15. Ministry of Energy Mines and Petroleum Resources. (2008). Energy Efficient Buildings Strategy. Victoria, BC: Government of British Columbia

16. The energy efficient building code, for example, was delayed by several years; small and short-term pilot projects were tried but never scaled up, including residential time-of-sale energy labels and on-bill financing for retrofits; some programs were not renewed after initial short-term funding commitments expired, including net-zero energy homes and SolarBC; and some were seemingly dropped altogether, such as energy-labelling provisions for new commercial buildings and energy conservation plans for all BC communities. Most recently, the province cancelled its LiveSmartBC energy audit and incentive program as of March 31, 2014.

17. The long-run marginal cost used for the 2013 Integrated Resource Plan was lowered to $85 to $100 per MWh because it was based on the cost of supplying power from incremental DSM resources and Electricity Purchase Agreement renewals rather than greenfield private wind and hydroelectric projects as was used for its 2008 Long-Term Acquisition Plan.

18. This change made it considerably more straightforward for utilities to justify the broad benefits that these kinds of support measures bring to their overall DSM plans and therefore ease the inclusion of such measures into these plans.

19. BC Hydro (2013). Integrated Resource Plan, pp 9-16 to 9-17.

20. BC Hydro. (2011). Exhibit B-1-3B in Amended New Appendix II. Revenue Requirements Application. Pp 179.

21. As Per Terasen Gas's 2008 Energy Efficiency and Conservation Programs Application

22. As per FortisBC Energy Utilities' Energy Efficiency and Conservation Program – 2013 Annual Report

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25. BC Hydro (2006). Table 8-2 Load and Resource Data for Figure 801 and Figure 8-2. 2006 Integrated Electricity Plan (IEP) and Long-Term Acquisition Plan (LTAP). Pp. 8-11

26. BC Hydro (2006) Table 8-27 DSM Plan by Plan Elements. F2007/F2008 Revenue Requirements Application (F07/F08 RRA). Pp. 8-70.

27. BC Hydro did not include in its 2013 IRP a TRC calculation that was based on all allowable benefits. If it had, we can assume that this ratio would be even higher.

28. A 2009 report commissioned by the province evaluated whether existing and anticipated federal, provincial and utility energy efficiency measures would meet the targets set out in the 2008 EEBS. For residential buildings, the report concluded that the target will be met only if all proposed existing and potential measures are undertaken. However, if only high-certainty measures are included (i.e., those likely to be implemented) only half of the provincial targets would likely be met. A recent internal review of EEBS progress for residential buildings found that the province was on track to achieve its targets (as per an email exchange with Ministry of Energy and Mines staff). The data used, however, was from 2010 (the latest available). Given significant provincial energy efficiency program pullbacks since 2010, one can only assume that the province is no longer on the path to achieving its energy intensity targets from the residential buildings sector.

For commercial buildings, the 2009 report projected that BC was on track to exceed the EEBS energy intensity target for commercial buildings by 28% if all measures were implemented and by 25% if only high-certainty measures were implemented. However, because the province's projections underestimated energy consumption for the 2007 base year (it assumed 1.49 GJ/m2 instead of 1.95 GJ/m2) and assumed a 6% increase in business-as-usual (BAU) energy intensity instead of the 12% decrease assumed in the consultant's report, the report showed that the province could achieve its energy intensity targets even should no further efficiency measures be implemented over the next decade . The targets, in other words, were set at a level less ambitious than the sector's updated BAU trajectory! What is more, problems with getting the data needed to assess the progress of EEBS targets for commercial buildings means that no reporting has taken place since 2009.

For further information please see Pape-Salmon, A, Katherine Muncaster and Erik Kaye (2010). British Columbia's Energy Efficient Buildings Strategy.

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55. The Energy Efficiency Advisory Council in Massachusetts and the California Public Utilities Commission in California.

56. Through a formal agreement, BC Hydro and FortisBC coordinate their energy efficiency programs, but this falls short of being a jurisdiction-wide strategic plan.

57. BC uses a regulatory decoupling mechanism that is designed to minimize a utility's "throughput incentive". Section 60(b)(iii) of the Utilities Commission Act allows utilities to recover DSM expenditures in rates, including "a fair and reasonable return on any expenditure made by it to reduce energy demands.." This means utilities can earn a rate of return on DSM comparable to energy sales.

58. BC Hydro's and FortisBC's new Home Energy Rebate Offer is a start toward providing a utility-funded and jurisdiction-wide, whole-home incentive program. However, it does not include an audit component which is crucial from both an energy performance data perspective as well as a capacity to customize subsequent information and incentive offers to home owners.

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70. Combined figure of 1,901 billion given for 2013 & 2014. Simply divided to get estimated annual budget. From Decision approving 2013-2014 Energy Efficiency Programs and Budgets.

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