Home energy labelling

Strategic Plan for Labelling of Part 9 Residential Buildings in B.C.

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- and — recognizing that the transition to clean energy will include fossil fuels for some time — advocating for responsible development of Canada's oilsands and shale gas resources.

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Home Energy Labelling

Energy Efficient Buildings for B.C.

Contents

List of Figures

List of Tables

Executive summary

For energy efficiency to be valued, it must first be measured in a way that allows comparison. Home energy labelling makes energy performance 'visible' to consumers through validated and easy-to-understand energy labels. Once widely adopted, labelling allows energy efficiency to be considered in real estate decisions and improves the business case for energy efficiency investments.

This strategic plan focuses on accelerating the uptake of EnerGuide labelling in B.C. Natural Resources Canada's EnerGuide rating system (ERS) can assess new and existing homes, including single-family homes, duplexes, rowhouses, townhouses, and low-rise apartments. It is an asset based system, meaning that the rating is derived from modelling of energy use after inspection of the home and/or review of schematics; unlike operational labels, it does not rely on consumption data. It applies to all levels of performance, unlike endorsement labels (eg EnergyStar) which are used to identify 'best in class' homes. Figure 1 summarizes the respective benefits of asset-based, endorsement, and operational labels. While this strategy focuses on EnerGuide labelling, each of these tools has a potential role to play in accelerating market transformation for energy efficiency.

Labelling system		Primary benefits	Secondary benefits
Comparative label, asset-based (e.g. EnerGuide)	Energy assessment (validated rating and homeowner report)	Provides actionable information at key decision point (sale/purchase, renovation) - prioritizes most effective EE measures by considering house as a system - face-to-face support - increases number and depth of EE upgrades - (optional add on) energy coaching: post-evaluation support	Supports Building Code compliance Increases household energy literacy
	Public disclosure (label) (in-house rating label, rating on MLS)	Real estate market can measure and price home energy performance	Facilitates marketing of high performance homes
	Data reporting (to government or utilities)	Assets database informs development of building code and retrofit programs	EE programs and incentives can be targeted to lowest performing homes
Endorsement label, asset-based (e.g. EnergyStar for homes)		Facilitates marketing of high performance homes	
Mass benchmarking, consumption-based (e.g. o-power)		Engages occupants on energy behaviour (print or web-based)	EE programs and incentives can be targeted to lowest performing homes Increases household energy literacy Reaches large numbers of homeowners irrespective of sale or renovation plans

Figure 1. Key benefits of asset-based comparative ratings, asset-based endorsement labels, and operational ratings

Market transformation for energy efficiency occurs when market participants change their behaviour, resulting in higher performing buildings being rewarded in the market, which leads to energy savings. [1]

Transforming the market for residential energy efficiency would mean that home energy information is understood by customers, used by realtors, reflected in homebuilders' decisions and appraisers' valuations, and accessible to regulators for planning; and that all parties act upon that information. In other words, homeowners and stakeholders change their behaviour.

Broad awareness, availability, affordability, accessiblity and acceptability of home energy labelling information in the real estate industry enables this behaviour change, so that energy efficiency — and its health and comfort benefits — is valued in the residential real estate market. To reach this goal, information about energy efficiency must be made available, that is, a critical mass of houses must be labelled. Which labelling tool is best suited depends on the market segment considered. Table 1 summarizes the medium-term desired outcomes from a labelling strategy in B.C. for different market segments.

Table 1. Medium-term outcomes, by target market segments

Market segment		Desired outcome
New homes	Market built and sold	• **critical mass** have asset-based comparison, validated labels, disclosed • pre-assessments based on schematic used to improve design before plans finalized and permits issued • operational comparison provided to occupants a year after occupancy
	Custom-built	• majority complete pre-assessments based on schematic; recommendations for improved design provided to owner for consideration before plans finalized and permits issued • operational comparison provided to occupants a year after occupancy
	Owner built and occupied	• majority complete pre-assessments based on schematic; recommendations for improved design considered before permits issued • operational comparison provided to occupants a year after occupancy
	Social housing	• procurement policy requires integration of all cost effective energy recommendations in pre-assessment • operational comparison provided to occupants a year after occupancy
Existing homes	Owner-occupied	• all need operational comparison with recommendations for actions
	Market rentals	• **critical mass** have asset-based comparison, validated labels, disclosed at the time of rental

[1] International Partnership for Energy Efficiency Cooperation, *Building Energy Rating Schemes: Assessing Issues and Impacts* (2014), p.s6. http://ipeec.org/publications.html

		• operational comparison provided to occupants with recommendations for actions
	Social housing	• procurement policy requires integration of all cost effective energy recommendations at time of renovation • operational comparison provided to occupants with recommendations for actions
	Offered for sale	• **critical mass** have asset-based comparison, validated labels, disclosed, with recommendations for actions
	Renovated	• all need asset-based and operational comparison with recommendations for actions (for renos over a certain size)
	To be demolished	• exempt from labelling requirements

In addition, data reporting processes must be in place so that utilities, local governments, and other key actors have information on all market segments to enable customized program and policy design. Validated information would be preferred, but unvalidated information could be sufficient for early programs.

Based on a review of existing programs in B.C. and elsewhere, four key policy tools for accelerating uptake of home energy labelling have been identified: voluntary incentives and education, regulatory requirements for labelling of new construction, regulatory requirements at point of renovation, and regulatory requirements at point of sale. These policies can be implemented by the provincial government or local governments. Local governments have the jurisdiction to require labelling as part of building permitting and inspections;[2] however, B.C. communities do not have the power to require that homes reach a specific energy performance target above the building code, or that energy information be disclosed to third parties.

Figure 2 and Figure 3 summarize the impacts of applying such policies in the Metro Vancouver area.

Benefits are quantitatively estimated for the Metro Vancouver region using the BC Hydro PIE model. Benefits include: the number of homes rated; the number of homes upgraded as a result of the rating process; and the annual energy, electricity, and GHG reductions expected between now and 2030.

Program costs are qualitatively assessed, and represent costs incurred by the regulating jurisdiction and/or organization providing incentives.

Labelling costs: are quantitatively assessed based on labelling uptake. Home assessments currently cost approximately $300–350 for existing homes; some incentive programs require a $150 follow-up post-upgrade evaluation (blower door test). Labelling cost estimates are based on a total cost of $500 per assessment. New building assessment costs are higher, ranging from

[2] Based on internal Pembina analysis, see T-P Frappé-Sénéclauze, B. Thibault and E. Pond, *Energy Labelling for New Homes: FAQs and Model Bylaw Amendments* (Pembina Institute, 2014). http://www.pembina.org/pub/2523. Local governments are recommended to seek their own legal opinion.

$500 to $750 for an as-per-plan and as-built assessment.[3] We do not distinguish here whether the cost is born by the homeowner or builder, or covered through program incentives. A full asset-based labelling program would also have reporting costs and administrative costs to maintain the assessment software, hardware and advisor network, as well as to analyze any reported results.

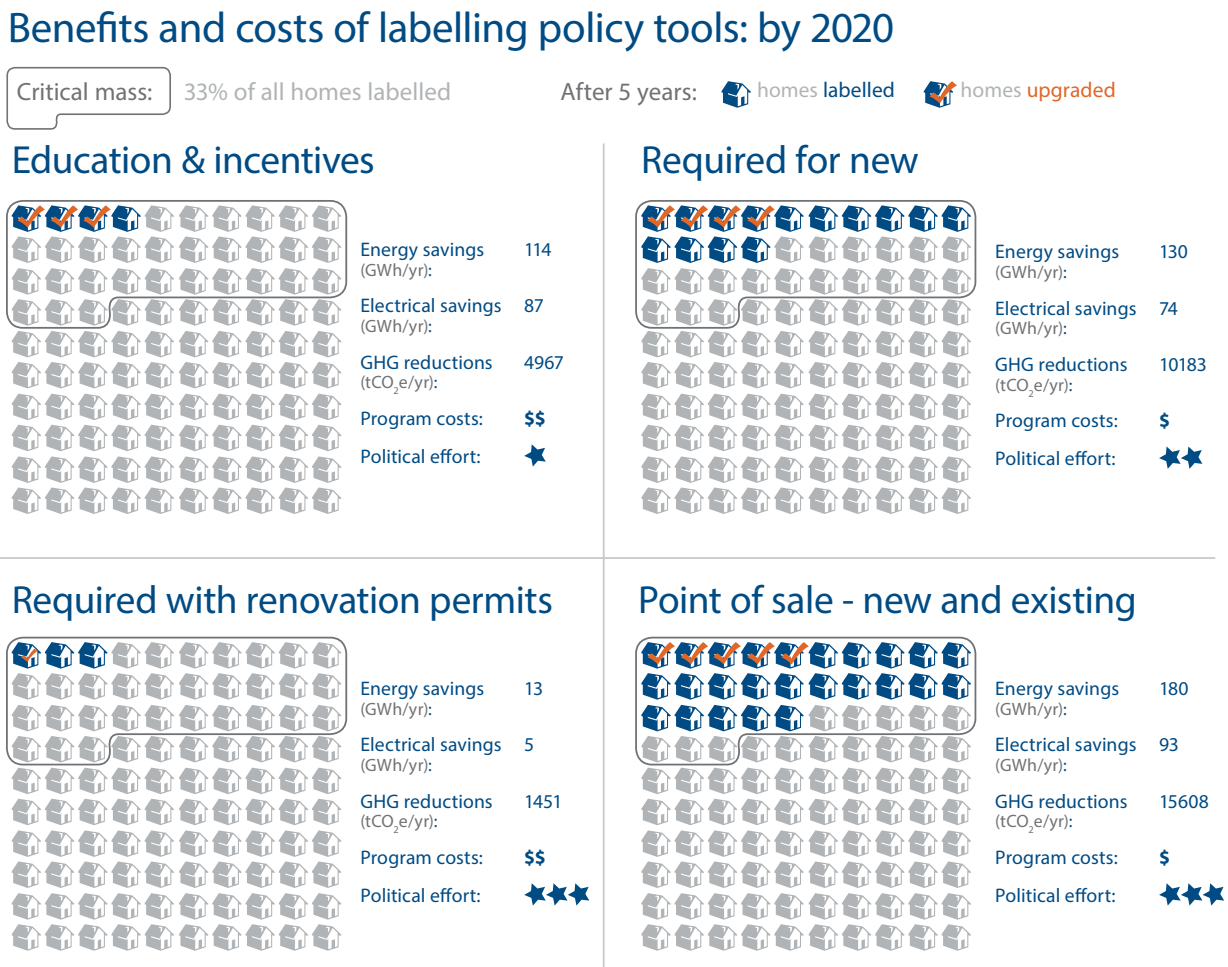

Figure 2. Benefits and costs of labelling policy tools, by 2020

[3] Note that labelled homes are eligible for a $2000 incentive from BC Hydro and FortisBC if rated above EG80 (or Energy Star, as of April 2015), and a 10% mortgage insurance rebate from CHMC (worth $800–$1600 approximately) if rated 82 or higher.

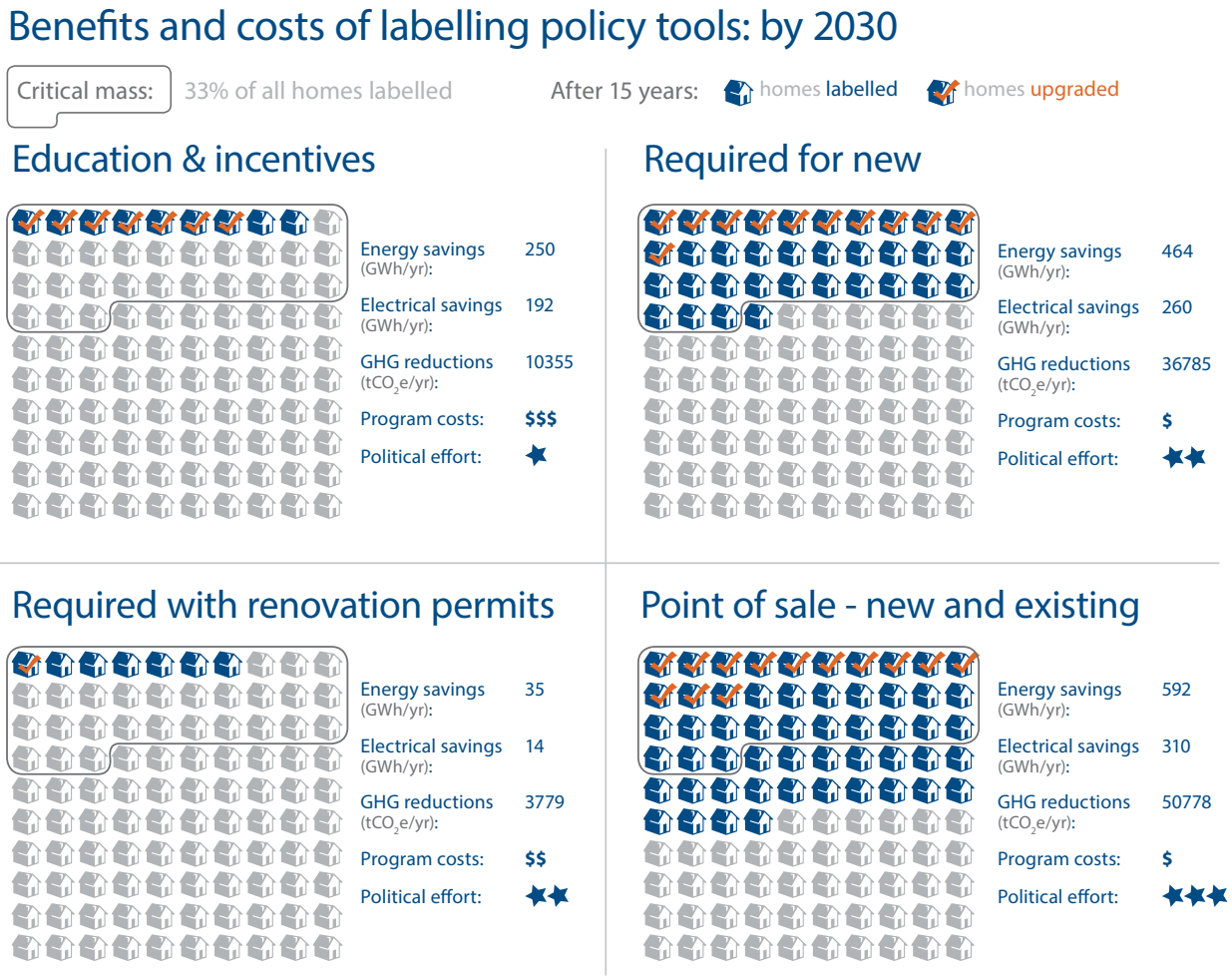

Figure 3. Benefits and costs of labelling policy tools, by 2030

Note that the modelling assumes programs begin in 2015.

Not suprisingly, market penetration is the greatest for a labelling requirement at point of sale, which cover the sale of both new houses and existing homes. A province-wide mandatory program has been previously signaled but not yet implemented: the government's Energy Efficient Buildings Strategy included an option to "Pursue policies for energy labelling of houses at time of transfer or sale";[4] a more recent, broader commitment was also included in the Pacific Coast Action Plan and reiterated by Minister Bennett.[5]

Incorporating labelling into the B.C. building code (or other provincial regulation), alongside setting energy performance targets such as maximum ACH or energy use intensity, could streamline compliance. Making compliance significantly simpler than the complex approach currently in place (as of December 2014) would likely be supported by local governments and

[4] B.C. Ministry of Energy and Mines, *Energy Efficient Buildings Strategy* (2008), 15. http://www.empr.gov.bc.ca/EEC/Strategy/EEBS/Pages/default.aspx

[5] Bill Bennett, letter to the Green Building Leaders, March 27, 2014. Available at http://www.pembina.org/docs/gbl/ministerbennett-response-mar14.pdf

possibly by builders as well. A 2014 UBCM resolution requesting that labelling be added to the Building Code was endorsed.

However, several market barriers would need to be addressed to reap maximal benefits from such a policy (Table 4). To address some of these barriers and prepare the ground for an approach that would address both new and existing buildings, we recommend an implementation in three phases:

1. **Continue incentives and education programs to prepare the ground and increase market demand for home energy performance services.**

   Multiple efforts are already underway for this phase: Township of Langley and Whistler's incentive programs, New West Energy Save program, Nanaimo realtor pilot program, various local Energy Diets, BC Hydro/Fortis New Home Program, BC Hydro online energy tracking tools, and other efforts by various stakeholders. Expanding the use of certified energy advisors (CEAs) to streamline permitting would also increase awareness and uptake while reducing permit wait times. The launch of the new ERS should be seized as a key opportunity to educate stakeholders (builders, realtors, home inspectors, loaning agencies, assessors, etc).

   Alongside these efforts to promote the use of EnerGuide, utilities and partners should develop and promote robust operational ratings. These operational ratings could be used to reach all homeowners, accessing market segments less likely to pursue asset-based labelling.

2. **Once a critical mass of builders are familiar with ERS, require labelling for new constructions (and possibly major renovations).**

   Labelling could be required through a provincial regulation, or possibly through local permitting (e.g. generalized use of CEAs and EnerGuide labelling as a means for local governments to ensure compliance with energy efficiency). Significant gains have already been made to demonstrate both interest and feasibility. At the 2014 UBCM convention, delegates supported a stand-alone resolution calling on the province to consider a labelling requirement in the Building Code for new Part 9 construction. Similarly, the fact that labelling for new homes has been required in Vancouver since 2009, and adopted by most builders in the City of North Vancouver, shows that it is technically and politically doable, at least in metropolitan areas.[6] Using the energy assessments to streamline code compliance, as initiated by the City of Vancouver, can lead to improved performance by new constructions and can benefit builders and local governments by reducing permit processing time.

3. **Once a critical mass of real estate agents are familiar with ERS and an adequate home energy performance industry is established, extend the labelling requirement to existing buildings through a point of sale requirement implemented at the provincial level.**

[6] Note however that these policies did not require disclosure of the rating on MLS. It is possible that the relatively low profile of the assessment results, while not helping market transformation, might have made it politically easier to advance these policies.

An adequate home energy performance industry must be established to ensure the industry can meet the demand for energy renovations), Similarly, there are efforts underway to lay the groundwork for all these.

Based on our research to date, this phased approach is the most likely to lead to wide adoption of labelling within a reasonable time frame, with the lowest pushback. Market and administrative systems have an opportunity to integrate labelling information first when dealing with new and reasonably efficient homes. Working first with builders before engaging home sellers at large also allows initial engagement to focus on a smaller group of stakeholders already accustomed to meeting permitting requirements.

Ideally, the requirement for new and point of sale labelling could be advanced directly at the provincial level. The best legislative home for such a regulation remains to be identified.

Working with local governments, preferably several within a region, to advance local bylaws (or permitting requirements) can help create a political window for action at the provincial level. Advancing labelling requirements with a few champion local governments provides a hub for innovation and prepares the market for a provincial regulation. Also, assessment requirements at time of renovation are currently best done at the local government level, since there is no provincial retrofit code.

A variety of actions should be taken in the short term (next one to three years) to prepare the ground for a regulation and to advance market demand for home energy performance. These activities and their desired outcomes are presented in Figure 14.

Introduction

Context

In October 2013, the B.C. government committed to "transform the market for energy efficiency and lead the way to 'net-zero' buildings" as part of the Pacific Coast Action Plan on Climate and Energy. The Plan states that "energy efficiency is the lowest cost way to reduce greenhouse gas emissions while creating good local jobs."[7]

In February 2014, Minister Bennett reaffirmed B.C.'s direction by stating that the provincial government plans to consider home energy labelling as part of operationalizing the Pacific Coast Action Plan. He referenced the Plan's call for a "policy that ensures that energy efficiency is valued when buildings are bought and sold."[8]

For energy efficiency to be valued, it must first be measured in a way that is comparable. Home energy labelling is one way to make energy performance 'visible' to consumers through validated and easy-to-understand energy labels. Once widely adopted, labelling allows energy efficiency to be considered in real estate decisions and improves the business case for energy efficiency investments. Labelling can be a key tool in market transformation for energy efficiency in the residential sector.

Timeliness

This home energy labelling strategic plan dovetails with several other regional and national initiatives. Setting a strategic direction for labelling will support better integration and success across the following projects:

- NRCan will be rolling out the revised national EnerGuide Rating System in 2015.
- Metro Vancouver has committed to the development of a regional labelling program.
- The Regional District of Nanaimo and City of Nanaimo are developing realtor programs and educational materials on labelling that should be replicable across the Province.
- There are already a moderate number of energy efficient homes being built by skilled builders across the province. A home energy labelling initiative would allow these builders to differentiate their homes from other non-energy efficient homes and would motivate private sector innovation and competition.

Scope

Geographic: This strategic plan has been developed for the province of B.C., with modelling and an implementation schedule specific to the Metro Vancouver region.

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[7] Pacific Coast Collaborative, *Pacific Coast Action Plan on Climate and Energy* (2013). http://www.pacificcoastcollaborative.org/Documents/Pacific Coast Climate Action Plan.pdf

[8] Bill Bennett, letter to the Green Building Leaders.

Building type: Home energy labelling under the EnerGuide system applies to low-rise residential buildings (single-family through to three-storey apartments) covered by Part 9 in the Building Code. Larger multi-unit residential buildings (MURBs), covered under Part 3 on the Building Code, are not included in this plan.

Structure

The **definitions** section introduces various forms of home energy labelling, differentiating between asset-based and operational labels, comparative and endorsement labels, and validated and unvalidated approaches.

We then present the **benefits** of asset-based valiated labelling and summarize the literature on impacts of labelling as experienced in jurisdictions that have implemented labelling requirements.

End goal and desired outcomes lays out the specific outcomes sought by energy labelling in the province of B.C. in the long, medium and short term. This section also explains the key qualitative benefits of home energy labelling, including labelling's role in market transformation for energy efficient residential buildings.

Next we investigate **policy tools** available for home energy labelling, distinguished by voluntary/mandatory, reach and point of intervention. Four policy tools are explained, followed by a brief synopsis of where they are currently in use.

In **benefits and costs**, we provide a summary of our methodology, quantitative impacts and cost estimates, along with the political effort required to implement each of the policy tools.

We then turn to **barriers and solutions** for the desired outcomes, including success factors for for each policy tool.

Based on the impacts/costs and barriers/success factors analysis, we then lay out a **recommended pathway** to reach broad adoption of labelling in B.C. in three phases: education and incentives, requirement for new homes, and requirement at point of sale. Specific steps that should be taken in the next one to three years to enable these policies and overcome barriers are discussed, and key milestones are identified.

Appendices include supporting material and a more detailed logic model of the pathways.

Alongside this strategic plan, a stakeholder engagement summary present the key findings from discussion with over 40 stakeholders, which informed this plan. An implementation plan for the Metro Vancouver region was also produced. These documents are available upon request.

Definitions

What is home energy labelling?

As shown in Figure 5, home energy labelling programs and policies generally require five components: home energy assessments, comparison again peers or standard to produce a rating, validation by third party to issue labels or certificates, data reporting to government, and public disclosure of results.

In Canada, residential energy assessments, ratings and validation services are provided by energy advisors certified by Natural Resources Canada. NRCan's EnerGuide rating system (ERS) can assess new and existing homes, including single-family homes, duplexes, rowhouses, townhouses, and low-rise apartments. The rating is derived from modelling of energy use after inspection of the home and/or review of schematics; it does not rely on consumption data.

A revised ERS will be rolled out across Canada in 2015, featuring improvements to the label and assessment methodology, with better reports for builders and homeowners. Figure 4 is an example of the new label, with the home's total energy use (GJ/year), energy intensity (GJ/m^2/year) and breakdown of end uses (e.g. space heating).

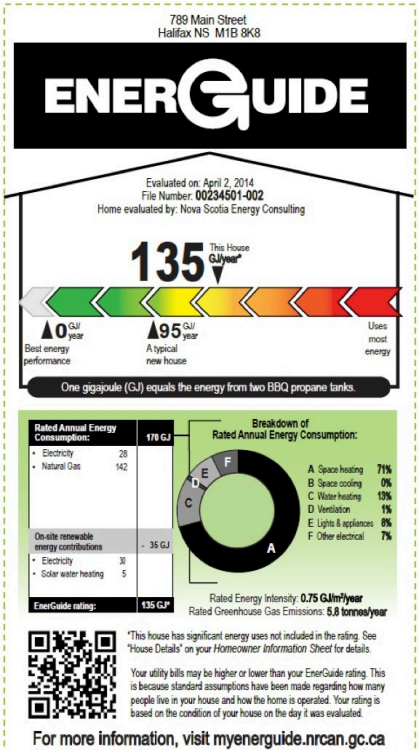

Figure 4. New EnerGuide label

EnerGuide Energy assessments provide builders and homeowners with reports that include the modelled energy performance of the home, the rating, and energy upgrade options.[9]

Data reporting occurs when energy advisors submit energy reports to NRCan; the data could also be provided to utilities, provincial and local governments to improve policy design and program delivery.

Public disclosure can be achieved by putting the rating sticker on the home's electrical panel and providing the information on a public website such as MLS when the house is being sold. Public disclosure is not always required in existing labelling programs, although it is a key driver of market transformation.

Figure 5. The five components of labelling

[9] For a more detailed description of the EnerGuide Rating System, see Appendix E in *Energy Labelling for New Homes*.

Comparative vs endorsement labels

A **comparative label** (e.g. EnerGuide) provides information on a particular building's ranking compared with similar buildings. An **endorsement label** distinguishes a certified building that fulfills a specific standard (e.g. Energy Star or Passive House) from non-certified buildings.[10]

The EnerGuide label is a 'diagnostic' home energy rating, as it rates the modelled performance of a home, verified with a blower door test. EnerGuide is different from "green" certification programs, such as Built Green, Passive House, R-2000, Energy Star for New Homes[11], LivingBuilding, or LEED for Homes, which target high performance homes. Their associated endorsement labels serve to identify and market homes that meet higher environmental standards.

Green certification programs raise the visibility of home energy performance and can help create a market for high performing houses. However, all of the "green" certification programs are currently targeted for new homes. Thus, they are not useful tools to compare the energy performance of existing homes, which constitute the bulk of the building stock. To allow differentiation and valuation of energy performance between existing homes, a comparative labelling system such as EnerGuide is needed, and potentially a "green" or "best in class" label for existing homes.

Also, current "green" certification programs reach less than 20% of the new homes, leaving the remaining 80% of new homes with third-party validation tools, other than EnerGuide Labels.

Figure 6. 'Green' or 'best in class' certification labels

Because these labels only apply to high-performance homes, they can help to create a market for better houses, but they are not adequate for promoting energy efficiency across the full range of homes in the new and existing building stock.

Asset-based vs operational ratings

Two types of ratings can be used to assess the efficiency of buildings. **Asset-based ratings**, such as EnerGuide, use building inspections (or analysis of schematics and computer models) to evaluate how a building will perform under standard operation assumptions. **Operational**

[10] International Energy Agency, *Energy Performance Certification of Buildings*, 2010, 15. http://www.iea.org/publications/freepublications/publication/buildings_certification.pdf

[11] NRCan Energy Star for Home, like EnerGuide, is produced by NRCan. There are two compliance options for new low-rise residential homes: a performance and a prescriptive path. The performance path requires energy modelling of the home, similarly to EnerGuide modelling; it can therefore generate both an EnerGuide and an Energy Star label. The prescriptive path requires a certain set of energy efficiency measures to be taken for the Energy Star label to be awarded. No 'whole house' assessment is conducted, and no EnerGuide rating or label is generated. Natural Resources Canada, "ENERGY STAR homes." http://www.nrcan.gc.ca/energy/efficiency/housing/new-homes/5057

ratings, such as Energy Star Portfolio Manager, use actual energy consumption data to compare the performance of buildings against each other.

Asset-based ratings can evaluate building efficiency independently from user behavior, allowing an apple-to-apple comparison between houses. Asset-based ratings are critical to enable real estate markets to compare the performance of houses and assign value to energy efficient features.

Operational ratings mix both building performance and current user behaviour. They are most useful for complex buildings, where building operation and maintenance offer significant opportunities for efficiency gains and for which an asset-based rating would be more costly to generate.

Residential operational ratings can be excellent tools for targeting energy efficiency marketing materials and engaging homeowner in behavior change campaigns,[12] as the rating is highly dependent on occupancy and user behavior.

Options for operational rating

For Part 3 (complex) buildings, the EPA has developed a free online Benchmarking tool, Portfolio Manager, now adapted by NRCan for Canada.[13] Building owners or managers import their energy use data and provide typical occupancy and building use. They can then see how their building performs compared to other buildings in the database with similar use and occupancy. This tool is available for low-rise residential homes and can produce weather-normalized energy use intensities. However, this tool does not provide Energy Star scores for residential buildings, as the statistical models have not yet been developed by NRCan or EPA.

For Part 9 residential homes, a comparative operational rating can be generated by analysis of utility bills given basic occupancy data. The occupancy data can be provided by the user, as is currently the case in the MyHydro profile tool offered by BC Hydro,[14] or could be estimated based on census and property assessment data. Because user behavior varies widely from home to home, it is very difficult to assess the energy performance of the home itself through analysis of utility bills alone without occupancy and behavioral data.

Validated vs unvalidated labels

Both asset-based and operational labels can be based on self-reported information or validated by third parties. Ratings generated from self-reported data are usually cheaper, but validated ratings are more trusted. EnerGuide is an example of a validated rating, while Energy Star Portfolio Manager rating is generally unvalidated, as it is based on data submitted by the building owner/manager (although third-party validation of ESPM ratings are available).

[12] See for example the tools offered by O-Power: http://www.opower.com/

[13] Natural Resources Canada, "ENERGY STAR Portfolio Manager." http://www.nrcan.gc.ca/energy/efficiency/buildings/energy-benchmarking/3751

[14] https://www.bchydro.com/powersmart/residential/smart_meters___conservation.html ; note that this tool only covers electrical consumption; for a complete energy picture inclusion of both gas and electricity data would be needed.

If the label is for self use (e.g. a building owner is trying to understand how efficient the building is for their own use), an unvalidated label may be sufficient. However, if the rating is to be used by a third party (e.g. a homebuyer, building assessor, or financial institution), a validated label would be preferable. Unvalidated ratings can be useful to engage building owners and occupants; validated labels allow other market agents to trust the information to inform pricing, loaning, and valuation. Both types of labels have their uses and value.

Benefits

Key benefits of labelling

Energy assessment, data reporting and public disclosure each provide specific, synergistic benefits, depicted in Figure 7. The rationale for these benefits and supporting study results (when available) are discussed below. It should be noted that given the relative newness of labelling policies, studies assessing their impacts are limited. The policy context for these studies also varies greatly, and may differ from conditions in North America.

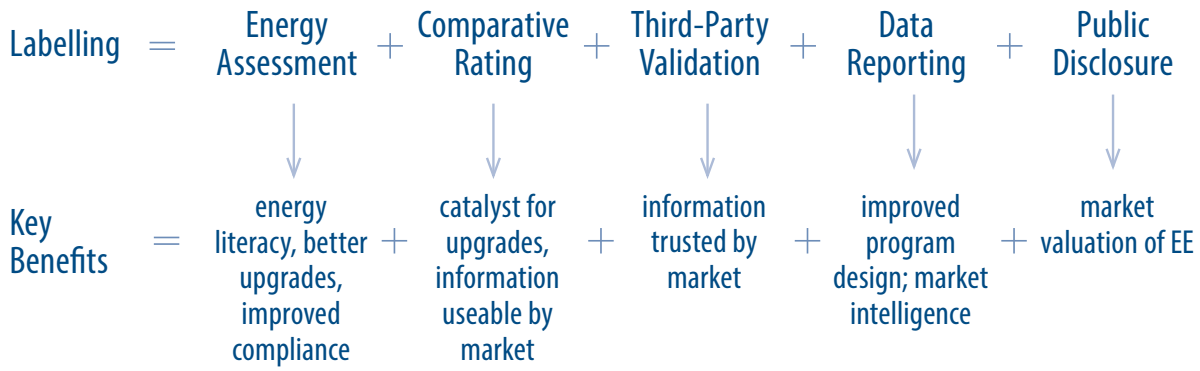

Figure 7. Key benefits associated with the five components of home energy labelling

Benefits of energy assessment

1. Increases energy literacy
2. Enables evaluation and tracking of energy performance
3. Improves depth and quality of upgrades by providing prioritized recommendations based on review of assets, face-to-face coaching, and access to incentives and programs:
    - for existing homes: Certified energy advisors (CEAs) support homeowner decision making by suggesting renovations with the best energy and cost returns and explaining incentive programs. This face-to-face interaction can increase uptake of incentive programs and help homeowners choose additional upgrades and/or more efficient technology.[15] CEAs can also provide additional 'energy coaching,' which can further increase energy savings.[16]
    - for new homes: CEAs can provide builders with timely feedback on energy efficient technologies and building techniques, an educational opportunity that can lead to improved design for current and future homes.[17]

[15] Of the 96,816 homeowners reached by CEAs during the LiveSmart program (April 2007-October 2014) 77% followed through with retrofits, generating an average energy savings of 26% per household. (Based on Livesmart data provided by Rylan Nowell, 4 November 2014.)

[16] An energy coaching pilot program conducted by CityGreen in 2013-2014 increased average energy savings by 24% for participants compared to non-participants. Peter Sundberg, *Summary of Energy Coach Findings* (2014), 1.

[17] Mike Young, CEA-new homes, City Green Solutions, personal communication, June 24, 2014; and Monte Polsen, CEA-new homes, Red Door Energy Advisors, personal communication, June 20, 2014.

4. Improves code compliance:
    - for new homes: The level of compliance with the energy efficiency elements of the building code for new construction in B.C. is currently unknown because for most homes, in most locations, energy efficiency requirements are not thoroughly inspected.

Energy assessments and blower door test results could act as a compliance pathway for energy performance targets in code, streamlining building officials' inspections. CEAs can also support building inspectors by verifying energy efficiency measures outlined in a checklist; the City of Vancouver and the City of North Vancouver are exploring these avenues as a route to streamline code compliance under the new code requirements for energy performance (in force January 1, 2015 and December 19, 2014, respectively).

Benefits of comparison and ratings:

1. Catalyses energy saving actions
    - for existing homes: by showing homeowners how their energy use (and therefore costs) compares with a standard and how it could be improved. When homeowners realise that there could be losing money by not pursuing upgrades and that they could save more money and/or have a healthier home by undertaking action, some segments of the market may act, when opportunity arises (either behaviourally (e.g. turning off lights) or by undertaking upgrades).
    - for new homes: by providing the builder with feedback and opportunity to improve design before house is built (if labelling includes an assessment based on schematic, as EnerGuide does) or for homes built in the future; provides information to properly price and market a home, and potentially to pursue "green" certification to achieve greater recognition and pricing.
2. Facilitates market valuation by providing easy-to-use house to house comparison

Benefits of third party validation

1. Facilitates market valuation by ensuring trustworthiness of information provided

Benefits of data reporting

1. Improves energy efficiency program design and delivery: By providing detailed and validated data on the new and existing building stock, energy assessment data enables government and utilities to better target incentive and education programs for builders and homeowners, and guide future code improvements.[18]
2. Improves home energy performance industry: The ERS data can provide invaluable market intelligence to the home energy performance industry to inform market opportunity, market penetration strategies and market development.

[18] See, for example, the role played by benchmarking in Vancouver's Building Retrofit Strategy. Benchmarking was used to identify high opportunity buildings, which will be targeted by high support programs maximize energy and GHGs returns. City of Vancouver, *Energy Retrofit Strategy for Existing Buildings,* Report to Council, June 2, 2014. http://former.vancouver.ca/ctyclerk/cclerk/20140625/documents/ptec1.pdf

Benefits of public disclosure

1. Enables valuation and rewarding of energy efficiency: Disclosure of assessment information enables the market to incorporate energy efficiency as a consideration for pricing. Ultimately, this increases the value and saleability of energy efficient houses and thus strengthens the business case for energy efficiency (see below, market transformation).
2. Improves energy literacy: Public disclosure of assessment information allows a wider range of market agents (realtors, builders, assessors, and homebuyers) to engage and act upon that information.
3. Meets consumer demand for energy performance information

Co-benefits

Labelling also has broader social benefits, which could be used to frame home energy labelling and labelling programs and policies. These include:

1. **Improved health and comfort:** Energy assessments diagnose heating system and envelope problems to improve comfort and indoor air quality and reduce the risk of mould.
2. **Consumer protection:** Energy labelling provides quantitative information on the expected performance of the largest single purchase most Canadians will make: their home. The blower door test can also act as a proxy test for the quality of construction, assessing components such as the vapour barrier that are not visible in the finished project.
3. **Job creation:** Labelling can stimulate local employment in the home energy performance and renovation sector. The total number of jobs (direct, indirect, and induced) for capital upgrades in multifamily buildings is estimated to be 13.41 per million dollar invested — significantly more than for a similar investment in energy infrastructure (5.32 per million dollar invested).[19]

   Reducing energy bills also keeps dollars in the local economy. Because the energy sector generally has a lower jobs creation per investment ratio, shifting spending away from energy use also has a net employment creation effect. The net difference in jobs by shifting from energy spending to non-energy spending is estimated at 9.88 per million dollars invested.[20]

   Over all, the Institute for Market Transformation estimates that a national building energy rating and disclosure policy in the U.S. would create more than 23,000 net new jobs in 2015 and more than 59,000 jobs in 2020.[21]

[19] Andrew C. Burr et al., *Analysis of Job Creation and Energy Cost Savings From Building Energy Rating and Disclosure Policy* (Institute for Market Transformation, 2012), Tables 5 and 6.. http://www.imt.org/resources/detail/analysis-of-job-creation-and-energy-cost-savings-from-building-energy-ratin

[20] Ibid., Table 6.

[21] Andrew C. Burr, *Energy Disclosure & the New Frontier for American Jobs* (Institute for Market Transformation, 2012). http://www.imt.org/resources/detail/energy-disclosure-the-new-frontier-for-american-jobs.

Labelling system		Primary benefits	Secondary benefits
Comparative label, asset-based (e.g. EnerGuide)	Energy assessment (Validated rating and homeowner report)	Actionable information provided at key decision point (sale/purchase, renovation) - prioritizes most effective EE measures by considering house as a system - face-to-face support - increases number and depth of EE upgrades - (optional add on) energy coaching: post-evaluation support	Support Building Code compliance Increase household energy literacy
	Public disclosure (label) (in-house rating label, rating on MLS)	Real estate market can measure and price home energy performance	Facilitate marketing of high performance homes
	Data reporting (to government or utilities)	Assets database informs development of building code and retrofit programs	Tailor EE programs and incentives to target least performing homes
Endorsement label, asset-based (e.g. EnergyStar for homes)		Facilitate marketing of high performance homes	
Mass benchmarking, consumption-based (e.g. o-power)		Engage occupants on energy behaviour (print or web-based)	Tailor EE programs and incentives to target least performing homes Increase household energy literacy Reach large numbers of homeowners irrespective of sale or renovation plans

Figure 8. Key benefits of asset-based comparative ratings, asset-based ratings, and operational ratings

Integration of energy efficiency pricing in real estate transaction will require broad uptake of asset-based descriptive labels, such as EnerGuide.

Summary of research on impacts of labelling — F.A.Q.

Is there consumer demand for home energy information?

Yes according to surveys, though some builder/realtor experience differs.

Despite the lack of information generally available to Canadians, surveys show homebuyers are interested in energy efficiency. According to a survey of over 1,600 Ontario homebuyers:[22]

- Nine out of ten homeowners consider energy efficiency important when purchasing a home.
- Almost 70% of homebuyers are willing to pay at least $5,000 more for an energy efficient home.
- Nine out of ten homebuyers say they will seek out an energy efficient home in the future.
- The number one reason homebuyers did not choose energy efficient options is that they were not offered by the builder.

Furthermore, a national survey conducted in 2013 on energy efficiency established that nearly nine out of ten Canadians support a requirement that all new homes to be rated for energy efficiency.[23]

This contrasts with the experience of many builders on the ground. During stakeholder engagement, homebuilders and their organizations stated that homebuyers do not rank energy efficiency very high on their "wish list" as compared to other "lifestyle" items (e.g. granite counter tops). Very few customers are asking for energy efficient homes and builders must often educate customers about energy efficient features in a home. Some industry stakeholders noted that while energy efficiency taken in isolation might not be top of mind, other correlated factors are more significant to homebuyers, such as whether the home is built to code, is of quality construction, has good indoor air quality, does not have higher energy bills than another comparable home sold for the same price in the same neighbourhood, etc.

Does home energy labelling catalyze and accelerate energy upgrades?

Yes, when accompanied with recommendations for upgrades and supporting policies.

Denmark was one of the first country to mandate energy labelling. A 2008 study considered energy data from a wide range of single family home between 1999 and 2002. Comparing energy consumption before and after labelling of the home across this population did not show a

[22] "4th annual EnerQuality survey shows importance of energy efficiency among homebuyers, despite recession," *CNW Telbec*, October 19, 2009. http://www.newswire.ca/fr/story/430055/4th-annual-enerquality-survey-shows-importance-of-energy-efficiency-among-home-buyers-despite-recession

[23] Online survey conducted from February 13 to 26, 2013, with a nationally representative sample of 1584 adult Canadians, proportionate to region, age, gender and language (English and French); margin of error of +/- 2.5%, 19 times out of 20. The Gandalf Group, *National Opinion Research for CEEA*, April 12, 2013. http://energyefficiency.org/wp-content/uploads/2013/04/CEEA-Survey-Gandal-2013-4-12.pptx

significant energy reduction from the labelling alone.[24] The study notes that this does not necessarily mean no efficiency gains were made, but that these gains could have been offset by an increase in indoor temperature, i.e. the ultimate outcome of the improvements might have been a welfare gain rather than an energy reduction.

In B.C., we see clear energy savings from home energy labelling as it was rolled out with incentive programs. Energy assessments have been a key component of the LiveSmart and EcoEnergy home retrofit programs. These combined policies have been very effective in driving energy savings:

- Of the 96,816 homes assessed in B.C. between April 2007 and October 2014, 77% followed through with retrofits.[25]
- Average energy savings from these upgrades is estimated at 26% per household.
- Approximately half of these energy savings resulted from measures that homeowners would have taken even if incentives were not offered (free riders); but 41% of participants who had some upgrade plans before the assessment decided to undertake more upgrades than previously planned based on their conversations with the advisors and/or the recommendations in the energy assessment report.[26]
- Free ridership was low for draftproofing (< 15%), indicating that fewer participant households would have completed such air-tightness measures on their own in the absence of the program.[27]
- Energy retrofits inspired by the program but not reported in participation data (spillover) are estimated to have nearly doubled total energy savings. The net impact of the program, subtracting free riders and adding spillovers, is about 50% greater than gross energy savings reported.[28]
- In addition to energy savings, the LiveSmartBC Efficiency Incentive Program realized significant greenhouse gas emission reductions and provided stimulus for economic growth and job creation in communities across the province.[29]

In the U.K., the introduction of mandatory labelling has had a significant impact on retrofit decisions. A survey conducted in 2009, two years after requiring the issuance of Energy Performance Certificates (EPC) at time of construction, sale, or rental, showed that the EPC was influencial in driving energy upgrades:

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[24] Vibeke Hansen Kjærbye, *Does Energy Labelling on Residential Housing Cause Energy Savings?* (AKF, Danish Institute of Governmental Research, 2008). http://www.kora.dk/media/272155/udgivelser_2008_pdf_energy_labelling.pdf

[25] Based on data provided by Rylan Nowell, MEM, November 3, 2014.

[26] BC Hydro, *Evaluation of the LiveSmart BC Efficiency Incentive Program F2009-F2011* (2012), 27.

[27] Ibid., 28.

[28] Free ridership was estimated at 44% of gross energy savings and spillover at 96% of gross energy savings (12% from renovation conducted by participants after the program, and 84% from renovations conducted by non-participants). The net energy savings from the program are therefore estimated at 151% of gross energy savings. Ibid., Appendix F.

[29] While we are not aware of studies explicitly quantifying economic and job impacts of LiveSmart, anecdotal evidence and macroeconomic arguments show how energy conservation measures stimulate economic growth and employment; see for example Acadia Center, *Energy Efficiency: Engine of Economic Growth in Canada* (2014). http://acadiacenter.org/document/energy-efficiency-engine-of-economic-growth-in-canada/

- 32% of the homebuyers who had read the energy certificate report carried out some of the recommended upgrades within months of buying.
- A further 9% intended to follow up on the recommendations in the near future.[30]

Despite these encouraging results, according to a three-year study conducted for the EU Commission, the overall impact of the EPC during home improvements is still relatively low compared to other factors: *"the most important factors influencing people's considerations [of home improvements] are the age and condition of their dwelling, comfort and financial issues. Finance plays a dual role: on the one hand, it can motivate people to invest in improved energy efficiency to save on energy cost in the long term or to increase the value of their property. Increasing energy efficiency and reducing energy bills are important factors according to about 40% of the survey respondents. On the other hand, finance can pose a big hampering factor if the necessary money to invest in home renovation is lacking."*[31]

A wider study from 10 EU countries stresses the importance of providing recommendations with the assessment, insisting that "*only EPCs with recommendations can have an effect."*[32] Around 40% of homeowners in the U.K., Netherlands, Denmark and Germany who were aware of the recommendation report rated the EPC "very useful" or "useful" for providing information about the home improvements needed to reduce energy bills.[33]

The homeowner awareness of having received an EPC differed significantly per country. In England, Denmark and the Netherlands, 75-80% of the respondents indicated they had received an EPC. In Germany and Finland, this number dropped to about 40% and 20%, respectively.[34] The study concludes that influence of the EPC over home improvements could be improved by providing information about renovation costs, energy cost savings, and where to go and whom to consult for further information and advice.[35] In other words, the label's impact can be amplified through bundling with the other components of a labelling program.

Alignment with retrofit incentives and financing options is also key to addressing financial barriers.

Does home energy labelling affect the price of houses?

Yes, reducing the need for incentives.

Experience in Europe and Australia demonstrates that once widely adopted, labelling can be an effective tool in rewarding performance (see Appendix C). Labelling's market impact can be seen in real estate decisions, including home buying and renting, investment and valuation:

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[30] National Energy Services, *Energy Performance Certificates: Seizing the Opportunity, Report 1* (2009), 3. www.nesltd.co.uk/news/can-we-seize-opportunity

[31] Julia Backhaus, Casper Tigchelaar and Marjolein de Best-Waldhober, *Key Findings & Policy Recommendations to Improve Effectiveness of Energy Performance Certificates & the Energy Performance of Buildings Directive* (2011), 4. www.ecn.nl/docs/library/report/2011/o11083.pdf

[32] Ibid.

[33] Ibid., 20.

[34] Ibid., 14.

[35] Ibid., 4.

- "the analysis of property transactions and listings…. overwhelmingly points to energy efficiency being rewarded by the market," with higher ratings commanding higher prices.[36]
- Office building benchmarking and rating has led to higher capital and higher income returns respectively.[37]
- Some real estate owners and managers are considering energy efficiency investments in terms of "better preserving their value going into the future in the face of changing demand and regulatory requirements."[38]
- **"**Sustainability criteria [i.e. including energy certification schemes] are being incorporated into industry texts on valuation, such as RICS' Red Book"[39]

Rewarding energy efficiency in the market reduces the need for incentives and should eliminate the need to subsidize energy assessments over the long-term.

Can home energy labelling improve the delivery of energy efficiency programs?

Yes, by providing better data.

Governments and utility companies have very limited access to occupancy, asset and whole house energy performance data on existing or new building stock. Utilities can access actual consumption data for whichever energy source they provide, but cannot share this information with other stakeholders (e.g. local governments) at a household level — which limits the capacity of utilities to merge their datasets to complete the energy picture. Detailed information, such as occupancy profiles, home archetype characteristics (e.g. number of bedrooms), energy use intensity, estimated energy end uses, heating system, air tightness and levels of insulation, is also missing.

Better information on the performance of the existing and new building stock could lead to improved policy and program delivery by utilities and governments.

Here are a few examples:

- The City of Vancouver, which has required energy assessment for new homes since 2009, has used the assessment data collected to guide the development of energy efficiency requirements under the new building bylaw (VBBL 2014).[40]
- The City of Vancouver is planning to use benchmarking data as a means to identify and prioritize the least efficient Part 3 buildings. A key action of their retrofit strategy is to develop tools to identify least efficient Part 9 homes; mandatory labelling could be such a policy.[41]

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[36] Bio Intelligence Service for the European Commission. *Energy Performance Certificates in Buildings and their Impact on Transaction Prices and Rents in Selected EU Countries* (2013), 12.

[37] *Building Energy Rating Schemes,* 53.

[38] *Energy Performance Certificates in Buildings,* 26.

[39] *Building Energy Rating Schemes,* 56. The Royal Institute for Chartered Surveyors "Red Book" refers to RICS Valuation – Professional Standards.

[40] Mark Hartman, personal communication, May 7, 2012.

[41] *Energy Retrofit Strategy for Existing Buildings*, 10.

- Denmark has compiled energy assessment data in a centralized database since it introduced mandatory labelling at time of sale in 1997. This information has been used to assess the saving potentials and to develop policy actions for energy efficiency in the entire building stock. In-depth studies undertaken in 2004 and 2009 by the Danish Building Research Institute and Copenhagen Technical University have shown that a 30% potential energy savings in existing buildings could be realized over the next 15 years.[42]
- Various organizations, provincial governments, and local governments have used labelling data compiled by NRCan for program delivery or research purposes. Privacy issues can be addressed either by requesting homeowner to sign a data sharing agreement (as was the case for the LiveSmart program, for example) or by anonymizing the data (removing names and addresses).

Once a representative sample is available, data from energy assessments could also be used to form a pool against which one can compare the energy ratings of a given home. A database could be made available online to allow the public to get a distribution of ratings for a given location, price range, or vintage of houses — thus providing the market an easy way to benchmark performance along comparable homes.

In addition to improving government program delivery, the ERS data could be a useful source of intelligence to support the growth of the home energy improvement industry, providing information on market opportunities, market penetration strategies and market development.

Could market transformation for energy efficiency in the residential building sector happen without home energy labelling?

No, not without massive investment in subsidies program.

Labelling is the key way to make energy performance visible, measurable and valued in the new residential building sector, and to accelerate improvement in the existing homes sector. In British Columbia, where there are virtually no whole home energy performance contractors, CEAs are currently the primary industry stakeholder providing homeowners with whole home energy improvement recommendations. Their third-party, validated assessments can be used by a range of market stakeholders to inform decisions on home energy upgrades and to place a value on the energy performance on a home.

Without market incentives to upgrade the existing building stock, energy efficiency across the residential building sector could be achieved in the long term through stock turnover and the adoption and enforcement of more and more stringent energy codes. Introducing an energy code for existing buildings can play an important role in accelerating this transition. However, the business and political case for these energy codes depend to a large extent on the evolution of market demand and building practices. Making energy performance visible to consumers is key to driving evolution of codes and standards, by improving the business case for these measures and providing ongoing data to assess the evolution of building practices. As described in the following text box, addressing the consumer awareness barrier and ensuring codes set objective-based targets is key to enabling the market to incorporate energy efficiency in a flexible manner.

[42] *Energy Performance Certification of Buildings* 33.

Vancouver introduced retrofit requirements for existing homes that are applying for renovation permits. A similar policy could potentially be introduced at the provincial level. However, a broader retrofit code for all homes would require much more detailed occupancy, asset and performance data, so policy would be targeted to specific types of homes.

Improved energy efficiency could also be achieved through higher energy prices and higher carbon taxes, although in B.C. the latter may simply lead to fuel switching to low-carbon electricity. And even with a cost imperative driving the demand for energy efficiency, a disclosure scheme would likely be necessary for the market to respond appropriately to the price signal, as labelling provides the necessary data.

Developers and the role of regulatory targets in market transformation

This excerpt from a report on reducing thermal bridging describes a perspective commonly voiced by developers on the need for consumer awareness and code targets to justify energy efficiency features in buildings:

"What ultimately matters to developers is a level playing field and opportunities to choose the most effective method to comply with code while balancing factors that can affect the success of a project by a greater measure, (for example, suitable granite countertops or great views of the mountains). It is a hard decision to invest in improving the building envelope performance when any difference between your building and a neighouring site in energy efficiency may not be easily recognized by consumers, especially when code does not require a design team to seriously consider thermal bridging. Code requirements that force major thermal bridges to be accounted for during design will be more effective in transforming the market than relying on the "fluid" analysis of cost benefits of new technologies. The market will naturally gravitate to cost-effective solutions within the margins of accepted practice."[43]

[43] Morrison Hershfield, *Building Envelope Thermal Bridging Guide: Part 2: Energy Savings and Cost Benefit Analysis* (2014), 2-6. http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/builders-developers/final-mh-bc-part-2-energy-and-cost-analysis.pdf

End goal & desired outcomes

End goal of labelling strategy

The end goal of a provincial labelling strategy is successful market transformation towards energy efficient new and existing homes. Market transformation for energy efficiency occurs when market participants change their behaviour, resulting in higher performing buildings being rewarded in the market, which leads to energy savings.[44]

Transforming the market for residential energy efficiency would mean that home energy information is understood by customers, used by realtors, reflected in homebuilders' decisions and appraisers' valuations, and accessible to regulators for planning; and that all parties act upon that information. In other words, homeowners and stakeholders change their behaviour.

Broad awareness, availability, affordability, accessiblity and acceptability of home energy labelling information in the real estate industry enables this behaviour change, so that energy efficiency — and its health and comfort benefits — is valued in the residential real estate market.

This strategic plan therefore aims for broad adoption of labelling across the Part 9 residential housing stock. Broad adoption of labelling, alongside increased stakeholder capacity to understand and act on the information, will support market transformation for energy efficient homes in B.C.

Desired outcomes

This strategic plan pursues the following measurable outcomes to be delivered by home energy labelling programs and policies in B.C.:

Long-term outcome

Energy efficiency information is acted upon (e.g. more demand for new and existing energy efficient homes, accelerated rate of energy upgrades, etc.)

Medium-term outcomes, by target market segments

Market segment		Desired outcome
New homes	Market built and sold	• **critical mass** have asset-based comparison, validated labels, disclosed • pre-assessments based on schematic used to improve design before plans finalized and permits issued • operational comparison provided to occupants a year after occupancy
	Custom-built	• majority complete pre-assessments based on schematic; recommendations for improved design provided to owner for consideration before plans finalized and permits issued

[44] *Building Energy Rating Schemes*. s6

		• operational comparison provided to occupants a year after occupancy
	Owner built and occupied	• majority complete pre-assessments based on schematic; recommendations for improved design considered before permits issued • operational comparison provided to occupants a year after occupancy
	Social housing	• procurement policy requires integration of all cost effective energy recommendations in pre-assessment • operational comparison provided to occupants a year after occupancy
Existing homes	Owner-occupied	• all need operational comparison with recommendations for actions
	Market rentals	• **critical mass** have asset-based comparison, validated labels, disclosed at the time of rental • operational comparison provided to occupants with recommendations for actions
	Social housing	• procurement policy requires integration of all cost effective energy recommendations at time of renovation • operational comparison provided to occupants with recommendations for actions
	Offered for sale	• **critical mass** have asset-based comparison, validated labels, disclosed, with recommendations for actions
	Renovated	• all need asset-based and operational comparison with recommendations for actions (for renos over a certain size)
	To be demolished	• exempt from labelling requirements

In addition, data reporting processes must be in place so that utilities, local governments, and other key actors have information on all market segments to enable customized program and policy design. Validated information would be preferred, but unvalidated information could be sufficient for early programs.

Short-term outcomes

In order to achieve the medium-term outcomes, the following short-term outcomes are needed:

1. Assessments and ratings: a framework exists for asset-based and operation ratings (includes tools, assessors, etc.) Successful launch of the new ERS and development of an operational rating system to reach all homes are key steps to support this outcome.
2. Validation: validation services are available to the marketplace, to be used when needed (e.g. during sale transaction).
3. Disclosure: a framework for disclosure exists (e.g. MLS at time of sale, on electrical panel in the house, in standard rental agreements. etc.),
4. Reporting: home energy occupancy, asset and performance data are readily available to utilities, local governments and other key stakeholders (e.g. real estate boards, homebuilders associations) for better program and policy design.

5. Acceptability: labelling tools are used and understood by a growing number of realtors, builders, and other stakeholders. Champion realtors and builders proactively use labelling information in their practice and support the introduction of labelling policies.
6. Political vision: local governments and provincial governments consider the role of labelling policies and signal intent to regulate.

See the logic model presented in Figure 14 for more details on these outcomes, as well as actions needed to achieve them.

A note about "critical mass"

The "critical mass" — the number of homes that need to be labelled to make market transformation self-perpetuate — has not been clearly defined in the literature. Here we have conservatively estimated that number as 33% of new and existing homes.

However, it is important that the full range of homes— from worst to best performers, existing to new — are rated and publicly disclosed. Without the full range, the best buildings do not stand out and the poorer performing homes are not shown to need improvement: the market has imperfect information and cannot adequately respond.

Also, in order for the market to trust the label, the label needs to be validated.

EnerGuide is currently the only system available in Canada that can provide asset-based, validated **comparison** labels. This strategic plan focuses on increasing the uptake of EnerGuide labels for new and existing homes.

While **endorsement** labels (e.g. Energy Star) can play a role in creating demand and pricing for energy efficiency in the new house market, they can, by design, only reach about 20% of the market and therefore cannot provide a sufficient set of comparator homes to allow energy efficiency to be evaluated across various market segments.

Operational assessments (e.g. O-power) can engage a broad range of customers on behaviour issues, but are not sufficient for properly pricing energy efficiency in the real estate market (where asset information is needed).

Policy tools

Based on a review of existing programs in B.C. and elsewhere, four key policy tools for accelerating uptake of home energy labelling have been identified: voluntary incentives and education, regulatory requirements for labelling of new construction, regulatory requirements at point of renovation and regulatory requirements at point of sale. These four policy tools are distinguished by whether they are mandatory or not, and their point of intervention, as shown in Figure 9.

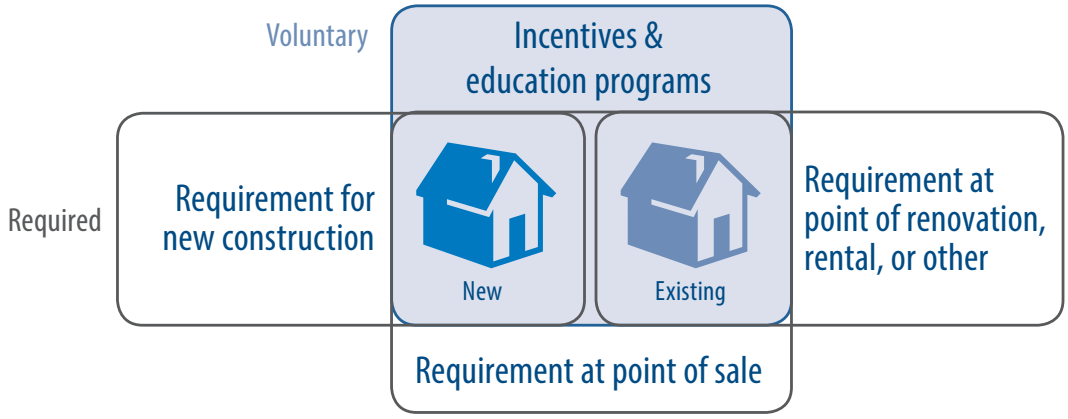

Figure 9. Labelling policy tools: level of application and reach

Requirement for existing homes could include requirement at point of renovation, rental, or triggered by another event (e.g. homes of a certain age, high consumption homes) We focus the following discussion on requirements at point of renovation.

Levels of application: voluntary or required

Labelling programs may be voluntary through incentives and education programs (e.g. Nelson, New Westminster, City of North Vancouver and Nanaimo, B.C.) or they may be required through regulation or utility policy (e.g. European Union, Austin TX, Berkeley CA, Vancouver B.C.[45]).

Most incentive programs, though not all, are "bundled" programs, with the main incentive applied to energy upgrades, for which an energy assessment is necessary. A few programs have incented only the assessment themselves, though their uptake has generally been more limited.

Note that purely voluntary energy assessments, self-directed by homeowners using an energy advisor, are excluded from consideration due to the low uptake numbers (about 10% of Canadian homes have been assessed after 15 years of EnerGuide availability, mostly with the help of federal and other incentive programs).

[45] Vancouver requires the energy assessment and data reporting, but not the public disclosure.

Points of intervention

Incentive and education programs may be provided for new construction (e.g. Township of Langley's permitting rebate), existing homes (e.g. Campbell River's Power Down program), or both new and existing homes. They target homeowners, builders and/or realtors. Incentives and education programs rely on marketing and outreach to bring participants to the program. Some also use administrative points of contact, such as new construction permitting, to recruit participants.

To be enforceable, mandatory labelling programs must be applied where a point of contact exists between program deliverers and homebuilders or homeowners. Streamlining compliance with existing administration and operations also reduces the costs of program monitoring and enforcement.

There are three main points of intervention: for new buildings at the point of construction, for existing buildings at renovation, and for both at point of sale. The first two involve permitting and inspections, which are handled operationally by local government. Point of sale requirements should be implemented by the provincial government, as local governments have no administrative function in home sales and therefore no point of contact.

A **labelling requirement for new construction** would require builders to show compliance at time of permitting and/or inspections. Details of policies may vary from simply requiring the final home to get an assessment (as currently the case in Whitehorse), to also requiring pre-assessments based on schematics. See Appendix A for a description of the policy adopted by Vancouver, which we consider to be best in class.

A **labelling requirement at point of renovation** would require homeowners or contractors applying for a renovation permit to conduct an energy assessment and report this information to local government if the renovations were above a certain value (e.g. City of Vancouver bylaw.)

A **labelling requirement at point of sale** would require home sellers to provide a recent energy assessment rating and recommendations report during home sales transactions. Rating disclosure on MLS listing would be required, although a grace period could be granted if an assessment is not available when the house is ready to be listed. This would avoid delaying sales in fast-moving real estate markets. The assessment would still be completed prior to property transfer.

Other key moments could also trigger a labelling requirement for existing homes, such as when there is a change of occupancy (**requirement at time of rental**), when the home is financed or refinanced (**requirement at time of mortgage issuance**), when the home reaches a certain age (**periodic requirement**), or when a home uses a larger amount of energy (**consumption-based requirement**). All of these moments offer distinct opportunities for intervention in the life cycle of a building, which could benefit from an energy assessment and the issuance of a label.

Reach

The four policy tools reach different, sometimes overlapping, segments of the residential building stock, as shown below.

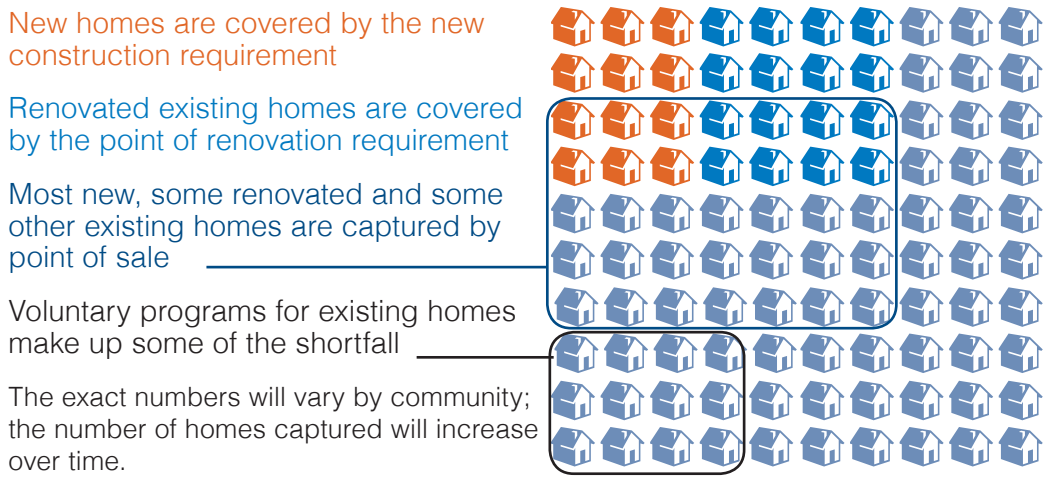

Figure 10. Segments of real estate market potentially captured by different policies

The number of homes captured by these policies will grow over time; the rate of labelling is estimated in the following section on benefits and costs of policy tools.

The remaining market segment (for homes which are not being, sold or renovated), which is the majority of the building stock, would benefit from operational labels. The policy tools to address this market segment include: voluntary labels (e.g O-power model) and mandatory assessments triggered by another criterion (e.g. for home over a certain age, or for home consuming over a certain amount).

Agency responsible for regulation and/or implementation

Outside Canada, mandatory programs are run by utilities (Austin, TX), local governments (Berkeley, CA) or higher levels of government (European Union, U.S. states). Appendix A has a full listing of labelling schemes, with a brief synopsis of the three most relevant to B.C.

In Canada, home energy labelling policy tools may be enacted and/or delivered by federal, provincial and local governments and utilities, as shown in

Figure 11 below. Most Canadian programs to date, with the exception of Vancouver, Whitehorse and Ontario, have been voluntary.

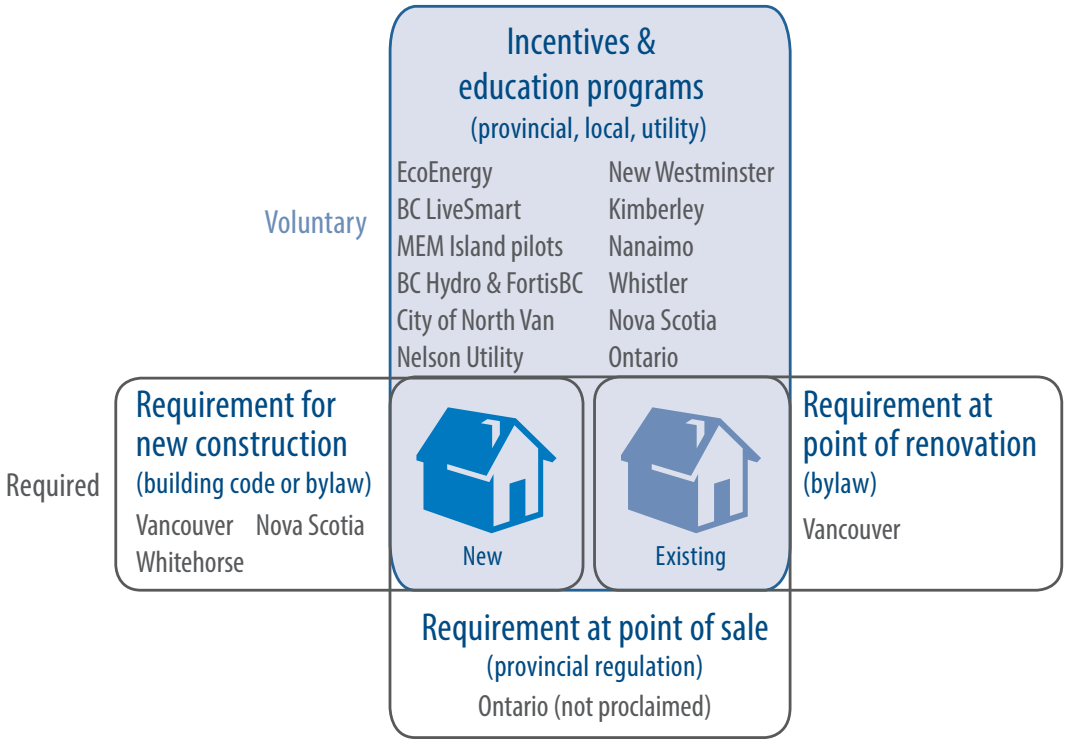

Figure 11. Labelling policy tools: past and current examples from B.C. and elsewhere in Canada

Jurisdictional issues with labelling in B.C.

The Province of B.C. enacts the B.C. Building Code, which applies to all communities in B.C. except the City of Vancouver, which has its own charter and therefore sets its own building code. Communities permit development and enforce the B.C. Building Code through inspections. Communities may require labelling as part of building permitting and inspections;[46] however, B.C. communities may not require homes to reach a specific energy performance target above the Building Code, or to require disclosure of energy information to third parties.

Thus, communities implementing labelling programs must do so using incentives such as thick wall exclusions or FAR additions (density bonuses), and/or negotiate during re-zoning.

Case study: City of North Vancouver's density bonus incentive

The City of North Vancouver offers density bonuses for labelled above-code homes. The value of this incentive is such that nearly all recently built homes comply with the program requirements.

The program does, however, come at a certain cost. While the incentive does not have a cash cost to the City beyond program administration, which is fairly streamlined, it does have a high real estate value and a significant opportunity cost: the added density could be used to incentivize other desired home features.

[46] Based on internal Pembina analysis, *Energy Labelling for New Homes*. Local governments are recommended to seek their own legal opinion.

This program has been successful in mainstreaming energy assessments and high performance homes. In the process of market transformation, the next step for the City of North Vancouver would be to shift these broadly accepted behaviors from incentivized to required.

However, while the City could require labelling for all new homes and homes undergoing renovations as a next step, it does not have jurisdiction to require above-code energy performance. Thus, to complete this market transformation step, the above-code requirements would need to be enacted by the province, or the province could provide a reach code opt-in regulation.

Policy tool benefits and costs

Methodology

The benefits and costs of the labelling policy tools have been assessed using the following methodology:

Benefits are quantitatively estimated for the Metro Vancouver region using the BC Hydro PIE model. Modelling assumptions are detailed in Appendix B. Benefits include the number of homes rated; the number of homes upgraded as a result of the rating process; and the annual energy, electricity, and GHG reductions expected between now and 2030.

Program costs represent costs incurred by the regulating jurisdiction and/or organization providing incentives. It is qualitatively assessed and categorized as either low, moderate or high, based on quantitative data (when available) and professional judgment. The assessment factors include complexity of program development and administration; delivery costs; direct costs to homeowners and/or builders; and, where applicable, the opportunity cost of incentives. Further discussion on the cost of policy development and implementation can be found in Appendix B.

Labelling costs: are quantitatively assessed based on labelling uptake. Home assessments currently cost approximately $300–350 for existing homes; some incentive programs require a $150 follow-up post-upgrade evaluation (blower door test). Labelling cost estimates are based on a total cost of $500 per assessment. New building assessment costs are higher, ranging from $500 to $750 for an as-per-plan and as-built assessment (we conservatively used the upper figure in the cost analyis).[47] We do not distinguish here whether the cost is born by the homeowner or builder, or covered through program incentives. A full asset-based labelling program would also have reporting costs and administrative costs to maintain the assessment software, hardware and advisor network, as well as to analyze any reported results.

Alongside program cost, the **political effort** needed for implementation is another key metric to compare policy tools. Political effort has been assessed qualitatively based on review of prior and existing programs; the numbers of incentive vs. mandatory programs in the province; stakeholder engagement by Pembina; and analysis of the Ontario case.

Of course, the level of political effort required to implement a given policy changes as barriers are addressed and market readiness increases. Activities required to prepare the ground for policy change are discussed in the next section, Barriers and solutions.

Results

Figure 12 and Figure 13 summarize the expected benefits and costs of the four policy tools, expressed as fraction of homes rated and number of homes upgraded by 2020 and 2030 in the

[47] Note that labelled homes are eligible for a $2000 incentive from BC Hydro and FortisBC if rated above EG80 (or Energy Star, as of April 2015), and a 10% mortgage insurance rebate from CHMC (worth $800–$1600 approximately) if rated 82 or higher.

Metro Vancouver area. While construction, renovation, and sales rates vary from region to region, it is reasonable to expect the overall results to be roughly similar in different areas.

The 'education and incentives' model run estimates the gains that could be achieved by re-instating a program similar to LiveSmart (including incentives for assessments and upgrades). The three other policy tools focus primarily on uptake of labelling. The energy upgrades that result from improved access to the information and increased market pressure for energy efficiency were roughly estimated based on professional judgement (see assumptions summary in Appendix B). It is important to note that historically the uptake of energy upgrades following the assessment has depended in great part on the level of incentives available. In the future, programs that combine incentives and building consumer demand (market transformation) can reduce the reliance on incentives to motivate energy upgrades. Model runs for the three 'requirements' do not capture retrofit uptake outside of these trigger points (renovation, sale); therefore, these results can considered as additional to the 'natural' rate of retrofit represented by the 'education and incentives' model.

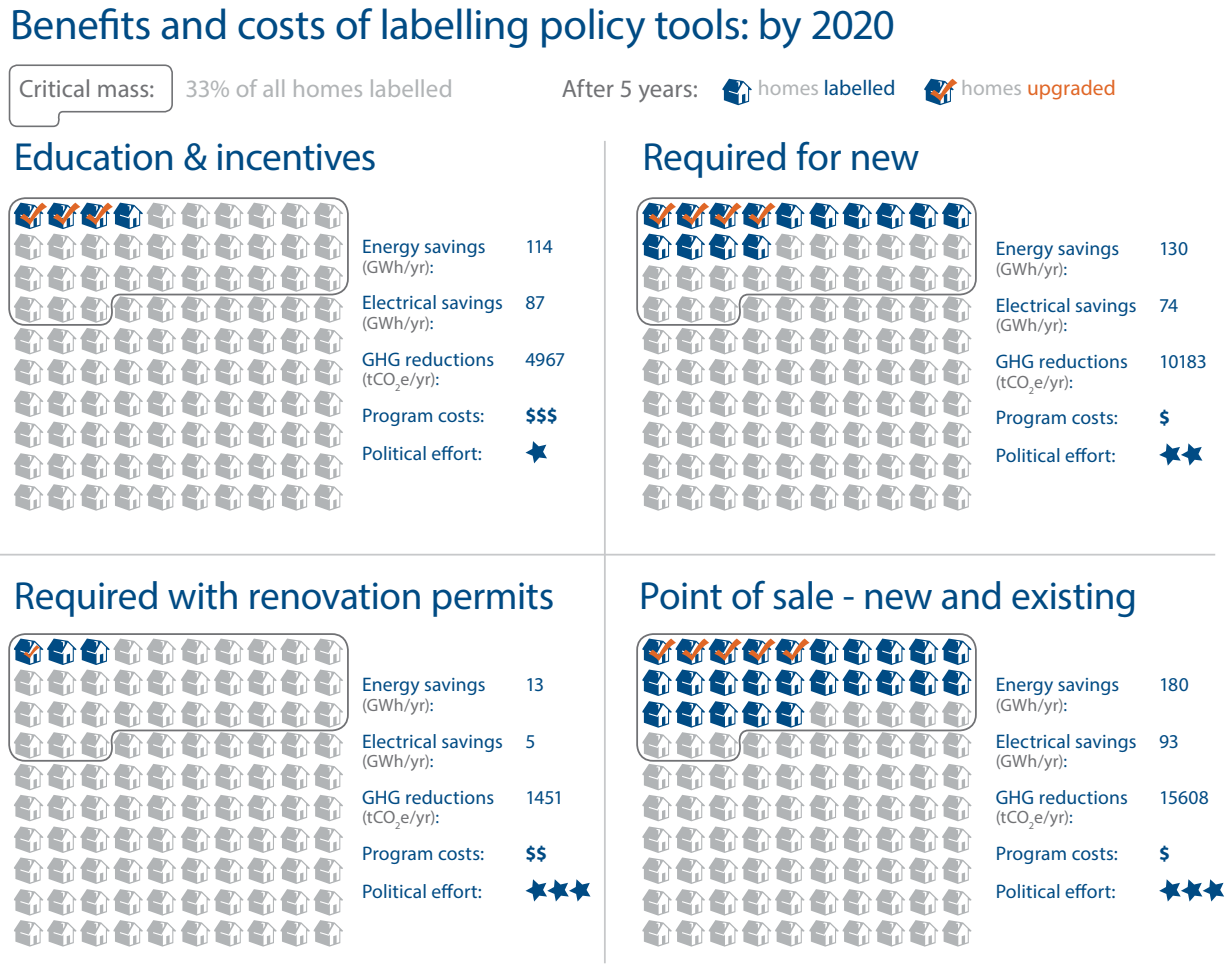

Figure 12. Benefits and costs of labelling policy tools, by 2020

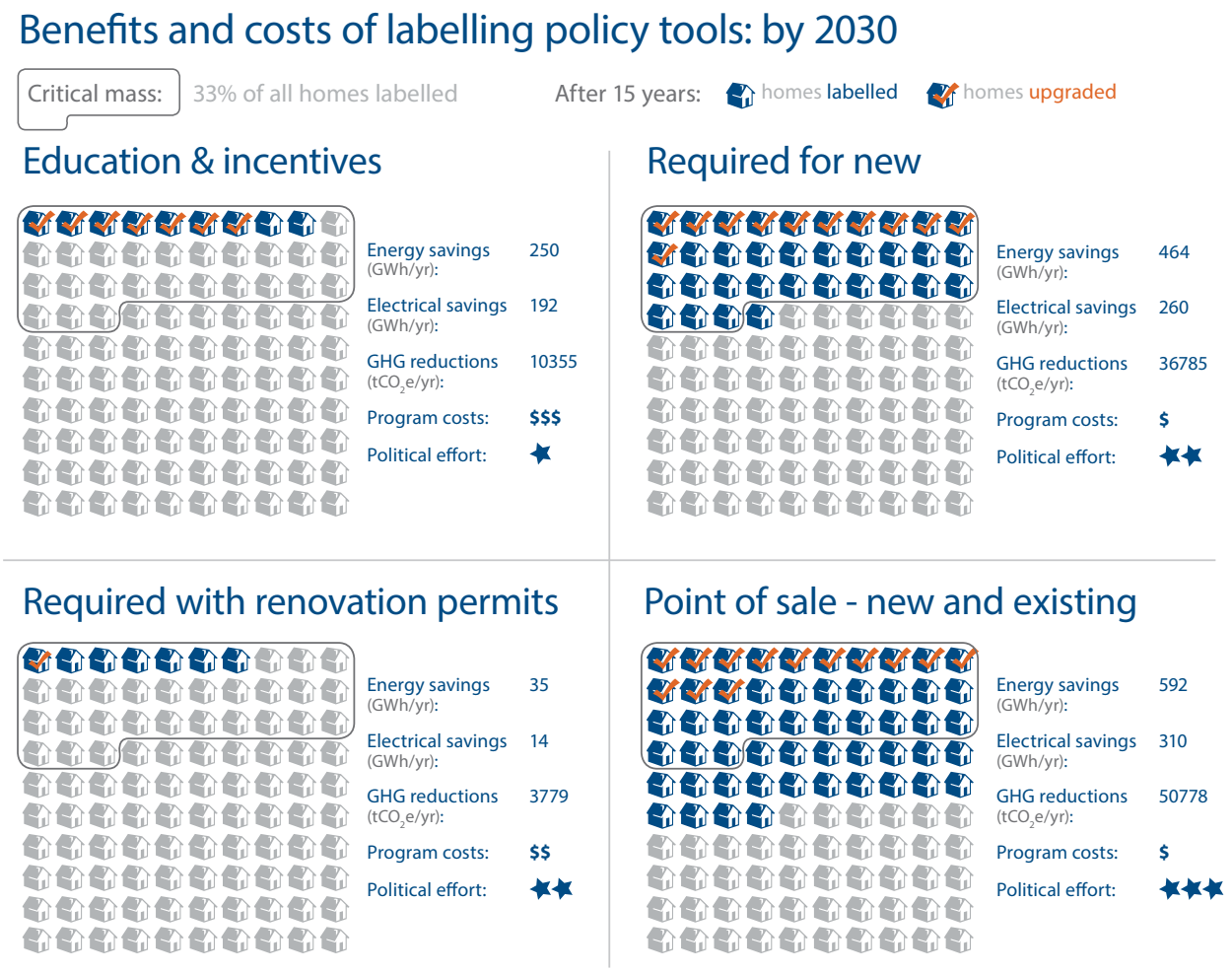

Figure 13. Benefits and costs of labelling policy tools, by 2030

Table 2. Four policy tools: cumulative costs of labelling, energy savings, and GHG reductions in Metro Vancouver region by 2020.

We assume policies are implemented in 2015 (ie table give outcomes 5 years after policy implementation)

Policy tool	% of dwellings labelled	% of dwellings renovated	Cumulative labelling costs ($M)	Annual Energy Savings (GWh/yr)	Annual Electrical Savings (GWh/yr)	Annual GHG Savings (tonnes CO2e/yr)
Incentives & education (voluntary labelling)	4%	3%	$24	114	87	4967
Required for new (including major renovation)	14%	4%	$100	130	74	10183
Required at point of renovation	3%	0.3%	$12	13	5	1451
Required at point of sale for new and existing (including major renovation)	25%	5%	$142	180	93	15608

Table 3. Four policy tools: cumulative costs of labelling, energy savings, and GHG reductions in Metro Vancouver region by 2030.

We assume policies are implemented in 2015 (ie table give outcomes 15 years after policy implementation)

Policy tool	% of dwellings labelled	% of dwellings renovated	Cumulative labelling costs ($M)	Annual Energy Savings (GWh/yr)	Annual Electrical Savings (GWh/yr)	Annual GHG Savings (tonnes CO2e/yr)
Incentives & education (voluntary labelling)	9%	7%	$63	250	192	10355
Required for new (including major renovation)	34%	11%	$313	464	260	36785
Required at point of renovation	7%	0.7%	$32	35	14	3779
Required at point of sale for new and existing (including major renovation)	54%	13%	$405	592	310	50778

Policy tools analysis and examples

Incentives and education

Incentive programs are often very popular, and might have waitlists (see for example Campbell River's Power Down program). The demand for incentives sometimes outstrips supply; the political effort required to provide incentives and public outreach is therefore estimated to be low. This was generally the case for retrofit incentives programs that included a labelling requirement, such as LiveSmart and ecoENERGY.

However, when it comes to incentivizing labelling on its own, separately from grants for improved performance, pilot programs have shown the demand for labelling incentives to be much lower than supply, even with incentive marketing and outreach efforts (see case study below). Incentive programs for assessments alone have been ineffective, showing the market failure and the need to address this market failure through mandatory labelling, or by pairing the labelling with incentives for upgrades.

Case study: Labelling incentive pilots 2010 – 2011

B.C. has experience with voluntary pilot programs that promote energy labelling for homes at point of sale. Two programs have subsidized the cost of the home energy assessment as long as the seller has arranged for their EnerGuide rating to be added on the MLS listing.

The first program ran in 2010 in Oak Bay, Salt Spring Island, Prince George and Tsawwassen, in cooperation with the B.C. Ministry of Energy and Mines and BC Hydro. For a period of six months, homeowners selling their homes were rebated from BC Hydro and the provincial government for three-quarters the cost of a home energy assessment (a $300 assessment cost homeowners only $75). Participants were required to share the resulting EnerGuide rating by including it in their home listing. This program was entirely voluntary, and had minimal uptake. (See Appendix A for details).

More recently, from July to December 2011, the Ministry of Energy and Mines, BC Hydro, the Victoria Real Estate Board, the Capital Regional District, and participating municipalities brought a similar pilot program at a wider scale, in coordination with the LiveSmart BC Energy Incentive program. The program offered residents selling their homes a free energy assessment, as long as the rating was posted on their MLS listing. This program, again voluntary, had 20 participants over a five-month period. In a market that consistently saw over 200 single-family home sales per month over that period, this amounts to an uptake rate of about 2%. (See Appendix A for details).

Some industry stakeholders noted that low uptake in these program was largely a result of the short program timeframes, limited marketing budgets and relatively low level of stakeholder education on the program, among other factors.

Required for new construction

A province-wide mandatory program has been previously signaled but not yet implemented: the 2008 EEBS included an option to "Pursue policies for energy labelling of houses at time of

transfer or sale";[48] a more recent, broader commitment was also included in the Pacific Coast Action Plan and reiterated by Minister Bennett.[49]

Incorporating labelling into the B.C. building code (or other provincial regulation), alongside setting energy performance targets such as maximum ACH or energy use intensity, could streamline compliance. Making compliance significantly simpler than the complex approach for compliance currently in place (as of December 2014) would likely be supported by local governments and possibly by builders as well. A 2014 UBCM resolution requesting that labelling be added to the Building Code was endorsed.

In addition, stakeholder engagement with three local communities[50] showed relatively strong support for implementing labelling for new construction. It was seen as a way to reward good builders, help other builders improve and build awareness, familiarity and capacity with the EnerGuide Rating System. However, builders or builder organizations may show less support due to time and cost constraints during the building process. The City of Vancouver has already included energy assessments as part of new construction requirements; however, they do not require public disclosure.

The political effort required to implement a labelling requirement for new construction is estimated to be moderate.

Required at point of renovation

The political effort is estimated to be moderate, though more will be known about its acceptability after the City of Vancouver requirement comes into force in January 2015.

Required at point of sale

The high estimation for political effort is drawn from the case of Ontario and prior stakeholder engagement by the Pembina Institute.[51]

The latter found that in general and across three communities, builder, realtor and energy advisor participants supported a labelling requirement for new construction, but raised concerns about requiring labelling for existing homes at point of sale.[52] Most of these concerns could be addressed by policy design, a simple compliance pathway, and pre-engagement with realtors and builders to ensure familiarity with the rating. These will be discussed in the next section, Barriers and solutions.

The other reason for estimating political effort as high comes from the experience in Ontario. Ontario introduced labelling at point of sale in its Green Energy Act; however, the labelling

[48] *Energy Efficient Buildings Strategy*, 15.

[49] Bill Bennett, letter to the Green Building Leaders.,

[50] Tom-Pierre, Frappé-Sénéclauze, Ellen Pond, Josha MacNab, Claire Beckstead, and Benjamin Thibault, *Home Energy Labelling Requirement at Point of Sale: Pilot Program Design* (Pembina Institute, 2012). http://www.pembina.org/pub/2400.

[51] *Home Energy Labelling Requirement at Point of Sale: Pilot Program Design*.

[52] The proposed program was for local government point of sale, rather than provincial.

section was not proclaimed due to strong opposition from the real estate community (see case study below).

Therefore, although the benefits are greatest and the administrative costs are low, the political effort required to move directly to point of sale is estimated to be higher than for other policies. As noted in the introduction to this section, political effort can change when the ground has been adequately prepared. We turn to key barriers and critical success factors next.

Case study: Labelling requirement in Ontario's Green Energy and Economy Act

As part of the section of the *Green Energy and Green Economy Act* that formed the *Green Energy Act*, the Ontario Government legislated a framework for mandatory disclosure of residential building energy consumption information from home sellers to homebuyers. However, these provisions are subject to proclamation before they come into force and the province has so far decided not to implement them.

On September 9, 2009, less than four months after the statute was passed into law and received royal assent, the Lieutenant Governor proclaimed all provisions of the *Green Energy Act* in force, except for s. 3, the mandatory home efficiency disclosure requirement.[53]

Questioned by energy and environment groups about the implementation of the requirement, the Ontario Government's official response was that NRCan is updating their EnerGuide auditing process for home energy labelling, and that the province will wait for the conclusion of that update rather than implementing a program and switching the necessary process mid-stream.[54] However, one policy analyst who has worked closely on *Green Energy Act* matters noted that the real, underlying reason is that real estate agents "went after [the program] tooth and nail".[55] A quick survey of industry websites and official statements supports this explanation. Industry seemed to be concerned that the requirement might deter property transactions or reduce selling prices, either because of the cost of energy audits or homeowner concerns about low ratings. However, they also couched opposition in broader privacy and government-overreach terms, as well as consumer-cost concerns.[56,57,58]

[53] *Green Energy Act, 2009*, S.O. 2009, c. 12, Sched. A, s. 3.

[54] Tim Weiss, Personal communication.

[55] Tim Weiss, Personal communication.

[56] Ontario Real Estate Association, *Mandatory home energy audit could significantly hurt home sellers in an already tough economy*, News release, date unknown. Available at: http://www.richardsilver.com/account/77fb2a8f0efbe214/pdfs/REALTORS_respond_to_energy_audit.pdf

[57] Toronto Real Estate Board, *Realtors win a green concession: Ontario eases home energy audit requirement*, April 28, 2009. http://toreal.blogs.com/toronto/selling_toronto_real_estate/

[58] Richard Silver, *Ontario's Green Energy Act to Mandate Energy Audits!!*, Mar. 2, 2009. http://torontoism.com/2009/03/02/ontarios-green-energy-act-to-mandate-energy-audits/; Linda Leatherdale, *New Energy Audit Just Another Home Tax Grab*, http://lindaleatherdale.com/index.php?limitstart=15

Barriers and solutions

Several jurisdictions have implemented labelling requirements, some successfully and others unsuccessfully. These precedents, alongside stakeholder engagement, highlight best practices and pitfalls in the setup and administration of a labelling program, and offer innovative concepts for program design.

These findings are presented in two tables: Table 4 outlines barriers and solutions to labelling in general, irrespective of the policy tool(s) used to move it forward. Table 5 outlines specific success factors for each policy tool.

Key barriers to broad adoption of labelling and critical success factors

Table 4 below lays out the key barriers and solutions along the pathway to market transformation. Barriers and success factors range from contextual (low energy prices/low carbon tax) to procedural (no EGR field). They are clustered under the five "A's" describing the general conditions for market transformation: awareness, availability, accessibility, affordability, and acceptance.

Table 4. Key barriers and critical success factors for broad adoption of home energy labelling

Key barriers	Success factors
Awareness	
Lack of public and industry familiarity with various types of home energy labels, the value of reporting and comparison tools, and their pros and cons	Education & incentive programs for key stakeholders, particularly realtors, home inspectors and general contractors Support launch of new ERS that has more readable label, improved information, more reliable methodology, more accurate report
Low energy prices, mild climate	Consider policies, such as the carbon tax, to internalize some of the externalities in the energy supply chain Communicate non-financial value of energy efficiency upgrades, such as improved comfort and indoor air quality
Availability	
No EnerGuide rating field on MLS other than Victoria Real Estate Board, limiting disclosure	Real estate boards add a field for EnerGuide rating, annual energy consumption and occupancy in MLS with mandatory question in data input sheet[59]
Operational labels not available	Develop a program to provide operational labels
Easy to use asset-based rating tools not available (Hot2000 model requires expertise, and there are no easier tools)	Develop easy to use asset-based tool (e.g. similar to BCH - AnalyseMy Home and Compare my Home tool)

[59] Could be the same question as that currently included in disclosure form: "Does this house have an EnerGuide rating (yes/no)? If yes, what is it?"

No reporting tools Privacy policies prevent sharing of detailed information with local government	Develop reporting processes and platform Include planning and delivery and design of incentive program by local government and utilities as intended use for the data in disclosure form used with the new ERS
Near-term: transition to revised ERS: program implementation may be delayed; education on new system may be required	Tie new programs and policies to revised ERS roll-out in 2015
Decreasing capacity of CEA and service organization infrastructure; most of the demand for CEA services came from homeowners and builders trying to access grants; with the HERO program no longer requiring assessments[60] and the incentives for new home shifting to Energy Star, demand for CEA services will decrease, leading to a decrease is supply capacity	Diversification of services offered by services organizations and CEAs Increase use of CEAs for assessment of new homes for permitting and compliance purposes Announce programs requiring CEAs in advance: the home energy evaluation industry in B.C. has demonstrated that it is capable of scaling capacity to meet demand
Accessibility	
Lack of access to CEAs in rural areas	Announce program well in advance Develop partnerships between remote energy advisors and local organizations able to provide blower door tests Train local building inspectors or home inspectors to act as CEA Ensure consistent demand for the service so industry can adapt and provide service
Occupancy and detailed home data is not accessible to create operational labels	Explore ways to obtain this data
Acceptance	
Lack of proven benefits of asset-based and operational ratings	Explain and publicize the results of labelling studies
EnerGuide rating reliability has not been tested for mandatory disclosure	New ERS has improved methodology that should increase accuracy and reliability. Ensure ongoing evaluation, quality control, and development of ERS methodology.
Low level of trust for accuracy of EnerGuide Label Low level of understanding of EnerGuide meaning	Test accuracy with other modelling tools (e.g. via NRCan's HTAP program and LEEP process) Support launch of new ERS that has more readable label, improved information, more reliable methodology, more accurate report
Energy efficiency not compelling to realtors despite evidence of consumer willingness to pay	Focus on professional responsibility to provide complete and accurate information Provide marketing materials for realtors to message non-energy benefits of home energy labelling (e.g. quality construction, home

[60] HERO no longer requires energy assessments because the utilities considered that making assessments mandatory in order to participate in incentives programs lowers program participation and diverts funds from the capital incentives.

	comfort, better indoor air quality, smaller environmental footprint, lower energy bills, etc.)
Potential for stakeholder opposition (e.g. realtors in Ontario)	Engage key stakeholders early and demonstrate labelling value to them Engage realtors and their organizations, identify champion realtors willing to publicly support policies
Winners and losers — as home values reflect energy efficiency, some homes increase in value and others may see value reductions[61]	Ensure meaningful upgrade incentives are available through early phase of market transformation Focus messaging on win-win for high performance homes and upgrade opportunities for lower performance homes
Political capital required to go beyond voluntary	Tie to larger community issues such as health, energy poverty, energy price increases or consumer protection Energy labelling provides a mechanism to assist provincial and local governments achieve energy and GHG reduction targets
Affordability	
Cost (to builder or owner) of assessments;[62] perception that labelling could impact housing affordability[63] (If goes to mandatory, assessment costs could increase.) Some builder pushback due to added costs and potential delays[64]	Offer incentives during transition period Outreach on assessment costs vs. energy cost savings over time Control costs through contractual service agreements If market demand increases (e.g. under mandatory labelling), decrease evaluation costs through economies of scale, industry innovations and increased industry competition
Risk of delays due to time needed to get assessment done	Reinstate contractual limits to assessment fees; set a maximum wait time
Time and effort required to obtain third-party verified labels	Develop affordable, low-effort programs (either operational labels requiring no effort by the homeowner, or asset labels that can be done by builder or homeowners without third-party involvement)

Success factors associated with specific policy tools

In addition to the key barriers and solutions, specific implementation barriers for individual policy tools will also need to be addressed, as detailed in the following table.

[61] Note that not all stakeholders agreed with the loss of value. Some realtors reported that home should already be priced appropriately, and that energy assessments will provide better information to prioritize upgrades.

[62] While the costs are small compared to the cost of construction, renovation or sales process, additional cost has been mentioned by realtors and builders as a barrier, e.g. for low-income seniors

[63] Some stakeholders noted that labelling could also contribute to affordability in two ways: lower value homes will offer entry-level housing stock; improved EE can make homes more affordable to operate. Best example of this: one builder keeps their strata fees low because they know the energy costs are going to be low.

[64] Though it should be noted that City of Vancouver has had an assessment requirement since 2009; while some discontent was expressed before the policy was in place, once integrated, builders adapted quickly and it became a non-issue.

Table 5. Policy implementation: specific barriers and success factors

Policy tool	Associated success factors
Education and Incentives	Increase funding for incentive programs, or pursue mandatory labelling programs Simplify program or streamline program administration to reduce program costs
	Consider re-instating energy assessments as entry point for incentive programs Consider other avenues to promote uptake of labelling
	Distribute incentive “vouchers” via realtors and builders
Required for new (building code or bylaw)	To avoid pushback from fear of loss of incentive programs, maintain above-code incentives for new homes through transition period. The requirement is only to label, not to hit a beyond-code target.
	To develop CEA capacity, particularly in rural areas: Announce program well in advance Develop partnerships between remote energy advisors and local organizations able to provide blower door tests Train local building inspectors to act as CEA
	Create a ‘builder advisor’ CEA training program to allow CEAs to offer useful advice to builders on energy efficient building practices and technologies (beyond the basic energy assessment) Create a program to potentially use CEAs as compliance advisors (similar to energy modellers in the commercial building sector)
	Engage builders and their organizations early in process and ensure that assessments support streamlined code compliance Set maximum wait time for assessment through contracts with service organizations
Point of renovation (bylaw)	To avoid labelling requirement pushing more homeowners to pursue renovations without permits, set labelling requirement threshold higher initially (e.g. $20,000); monitor impact and lower threshold over time Homeowner engagement and outreach about benefits of energy efficiency
	Incorporate minimum energy efficiency measures for renovations, tied to nature and cost of renovations
Point of sale (provincial regulation)	Design program to avoid sales delays — assessment to be done prior to property transfer; NRCan software system to have fast turnaround times Enforce compliance for private sales Hardship waiver/targeted subsidy (e.g. for low-income seniors) Provide incentive programs for energy upgrades at initial program launch and during transition period
	Ensure two years of incentive programs for assessments prior to a requirement to build the necessary and robust delivery network Develop partnerships between remote energy advisors and local organizations able to provide blower door tests Engage the home energy labelling industry prior to creating the program

Recommended pathway

The previous sections introduced four policy tools for energy labelling; this section presents the recommended pathway to implement labelling policies in B.C. Five distinct pathways were considered in the first draft of this strategic plan (see Appendix E). Pathways, barriers, and solutions were discussed with over 40 stakeholders in the fall of 2014; their feedback informed the development of this recommended pathway.

As articulated in the section on Goals, the objective of the pathway is to support market transformation for energy efficiency by ensuring that a critical mass of homes are assessed, that the resulting ratings are disclosed to inform market behavior, and that the data is made available to government and utilities to inform program design.

While the end goal is for labelling to reach both new and existing homes, we recommend an implementation in three phases:

1. Continue incentives and education programs to prepare the ground and increase market demand for home energy performance services. Multiple efforts are already underway for this phase: Township of Langley and Whistler's incentive programs, New West Energy Save program, Nanaimo realtor pilot program, various local Energy Diets, BC Hydro/Fortis New Home Program, BC Hydro online energy tracking tools, and other efforts by various stakeholders. Expanding the use of CEAs to streamline permitting would also increase awareness and uptake while reducing permit wait times. The launch of the new ERS should be seized as a key opportunity to educate stakeholders (builders, realtors, home inspectors, loaning agencies, assessors, etc).

   Alongside these efforts to promote the use of EnerGuide, utilities and partners should develop and promote robust operational ratings. These operational ratings could be used to reach all homeowners, accessing market segments less likely to pursue asset-based labelling.

2. Once a critical mass of builders are familiar with ERS, require labelling for new constructions (and possibly major renovations) through a provincial regulation, or possibly through local permitting (e.g. generalized use of CEAs and EnerGuide labelling as a means for local governments to ensure compliance with energy efficiency). Significant gains have already been made to demonstrate both interest and feasibility. At the 2014 UBCM convention, delegates supported a stand-alone resolution calling on the province to consider a labelling requirement in the Building Code for new Part 9 construction. Similarly, the fact that labelling for new homes has been required in Vancouver since 2009, and adopted by most builders in the City of North Vancouver, shows that it is technically and politically doable, at least in metropolitan areas.[65] Using the energy assessments to streamline code compliance, as initiated by the City of Vancouver, can lead to improved performance of new constructions and can benefit builders and local governments by reducing permit processing time.

[65] Note however that these policies did not require disclosure of the rating on MLS. It is possible that the relatively low profile of the assessment results, while not helping market transformation, might have made it politically easier to advance these policies.

3. Once a critical mass of real estate agents are familiar with ERS and an adequate home energy performance industry is established (to ensure the industry can meet the demand for energy renovations), extend the labelling requirement to existing buildings through a point of sale requirement implemented at the provincial level. Similarly, there are efforts underway to lay the groundwork for all these.

Based on our research to date, this phased approach is the most likely to lead to wide adoption of labelling within a reasonable time frame, with the lowest pushback. Market and administrative systems have an opportunity to integrate labelling information first when dealing with new and reasonably efficient homes. Working first with builders before engaging home sellers at large also allows initial engagement to focus on a smaller group of stakeholders already accustomed to meeting permitting requirements.

Ideally, the requirement for new and point of sale labelling could be advanced directly at the provincial level. The best legislative home for such a regulation remains to be identified.

Working with local governments, preferably several within a region, to advance local bylaws (or permitting requirements) can help create a political window for action at the provincial level. Advancing labelling requirements with a few champion local governments provides a hub for innovation and prepares the market for a provincial regulation. Also, assessment requirements at time of renovation are currently best done at the local government level, since there is no provincial retrofit code.

A variety of actions should be taken in the short term (next one to three years) to prepare the ground for a regulation and to advance market demand for home energy performance. These activities, and their desired outcomes, are presented in Figure 14 and outlined in more detail in an implementation plan produced for the Metro Vancouver region. Figure 14 presents key milestones along the recommended pathway. Several of these milestones are tied to political decisions at the provincial level.

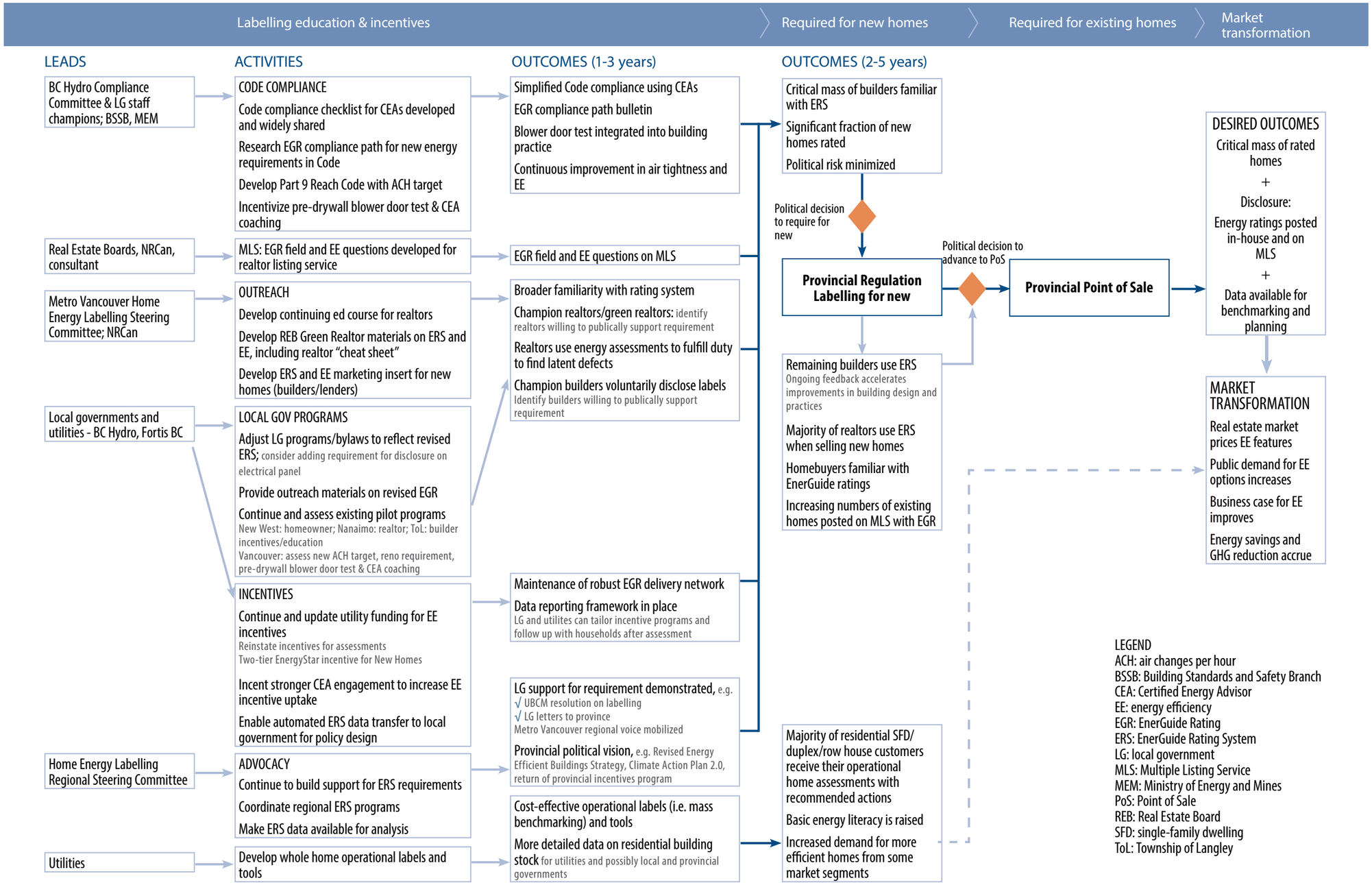

Figure 14. Logic model: phases and milestones along the recommended pathway

Appendix A. Summary of existing programs

The following pilot projects and current programs in B.C. were reviewed to prepare this report. A few of these are described in further details below.

Table 6. Past and current home labelling programs in B.C.

Application	Existing homes	New homes
Voluntary	ecoENERGY – national (discontinued) LiveSmart – B.C.-wide (discontinued) HERO – B.C.-wide (by utilities) MEM CRD pilots Nelson New Westminster	BC Hydro and FortisBC incentives Township of Langley City of North Vancouver
Mandatory	City of Vancouver VBBL 2014*	City of Vancouver**

*for renovations above $5000 – assessment and reporting to City of Vancouver only, no public disclosure required

** during permitting/inspection process – assessment and reporting to City of Vancouver only, no public disclosure required

Voluntary — incentives and education programs

Capital Regional District (CRD): Incentives for point of sale disclosure (2010–2011)

The first phase of this pilot program ran from January to June 2010 in Oak Bay and Salt Spring Island, instigated by the Victoria Real Estate Board in cooperation with the B.C. Ministry of Energy and Mines and BC Hydro. For a period of six months, homeowners selling their homes were rebated from BC Hydro and the provincial government for three-quarters of the cost of a home energy assessment (a $300 assessment cost homeowners only $75).[66] Participants were required to share the resulting EnerGuide rating by including it in their home listing.[67] This program was entirely voluntary, and had minimal uptake.[68] Feedback from project partners identified four barriers to higher uptake:[69]

- A seller's market in Oak Bay leading to fast sales and no need/time to participate
- Massive communication and commitment challenges due to LiveSmart and ecoENERGY program closure and restarting during initial pilot period.
- Reluctance on the part of realtors to market the concept to their clients

[66] The program is explained in a news video: CityGreen Solutions, "Pilot Project Will Help Assess a Home's Energy Efficiency," January 5, 2010. http://www.citygreen.ca/video-time-sale-pilot-project-oak-bay-salt-spring-island

[67] Ministry of Energy and Mines, *CRD Time of Sale Energy Labelling Pilot Project: Final Report* (2012); Haynes Zirnhelt and Matt Horne, *Energy Labelling and Efficiency Requirements for Existing Buildings* (Pembina Institute, 2010), 8. http://www.pembina.org/pub/labelling-ee-existing-buildings

[68] Emily Eng, Program Coordinator, Ministry of Energy and Mines, Energy Efficiency Branch, personal communication, December 15, 2011.

[69] *CRD Time of Sale Energy Labelling Pilot Project,* 1.

- Limited marketing activities to publicize pilot
- Short pilot program timeframe dissuaded investments of time and effort
- Limited funding for stakeholder engagement and education on the program

The second phase ran from July to December 2011, as the Ministry of Energy and Mines, BC Hydro, the Victoria Real Estate Board, the Capital Regional District, and participating municipalities expanded the scope to the entire CRD region. The new program offered residents selling their homes a free energy assessment, as long as the rating was posted on their MLS listing.[70] In addition, personal training was conducted with over 450 realtors throughout the CRD. This program, again voluntary, had 26 participants over a five-month period.[71] In a market that consistently saw over 200 single-family home sales per month over that period,[72] this amounts to an uptake rate of about 2%.

The final report from MEM attributed the low uptake to the perception of risk in disclosure: "feedback from realtors indicated the EnerGuide rating was seen as a risk for home sellers: lacking other similar homes with posted ratings, realtors and sellers were concerned that buyers would have no benchmark to understand what the EnerGuide rating meant. If interpreted as a percentage score, they feared their EnerGuide rating would reflect badly on the homes.[73] The second phase of this program was impacted by similar factors as the first phase, including limited funding for stakeholder engagement, education and marketing. Most importantly, the short project timeframe that did not allow for the program concept and practise to take hold.

City of Nelson: EcoSave incentive and on-bill financing program (2012–2015)

The EcoSave program is offered by the City of Nelson's electricity utility, Nelson Hydro. It offers initial energy assessment at a reduced rate, 'one-stop shop' support offered by a local program coordinator, access to provincial incentives, and on-bill financing.[74]

The on-bill financing program offers Nelson Hydro customers access to loans up to $16,000 for a five or 10-year term at a 3.5 % fixed interest rate. Monthly loan payments are added to the customer's utility bill.

In the pilot phase of the project (2012–2013), over 430 homeowners registered for the program and 107 post-retrofit assessments were completed. Participants saved on average 55 GJ/yr (electricity and natural gas combined). This represents an average energy reduction of 35%, resulting in GHG reductions of 260 tCO_2e. Total annual energy savings were 5,837 GJ, yielding

[70] Government of British Columbia, "Free Home Energy Assessments in the CRD when EnerGuide for Houses efficiency label posted on MLS," *LiveSmart B.C.*, August 8, 2011. http://www.livesmartbc.ca/blog/2011/free-home-energy-assessments-in-the-CRD-when-EnerGuide-for-houses-efficiency-label-posted-on-MLS.html ; Capital Regional District, "Energy Labelled Home Sales to Spur Green Economy in Capital Region," media release, August 8, 2011. http://crd.B.C..ca/media/2011-08-08-home-energy.htm

[71] *CRD Time of Sale Energy Labelling Pilot Project,* 2; Emily Eng, Program Coordinator, Ministry of Energy and Mines, Energy Efficiency Branch, personal communication, December 15, 2011.

[72] August–December 2011 month-by-month summaries, available at REALTORS of Greater Victoria, "Historical MLS® Statistics," *Victoria Real Estate Board*. http://www.vreb.org/mls_statistics/historical_statistics.html#a2011 .

[73] *CRD Time of Sale Energy Labelling Pilot Project,* 3.

[74] City of Nelson, "EcoSave Energy Retrofits Program." http://www.nelson.ca/EN/main/services/electrical-services/energy-grants.html

a $72,896 reduction in energy costs. Registration targets were met within the first few months of launching the program.[75]

The pilot program was considered a success, with the program continuing in 2014 and 2015.

City of Campbell River: Power Down Campbell River and Energy Challenge (2013–2014)

Power Down Campbell River was a community energy conservation program launched in January 2013 by the City of Campbell River in partnership with BC Hydro. It had three elements: the Energy Challenge, Energy Rebate Program, and community outreach for distribution of BC Hydro's low-income program, the Energy Conservation Assistance Program (ECAP).[76,77]

The Energy Challenge was a multi-media campaign featuring five families competing over 30 days to conserve energy and share their tips through local media outlets and social media. A professionally produced film as well as a short video showcasing the top energy conservation tips were produced and distributed through YouTube and ShawTV.

The Energy Rebate Program offered 115 local residents a free home energy audit in exchange for making an energy pledge to commit to a specific retrofit or behavior change action in their home.

Township of Langley: rebates for better-than-code new home (2014–)

This program offer rebate on building permits for above-code energy performance for new homes. Single-family homes that achieve an EnerGuide rating of 80 or more receive a $750 rebate on their building permits fees; multi-family units that reach a rating of 82 or more receive a $150 rebate for each unit.[78]

The program also offer a free assessment based on plans by a certified energy advisor hired by the Township, and is available on a regular basis at city hall to answer builder questions and provide advice.

The main goal of the program is to educate builders and encourage energy efficient construction through rebates that offset costs and allow builders to secure other incentives, such as the BC Hydro/FortisBC $2000 incentive and CMHC's 10% mortgage insurance rebate for beyond-code homes.

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[75] Nelson Hydro, Energy Retrofits Program Pilot Phase Report (2014), 1. http://www.nelson.ca/assets/City~Services/Electrical~Services~Nelson~Hydro/Documents/EcoSave%20Pilot%20Phase%20Report_FINAL.pdf

[76] City of Campbell River, "Power Down Campbell River." http://www.campbellriver.ca/your-city-hall/green-city/climate-action/power-down-campbell-river

[77] BC Hydro, "Campbell River challenges residents to Power Down," news release, March 28, 2013. https://www.bchydro.com/news/unplug_this_blog/2013/campbell-river-power-down.html

[78] Township of Langley, "First Builder Benefits From Green Building Program," news release, July 23, 2014. http://www.tol.ca/portals/0/township%20of%20langley/corporate%20administration/corporate%20communications/press%20releases/2014-07-23%20RELEASE%20Green%20Building%20Quadra.pdf

The project started in January 2014, but has not been extensively publicized. Maximum enrolment is set at 100 homes; as of June 2014 only a few builders had participated, accessing rebates for 10 to 15 homes each.[79] Program publicity was planned to be increased in the summer months and uptake is expected to increase at that time.

New Westminster: EnergySaveNewWest residential incentive program (2014–)

This programs aim to increase uptake of provincial retrofit incentives in the City of New Westminster. It offers a limited number of $240 rebates on energy assessments, as well as access to an independent green building advisor hired on retainer by the City.[80]

The program also features a Community Energy Challenge offering households that completed at least two energy measure a chance to win $3500 in Energy Star appliances or one of 10 $150 cash prizes.

Nanaimo: Realtor Education Program (2014–2015)

The city of Nanaimo and the Regional District of Nanaimo, with funding from BC Hydro and The Real Estate Foundation and in partnership with a local realtor, initiated in 2014 a realtor education program focused on home energy assessment and labelling.[81]

Six training sessions were co-facilitated by a realtor and a CEA. Sessions took place in a house, where the CEA gave realtors a summary of the energy assessment they had previously conducted on that house. 60 realtors from the Nanaimo region were invited, 42 attended (out of a total of 1032 realtors in the Vancouver Island Real Estate Board (VIREB)).

The training sessions were the first phase of the program and led to the introduction of a rebate program on October 1, 2014, covering the cost of assessments. Engagement materials, including video testimonies of realtors participating in the program and talking point summaries for realtors, will be posted on the VIREB website.

It is hoped that the training materials will be reused to design a Category B course (i.e. electives) available as credits for the realtors' biannual re-certification process.

Existing mandatory labelling programs

Table 7 summarizes mandatory labelling programs in place in Europe, the U.S., and Canada. We further discuss three programs in particular illustrating a range of policy options that could be considered in B.C.:

- Denmark's Energy Labelling Scheme, which, having been initiated in 1997, was an early leader in labelling policy and therefore one of the most studied and evaluated of such policies
- The City of Austin's smaller-scale Energy Conservation Audit and Disclosure (ECAD) Ordinance, which took effect in June 2009

[79] Mike Young, CEA, personal communication, June 24, 2014.

[80] New Westminster, "Energy Save New West." http://www.energysavenewwest.ca/residential/

[81] Project update call, Rob Lawrance, Environmental Planner, City of Nanaimo, September 23, 2014.

- The City of Vancouver's 2007 building bylaw, which requires an energy assessment for new homes, and its 2014 revision, requiring assessments for renovation above $5,000

The key design elements of each program are discussed below.

Denmark: Mandatory labelling

Denmark introduced mandatory labelling in 1997,[82] with the objective of encouraging energy and water efficiency in the Danish building stock. The labelling program applies to residential, public and commercial buildings. New buildings require labelling prior to occupation, while existing buildings under 1500 square metres require up-to-date (within five years) labelling prior to their sale. Building sellers are responsible for the labelling costs.[83]

Denmark's labelling program includes a building rating, similar to the EnerGuide rating from Natural Resources Canada (NRCan), and an energy plan with recommendations for the anticipated costs and paybacks from improvements. The labelling program is not connected to other policy mechanisms, nor is it strictly enforced, and it is currently being reviewed in order to improve its performance. Although 45,000 to 50,000 homes are labelled in Denmark each year, only about 60% of houses that should have labels actually do. Almost half of homeowners did implement some energy savings measures after purchase, which can be partially attributed to the labelling program.

Austin, TX: Energy Conservation Audit and Disclosure Ordinance

The city of Austin, Texas, has a mandatory labelling program for customers of Austin Energy, the city-owned utility.[84] In effect since 2009, the Energy Conservation Audit and Disclosure Ordinance (ECAD) aims to reduce the city's GHG emissions, supporting Austin's Climate Protection Plan. The ordinance applies to existing single and multi-family residences and commercial buildings that are more than 10 years old. Home sellers are required to have an energy audit performed prior to the sale of their home, and provide the audit to potential buyers and to Austin Energy. Exemptions are provided for homes that have already participated in other energy programs, or are being sold for reasons such as foreclosure.

Austin Energy provides workshops to the local real estate industry so that they can provide guidance and information to their clients about the program, and the benefits of energy efficiency. Austin Energy also has rebate and low-cost loan programs for energy efficiency upgrades. It is estimated that the labelling program affects 3,000 homes each year.[85]

Vancouver, B.C.: Mandatory rating program for new and renovated buildings

As part of its Green Homes Program, the City of Vancouver's 2009 building bylaw required new single-family and duplex houses to undergo an energy assessment and obtain an energy rating

[82] *Energy Performance Certification of Buildings*, 31.

[83] *Energy Labelling and Efficiency Requirements for Existing Buildings.*

[84] *Energy Labelling and Efficiency Requirements for Existing Buildings*, 17.

[85] For more details on Austin's program, see Austin Energy, "Energy Conservation Audit and Disclosure (ECAD) FAQs." http://austinenergy.com/wps/portal/ae/programs/ecad-ordinance/ecad-for-residential-customers/faqs

using NRCan's EnerGuide system.[86] The EnerGuide rating and the assessment report must be provided to the city before the occupation permit is issued.[87] The data is intended for use by the city's planning teams and the ratings are not required to be shared with prospective homebuyers or shared publicly, unless the builder decides to do so (or the buyer requests the information). If the assessment stands in the way of a quick sale, the builder can sign off the obligation to do the final assessment to the homebuyer. More than 2,000 single-family and duplex homes have been labelled under this program since 2009, when the bylaw was introduced.[88]

Vancouver adopted a new building bylaw in 2014 (in force January 1, 2015), which introduced new labelling requirements.

For new homes:

1. Before building permit: builder must submit assessment based on schematics (P-files), giving CEA an opportunity to discuss options for improvements with builder/ buyer, and giving builder the opportunity to make changes to schematics before submitting them for permitting.
2. Before insulation inspection: CEA conducts pre-drywall blower door test to identify major leaks while they can still be fixed, and provides builder with thermal bridging checklist
3. Before final inspection: Final CEA visit with blower door test, report submitted to city

For existing homes:[89]

The City of Vancouver requires energy assessments and potentially upgrades to existing buildings as a condition of issuance of a renovation permit — required for a building repair, renovation, reconstruction, addition, or change of major occupancy. Requirements vary with renovation cost:

- Greater than $5,000: a home energy audit must be undertaken as a permit condition
- Greater than $25,000 the home must be weather sealed if the energy assessment indicates the home has high air leakage
- Greater than $50,000: attic insulation must be installed if the energy assessment indicates existing insulation levels are insufficient

[86] Information on Vancouver's Green Buildings programs can be found at City of Vancouver, "Green building and renovating." https://vancouver.ca/home-property-development/green-building-and-renovating.aspx; Vancouver's green building amendments to its Building Bylaw include a range of energy efficiency measures, from insulation to heat recovery ventilators, detailed in City of Vancouver, *By-law No. 9691: A Bylaw to amend Building By-law No. 9419 regarding green building strategy for one family homes, one family homes with secondary suites, and two family homes,* July 8, 2008. https://vancouver.ca/files/cov/green-homes-ammendments.PDF

[87] For the Council report with the adopted bylaw amendments, see City of Vancouver, *Policy Report: The Green Homes Program*, June 9, 2008. https://vancouver.ca/files/cov/green-homes-council-report.pdf

[88] Mark Hartman, City of Vancouver, personal communication, May 9, 2012. Prior to the green building bylaw, new Vancouver buildings were estimated to have an average EnerGuide rating of 72; see *Policy Report: The Green Homes Program,* 4.

[89] *Energy Retrofit Strategy for Existing Buildings*.

There are, on average, 1,600 residential (detached and multi-family) renovations permits issued in a given year. As a result, these requirements will impact an estimated maximum of 11% of the detached homes in Vancouver by 2020.

Table 7. Existing mandatory energy labelling programs

Region	Jurisdiction	Short name	Enacted	Effective	Disclo-sure*	New	At Sale	At Rental
Canadian provinces	Ontario	Green Energy and Economy Act	2009	Not proclaimed[90]	✓ (a)	✓	✓	
	Nova Scotia[91]	Environmental Goals and Sustainable Prosperity Act	2007	2009 (through Building Code Act)		✓		
Canadian cities	Vancouver	VBBL 2007	2007	2008		✓		
	Vancouver	VBBL 2014	2014	2015		✓		
	Whitehorse	Building bylaw	2012	2014		✓		
U.S. states[92]	Alaska	AS.34.70.101	2008	2008	✓ (b)	✓	✓	
	Kansas	HB 2036	2007	2007		✓		
	Maine	H.P. 1468 - L.D. 2074	2006	2006				✓
	Nevada	SB 437	2007	2011	✓ (b)	✓	✓	
	New York	Truth in Heating Law	1980	1981	✓ (b)	✓	✓	✓
	South Dakota	SB 64	2009	2009		✓		
U.S. cities and counties[93]	Austin, TX	ECAD Ordinance	2008	2011	✓(a)		✓	
	Chicago, IL	Ordinance No. SO2013-1645	2013	2013	✓ (b)		✓	✓
	Montgomery County, MD	Bill No. 31-07	2008	2008	✓ (b)		✓	

[90] The Government of Ontario decided not to proclaim labelling requirement under the GEEA in 2010 (Peter Gorrie, "Energy audits for homes latest Ontario retreat," *Toronto Star*, July 31, 2010. http://www.thestar.com/news/2010/07/31/gorrie_energy_audits_for_homes_latest_ontario_retreat.html); the motion was reintroduced and carried in Fall 2013 (Filed by MPP Phil McNeely, September 16, 2013. Debated October 3, 2013. Carried on recorded division October 3, 2013. http://www.ontla.on.ca/web/go.jsp?Page=/house-proceedings/motions-private-members/files_html/40-2_section_6b_Private_Member_Motions&menuitem=dandp_proceedings&locale=en).

The Ontario Real Estate Association still raised objections (OREA, "Discussion Reopens Around Mandatory Home Energy Audits," September 26, 2013. http://www.oreablog.com/2013/09/discussion-reopens-around-mandatory-home-energy-audits/)

[91] Government of Nova Scotia, *Environmental Goals and Sustainable Prosperity Act Progress Report 2010*, 1. http://gov.ns.ca/nse/egspa/

[92] Institute for Market Transformation, 2013

[93] Ibid.

	Santa Fe, NM	No. 2007- 38	2007	2008	✓ (a)	✓		
EU	17 member states[94]	EPBD	2002, 2010	varies	✓	✓	✓	✓
Australia	Australian Capital Territory[95,96]	EER	1999	1999		✓	✓	

* Disclosure of energy assessment results (a) or utility bills (b)

[94] As of January 2009, 17 member states had successfully implemented the requirements of the Energy Performance of Buildings Directive (EPBD). Seven states (Bulgaria, France, Latvia, Lithuania, Malta, Poland and Slovenia) are yet to meet all the requirements but have made significant progress in implementation. Three states (Hungary, Cyprus and Greece) have not yet implemented any elements of the directive (J. Arbon and E. Hotchkiss, *Study on Energy Performance of Buildings* (Policy Department Economic and Scientific Policy, European Parliament, 2008).) The EPBD was recast in 2010 (2010/31/EU) to deal with implementations challenges of the 2002 directive and further clarify the requirements for member states. See Shailendra Mudgal, Lorcan Lyons and François Cohen, *Energy Performance Certificates in Buildings and Their Impact on Transaction Prices and Rents in Selected EU Countries,* Annex A (2013). Similar policies have been in place in the U.K. and in Denmark since the 1990s; see *Home Energy Labelling Requirement at Point of Sale: Pilot Program Design*, 9.

[95] Australian Bureau of Statistics, *Energy Efficiency Rating and House Price in the ACT* (2008), 1. http://greengurus.com.au/wp-content/uploads/2011/03/Effect-Energy-Efficiency-has-on-House-Price_ACT-study.pdf

[96] Stephen Berry, Tony Marker, and Tom Chevalier, *Modelling the Relationship Between Energy Efficiency Attributes and House Price : The Case of Detached Houses Sold in the Australian Capital Territory in 2005 and 2006* (2008). aceee.org/files/proceedings/2008/data/papers/2_193.pdf

Appendix B. Modelling assumptions and results

General building stock parameters for Metro Vancouver

Type of dwelling	GROWTH RATE (%)[97]	Total number of units in 2011 (census)
Single family dwelling/Duplex electric heat	1.1%	128323.5
Single family dwelling/Duplex gas heat	1.1%	299421.5
Row electric heat	3.1%	53892
Row gas heat	3.1%	45908
Low-rise apt units electric heat	1.0%	228585
Low-rise apt units gas heat	1.0%	0
High-rise apt units electric heat	5.5%	129255
High-rise apt units gas heat	5.5%	0
Mobile electric heat	1.1%	2694.6
Mobile gas heat	1.1%	2295.4

Parameter	Value (per year)
Annual permitted renovation rate[98]	0.57%
Annual units sold[99]	SDF: 3.1%
	Row: 5.8%
	Apartments: 3.9%
Annual teardown rate[100]	Ground oriented: 0.45%
	Apartments: 0.05%

[97] Based on CMHC Canadian Housing Observer and CMHC regional housing data, 2014. http://www.cmhc-chl.gc.ca/en/corp/about/cahoob/

[98] Average number of permits for alterations in Vancouver 2009-2013: 1515 per year (http://vancouver.ca/home-property-development/statistics-on-construction-activity.aspx) Number of dwellings in Vancouver: 264,575 (2011 census)

[99] Total sales data averaged in GVREB from 2004-2013. Breakdown by building type from data provided for 2012 and 2013: http://www.rebgv.org/sites/default/files/REBGV%20Stats%20Package%2C%20December%202013.pdf Rate: Total sales / 2011 metro Vancouver total unit (note: GVREB does not cover all of metro Vancouver, but does include some areas outside (e.g. Whistler)).

[100] Metro Vancouver, *Metro Vancouver Housing Data Book.* http://www.metrovancouver.org/services/regional-planning/PlanningPublications/MV_Housing_Data_Book.pdf. Demolitions 2004 to 2013 (10 years): 25,688 residential units; annual average: 2,569. Ground oriented dwellings account for 92.5% (23,735 units) of the residential demolitions that occurred from 2004 to 2013. Rest is apartments. 2011 census total number of units: 532,535 Ground oriented, 357,840 apartments.

Modelling assumptions, PIE model

Policy Tool	Housing stock affected & labelling uptake rate (% of units labelled)	Source of energy saving	Assumption on retrofit uptake (% of labelled units) and performance gain
Incentives & education	New (1% of new[101])	Improved design for new	Performance increase equivalent to incentivized level (assuming ~ 15% better than code, eg EGH 77 to 80, or 80 to 83) for 90% of assessment completed
	Existing (~1% of existing[102])	Upgrades at time of renovation or sale due to presence of cash incentives	Participation in incentive program triggers 25% EE improvement (eg EGH 65 to 74) for 75% of pre-assessments completed
Required for new	New (100% of new)	Increased compliance with energy code	Compliance with energy code increase by 10% (e.g. from 85% to 95%)
		Improved design for new	Performance increase equivalent to incentivized level (assuming ~ 15% better than code, eg 80 to 83) for half of assessments completed
	Existing – at renovation (50% of permit requests[103])	Increase in energy efficiency upgrades at time of renovation	Labelling at point of major renovation triggers 15% EE improvement (eg EGH65 to 70) for 10%[104] of assessments
	Existing – at point of sale (5% of sales)[105]	Voluntary upgrade before sale to improve EGH score before posting on MLS	Labelling at point of sale triggers 15% EE improvement (eg EGH65 to 70) for 10% of assessments at point of sale
Required at point of sale	New (100% of new)	Same as for requirement for new, above	
	Existing – at renovation (50% of renovations)		
	Existing – at point of sale (85% of sales)	Voluntary upgrade before sale to improve EGH score before posting on MLS	Labelling at point of sale triggers 15% EE improvement (eg 65 to 70) for 10% of assessments at point of sale
Required at point of renovation	Existing – at renovation (75% of renovations[106])	Increase in energy efficiency upgrades at time of renovation	Labelling at point of renovation triggers 15% EE improvement (eg 65 to 70) for 10% of assessments at point of retrofits

[101] Based on uptake of incentive for new homes program, BC Hydro/FortisBC (estimate by Katherine King, BC Hydro)

[102] B.C. LiveSmart program: resulted in more than 96,000 homes being assessed over 7.5 years, or 8% of the eligible building stock (~1%/year). 77% of the assessed home followed through on upgrades, with average energy savings modelled at 26%. (Based on Livesmart data provided by Rylan Nowell, 4 October 2014)

[103] Assuming requirement for new applies to major renovation.

[104] Could be greater depending on level of incentives and possible minimum upgrade requirements (e.g. Vancouver 2014 building bylaw)

[105] Will increase as EGR becomes more prevalent in real estate markets

[106] Assuming the added requirement either does not apply to certain renovations and that the number of renovation conducted without permit might increase as a result of the additional requirement.

Policy tool administrative costs (beyond labelling and incentives)

Voluntary — Incentives and education

Voluntary programs have mainly relied on federal, provincial and/or utility funding and support. Incentive programs can have high administrative and outreach costs.

The provincial government actively supported voluntary auditing and labelling programs in the past with LiveSmart, which administered the overall program including data collection, subsidized assessment fees and provided upgrade incentives to March 2014.

Currently, B.C. incentive funding is provided by BC Hydro and FortisBC.

The up-front costs to individual homeowners and builders depend on the incentive program. Home assessments currently cost $300–350 for existing homes, with a $150 follow-up post-upgrade evaluation (blower door test).

New building assessment costs are higher, at about $750 for an as-per-plan and as-built assessment. Note that labelled homes are eligible for a $2000 incentives from BC Hydro and FortisBC if rated above EG80 (or Energy Star, as of April 2015), and a 10% mortgage insurance rebate from CHMC (worth $800–$1600 approximately) if rated 82 or higher.

Energy upgrades also lead to savings in energy costs over time, with the savings depending on the upgrade.

Required for new construction

Policy design exists for local government bylaw amendments,[107] but no detailed policy design has been completed yet for a requirement through the B.C. Building Code. A labelling requirement could be added, possibly alongside maximum air leakage and/or energy intensity targets, in the next round of building code revisions, slated for 2017-18. The costs of development are estimated to be low.

Administration costs are low as labelling can be integrated into existing local government operations, specifically permitting and final inspection (see Appendix B).

Builders would need to include a $750 assessment in construction costs; as noted under incentives, there are current incentives for reaching above-code performance that more than cover the assessment costs.

Adding an EGR field to MLS listings services by the Real Estate Boards would support the requirement; this cost has been assessed as low.[108]

[107] See *Energy Labelling for New Homes*.

[108] Victoria Real Estate Board, personal communication, 2013. Note that the GVREB is in the process of redesigning its MLS platform and plans to add fields for EnerGuide ratings (GVREB, personal communication, 2014).

Required at point of renovation

Policy design has been explored by the City of Victoria and enacted by the City of Vancouver, thus the policy development costs would be low.

Administrative costs, as with new construction, are likely low due to the relative simplicity of incorporating the requirement into existing permitting processes.

Homeowners would bear the cost of assessment, which could be offset by energy upgrades and energy bill savings or higher home values (in the case of a high rating).

Required at point of sale

Policy development costs are expected to be low to moderate as policy development for provincial point of sale is still needed for B.C. Work on local government point of sale has been completed[109] and Ontario has previously developed a provincial point of sale requirement that may serve as a precedent.

Administrative costs are expected to be low, as compliance is ensured through existing provincial processes (e.g. property transfer).

As noted above, adding an EGR field to MLS listings services by the Real Estate Boards would support the requirement; the cost has been assessed as low.[110]

Quantification of energy and GHG savings for the Metro Vancouver area

Results from modelling the quantitative benefits of home energy labelling for the Metro Vancouver region, which had 891,340 residential units as of 2011, are shown in the table below for both new builds and existing residences. The modelling was done using BC Hydro's PIE model for Metro Vancouver as a whole.

Table 8. Total housing stock (PIE model output)

	2016	2020	2030
Total number of existing homes	991,668	1,073,393	1,335,754
Vintage homes	766,743	755,700	734,295
Cumulative new (since 2015)	36,993	118,718	381,079
Total number of renovations	7,667	45,672	120,058
Total cumulative sales for vintage homes starting 2015	54,384	150,498	330,939

[109] *Home Energy Labelling Requirement at Point of Sale: Pilot Program Design*.

[110] Victoria Real Estate Board, personal communication, 2013.

Modelling results — by policy tool

Policy start date 2015

Policy tool	sum of model	% of homes labelled	% of homes renovated	Cumulative labelling costs ($M)	Annual Energy Savings (GWh/yr)	Annual Electrical Savings (GWh/yr)	Annual GHG Savings (tonnes CO2e/yr)
2016							
Incentives & education (voluntary labelling)	B + C	0.8%	0.61%	$ 4	41	29	2107
required for new - with cash incentives for high performance	D+E2+F+G	4%	1%	$ 30	30	17	2277
required for new - with bonusing incentives for high performance	D+E1+F+G	4%	4%	$ 30	93	52	7394
Mandatory at point of sale for new and existing	D+E2+M*+K	8%	2%	$ 44	46	23	4074
Mandatory at point of sale for new and existing, including major renovation	D+E2+J+K	9%	2%	$ 45	47	24	4104
Mandatory at point of renovation	N	0.6%	0.1%	$ 2	4	2	488
2020							
Incentives & education (voluntary labelling)	B + C	4%	3%	$ 24	114	87	4967
required for new - with cash incentives for high performance	D+E2+F+G	14%	4%	$ 100	130	74	10183
required for new - with bonusing incentives for high performance	D+E1+F+G	14%	12%	$ 100	329	182	26371
Mandatory at point of sale for new and existing	D+E2+M*+K	23%	5%	$ 135	177	90	15568
Mandatory at point of sale for new and existing, including major renovation	D+E2+J+K	25%	5%	$ 142	180	93	15608
Mandatory at point of renovation	N	3%	0.3%	$ 12	13	5	1451
2030							
Incentives & education (voluntary labelling)	B + C	9%	7%	$ 63	250	192	10355
required for new - with cash incentives for high performance	D+E2+F+G	34%	11%	$ 313	464	260	36785
required for new - with bonusing incentives for high performance	D+E1+F+G	34%	31%	$ 313	1081	599	86810
Mandatory at point of sale for new and existing	D+E2+M*+K	50%	12%	$ 388	586	304	50861
Mandatory at point of sale for new and existing, including major renovation	D+E2+J+K	54%	13%	$ 405	592	310	50778
Mandatory at point of renovation	N	7%	0.7%	$ 32	35	14	3779

Modelling results - detail of model components

run		Sector affected	Source of saving	Assumptions (Renovation rate 1% of Existing, sales's rate as per assumptions)	Compliance	# of units labelled / # of Policy participants cumulative from 2015			Cost of labelling($M)			# of units Completing the EE Measures			Market Saturation-Percentage Labelled			Market Saturation-Percentage of units Completing the EE Measures			Annual Energy Savings GWh/yr	Annual Electric Savings GWh/yr	Total GHG Savings tCO2e /yr	Annual Energy Savings GWh/yr	Annual Electric Savings GWh/yr	Total GHG Savings tCO2e /yr	Annual Energy Savings GWh/yr	Annual Electric Savings GWh/yr	Total GHG Savings tCO2e /yr
			Uptake for labelling	Uptake for EE increase		2016	2020	2030	2016	2020	2030	2016	2020	2030	2016	2020	2030	2016	2020	2030	2016	2016	2016	2020	2020	2020	2030	2030	2030
B	incentives	Incentive programs for NEW (1%)	Improved design for new homes	Performance increase equivalent to incentivized level (assuming ~ 15% better than code, eg EGH 77 to 80, or 80 to 83) for 90% of assessment completed	100%	370	1,187	3,811	$ 0.3	$ 1	$ 3	333	1,068	3,430	0.0%	0.1%	0.3%	0.0%	0.1%	0.3%	1	0.4	66	3	1	208	8	4	643
			1.0%	90.0%																								
C		Retrofit program for existing homes	Upgrades by homeowner due to presence of cash incentives (1% of existing homes each year, similar to renovation rate)	75%* renovation uptake-Labelling at point of renovation triggers 25% EE improvement* (eg EGH65 to 74)	100%	7,667	45,672	120,058	$ 4	$ 23	$ 60	5,751	34,254	90,043	1%	4%	9%	1%	3%	7%	40	29	2,041	112	85	4,758	242	188	9,711
			100%	75%																								
D	Required for new	NEW 100%	Increased compliance with energy code (10%)	Increase of 10% in the energy code compliance	100%	36,993	118,718	381,079	$ 28	$ 89	$286	3,699	11,872	38,108	4%	11%	29%	0%	1%	3%	5	4	325	53	30	4,098	230	128	18,327
			100%	10%																								
E1		NEW 100%	Improved design for new	Performance increase equivalent to incentivized level (assuming ~ 15% better than code) (95% uptake	100%	36,993	118,718	381,079	$ 28	$ 89	$286	35,143	112,782	362,025	4%	11%	29%	4%	11%	27%	85	46	6,944	270	147	21,969	837	460	67,891
			100%	95%																								
E2		NEW 100%	Improved design for new	Performance increase equivalent to incentivized level (assuming ~ 15% better than code) (50% uptake	100%	36,993	118,718	381,079	$ 28	$ 89	$286	9,248	29,680	95,270	4%	11%	29%	1%	3%	7%	22	12	1,827	71	39	5,781	220	121	17,866
			100.0%	25.0%																								
F		Existing – at renovation	Increase in energy efficiency upgrades at time of renovation	%50 of permit requests- Labelling at point of renovation triggers 15% EE improvement (eg EGH65 to 70) for 10%[2] of assessments at point of retrofits	100%	3,834	22,836	60,029	$ 1	$ 8	$ 21	383	2,284	6,003	0%	2%	4%	0%	0%	0%	2	1	96	5	4	233	10	8	423
			50.0%	10.0%																								
G		Existing – at point of sale	Voluntary upgrade before sale to improve EGH score before posting on MLS	5% of sales- Labelling at point of sale triggers 15% EE improvement (eg EGH65 to 70) for 10% of assessments at point of sale	100%	2,719	7,525	16,547	$ 1	$ 3	$ 6	272	752	1,655	0%	1%	1%	0%	0%	0%	1	0	30	2	1	70	4	3	169
			5.0%	10.0%																								

run		Sector affected	Source of saving	Assumptions (Renovation rate 1% of Existing, sales's rate as per assumptions)	Compliance	# of units labelled / # of Policy participants cumulative from 2015			Cost of labelling($M)			# of units Completing the EE Measures			Market Saturation- Percentage Labelled			Market Saturation- Percentage of units Completing the EE Measures			Annual Energy Savings GWh/yr	Annual Electric Savings GWh/yr	Total GHG Savings tCO2e /yr	Annual Energy Savings GWh/yr	Annual Electric Savings GWh/yr	Total GHG Savings tCO2e /yr	Annual Energy Savings GWh/yr	Annual Electric Savings GWh/yr	Total GHG Savings tCO2e /yr
			Uptake for labelling	Uptake for EE increase		2016	2020	2030	2016	2020	2030	2016	2020	2030	2016	2020	2030	2016	2020	2030	2016	2016	2016	2020	2020	2020	2030	2030	2030
K	Required at PoS	Existing – at point of sale	Voluntary upgrade before sale to improve EG score before posting on MLS	85% of sales -Labelling at point of sale triggers 15% EE improvement (eg 65 to 70) for 10% of assessments at point of sale	100%	46,226	127,923	281,298	$ 16	$ 45	$ 98	4,623	12,792	28,130	5%	12%	21%	0%	1%	2%	17	7	1,857	51	21	5,495	132	53	14,162
			85%	10%																								
M		Existing – at renovation	Increase in energy efficiency upgrades at time of renovation	10% of renovations -Labelling at point of renovation triggers 15% EE improvement (eg 65 to 70) for 10% of assessments at point of retrofits	100%	767	4,567	12,006	$ 0.3	$ 2	$ 4	77	457	1,201	0%	0%	1%	0%	0%	0%	1	0.2	65	2	1	194	5	2	506
			10%	10%																								
N	Required at PoR	Existing – at renovation	increase in energy efficiency upgrades at time of renovation	75% of renovations- Labelling at point of renovation triggers 15% EE improvement (eg 65 to 70) for 10% of assessments at point of retrofits	100%	5,751	34,254	90,043	$ 2	$ 12	$ 32	575	3,425	9,004	1%	3%	7%	0%	0%	1%	4	2	488	13	5	1,451	35	14	3,779
			75%	10%																								
O		Existing – at renovation	Minimum energy efficiency upgrades required at time of renovation	75% of renovations -Labelling at point of renovation triggers 15% EE improvement (eg 65 to 70) for 50% of assessments at point of retrofits	100%	5,751	34,254	90,043	$ 2	$ 12	$ 32	2,875	17,127	45,022	1%	3%	7%	0%	2%	3%	22	9	2,437	66	26	7,199	169	66	18,473
			75%	50%																								

Appendix C. Does energy labelling affect the price of houses?

One of the main objectives of energy labelling is to increase the consideration of energy efficiency in real estate transactions. Customer valuation of energy efficiency could be shown through reputational advantages, faster sales of high-quality homes, better retention of renters, reputational advantages, and, ultimately, higher rental rates (if applicable) and home sale prices.

A key indicator of the valuation of energy efficiency is whether buyers or renters are willing to pay a premium for buildings with better performance. Answering this question demands first that energy performance be established in a standardized way, such as by an EnerGuide rating or other labelling system.

Jurisdictions that have implemented labelling requirements at point of sale demonstrate that, in general, there is a positive relationship between better energy performance and higher sales prices.

Australia: The Australian Capital Territory label provides basic energy consumption estimates and a zero-to-six star rating system. Statistical analysis of the more than 5,000 sales in 2005 and 2006 showed that a one star improvement led to a sales price premium of approximately 3%; for a median house value of $350,000, the premium is thus more than $10,000.[111]

European Union: Analysis of listing data for buildings for sale or rent in areas of Austria, Belgium, France and the United Kingdom has shown that, in general, a higher energy rating on the energy performance certificate (EPC) led to a higher sales and rental price. The sales premium for a one-letter improvement in energy efficiency ranged from a high of 11% in Austria to a low of 2.8% in Ireland.[112] Premiums on rental prices range from 1.4% in Ireland to 4.4% in Vienna. Oxford, U.K., was the only area in the study where a positive correlation between energy efficiency and sales prices was not found, although this could be due to a small sample size.[113] A more recent U.K. study suggests that there is indeed a positive premium for energy efficiency in the U.K. housing market, of roughly 5% for a C-rated property compared to an F-rated one.[114]

Global: The European Commission reviewed 22 studies analyzing the impacts on property values of various energy labelling and green certification schemes. The studies were conducted between 2007 and 2012 and covered voluntary or mandatory labelling and/or certification

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[111] National Framework for Energy Efficiency, *Energy Efficiency Rating and House Prices in the ACT* (2008), 6. http://greengurus.com.au/wp-content/uploads/2011/03/Effect-Energy-Efficiency-has-on-House-Price_ACT-study.pdf

[112] Shailendra Mudgal, Lorcan Lyons, and François Cohen, *Energy Performance Certificates in Buildings and Their Impact on Transaction Prices and Rents in Selected EU Countries*, Final report prepared for European Commission (Bio Intelligence Service, Ronan Lyons and IEEP, 2013), 115. http://ec.europa.eu/energy/sites/ener/files/documents/20130619-energy_performance_certificates_in_buildings.pdf

[113] Ibid., 111.

[114] Fuerst et al., cited in *Energy Performance Certificates in Buildings and Their Impact on Transaction Prices and Rents in Selected EU Countries*.

programs in the EU (EPC), Japan (Tokyo Green Building Programme), United States (Energy Star, Green Point and/or LEED), Singapore (Green Mark), Switzerland (Minergie) and Australia (ACT House Energy Rating Scheme). Most of the papers studied the impact of ratings on sales prices; a few also covered rental rates. Of the 22 studies considered, 19 showed higher energy performance ratings to have a positive impact on either rental or sales values, or both.[115]

[115] Ibid., 37.

Appendix D. Elements of a 'best in class' energy labelling policy

Based on review of existing policy, a comprehensive home energy labelling framework would include:

- Mandatory labelling for new homes, in four steps:
    1. Before building permit: pre-assessment based on schematics (P-files) submitted to city; options for improvements to be discussed with developer / buyer
    2. Before insulation inspection: CEA conducts pre-drywall blower door test to identify major leaks while they can still be fixed, and provides builder (and possibly building official) with completed energy efficiency checklist
    3. Before final inspection: Final CEA visit with blower door test, report submitted to LG and labelled posted on electrical panel
    4. Before sale (if not custom built): Disclosure of rating on MLS
- Mandatory labelling (and disclosure) for existing homes at time of sale, time of major renovation, and before rental
- Incentives and financing offers to facilitate upgrade based on energy assessment suggestions
- Data made available for use by decision makers:
    - Government: web portal allows access to data; analysis is conducted regionally and provincially to facilitate benchmarking
    - Homeowners: interactive web portal allows to access home energy information, and to change operations assumptions to match their household and estimate their energy use and utility costs.

Appendix E. Five possible pathways for labelling

In the process of drafting this strategy plan, we considered five plausible pathways towards broad adoption of home energy labelling. This Appendix summarizes these five pathways and their respective pros and cons. The suggested pathway that is outlined in this document evolved from Pathway 2, "Building code to point of sale".

Figure 15 summarizes the five pathways. Key enablers are indicated at the top. They include: a robust ERS delivery network, the availability of retrofit incentives, and the availability of incentives for 'better than code' homes to bridge the gap between labelling programs and the energy upgrades that yield energy efficiency improvements.

The independence and validity of the EnerGuide rating will need to be maintained by NRCan through market transformation and beyond, including improvements to the system. However, as assessments become part of standard permitting and sales processes, the ERS delivery network should cease to be dependent on incentives. Similarly, assessment incentives should be phased out once the market integrates labelling tools into business-as-usual operations.

The length of the bars at the top of the figure indicates roughly when we expect these enablers to be phased out. It is important for public acceptability to avoid removing the incentive right after a mandatory requirement is put into place. Incentives for high performance new homes should be continued for a transition period after energy labelling for new homes is made mandatory. Similarly, incentives for retrofits and assessments should be available during a transition period with a policy requiring labelling at point of renovation and sale.

Figure 15 also summarizes other key elements needed to meet the desired outcomes. Necessary pre-conditions are elements that must be in place for successful programs to advance, as raised in the critical success factor section.

Activities and programs needed to help meet these pre-conditions are represented by the 'preparing the ground' box, which is the common first step for all pathways.

The five pathways for consideration are distinguished by coloured arrows and discussed below.

After reviewing their respective advantages and disadvantages, we articulate the path we deem most likely to deliver broad-scale labelling within reasonable time frame and highlight key milestones along this path.

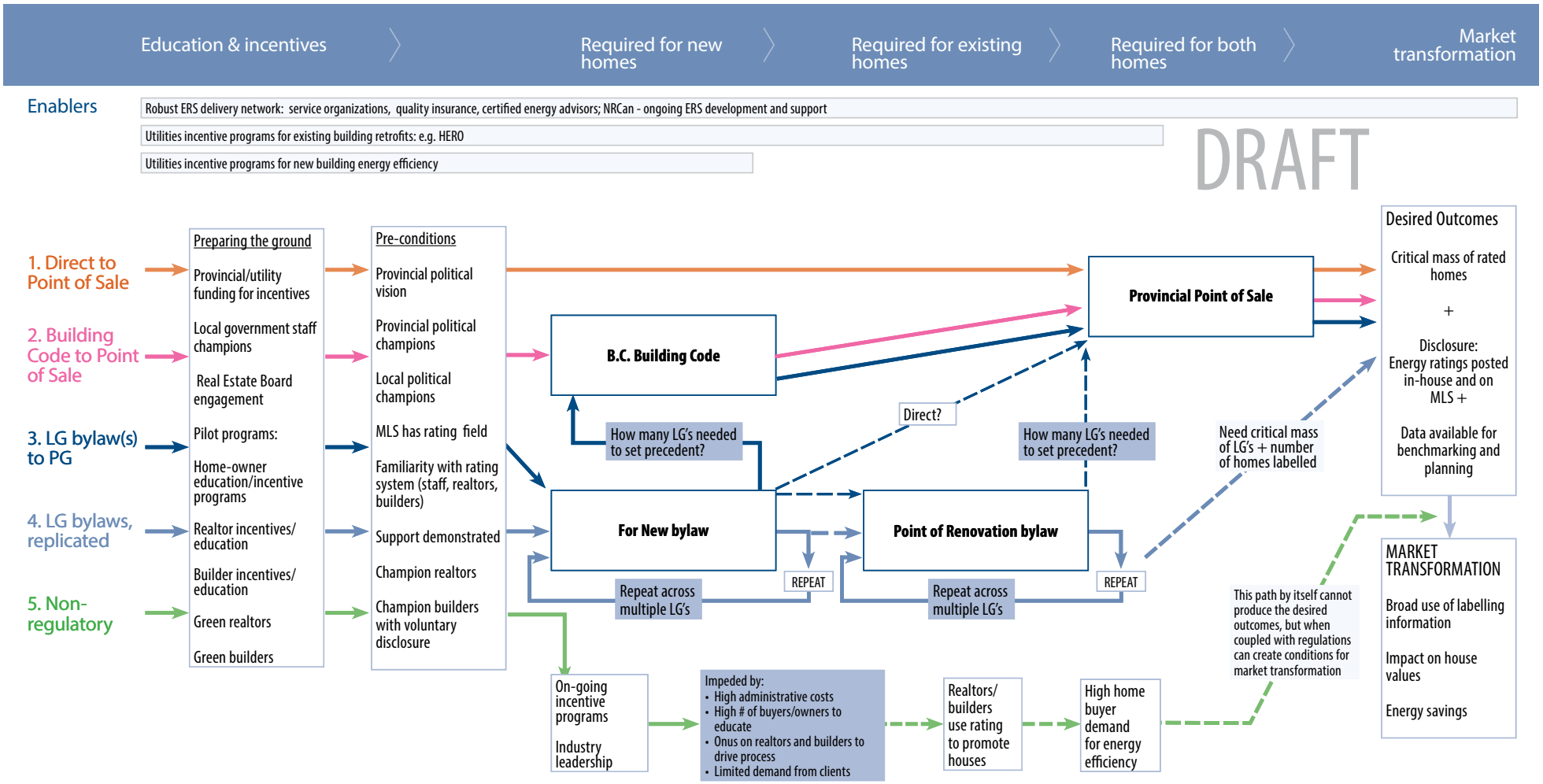

Figure 15. Pathways to desired outcomes and market transformation

Five pathways for consideration

We distinguish five pathways to market transformation. Three are regulatory pathways that will reach the desired outcomes: they include labelling at point of sale. As discussed under Benefits and Costs, the point of sale policy tool is the most likely to generate a critical mass of labelled homes in the new and existing market. The fourth regulatory pathway involves only local government, requiring replication in municipalities and regional districts across the province.

We also articulate a 'non-regulatory' pathway, dependent solely on education programs, incentives, and market actors, as this emerged in our engagement workshop as the preferred route for several stakeholders. To give it full consideration, we articulate it here as a distinct, potentially self-sufficient, pathway. Note that this is somewhat distinct from the broader notion that education, incentives, and industry leaders have a key role to play in preparing the ground for labelling regulation and market transformation. Articulated as a potential pathway, we consider whether the pathway could reach critical mass and market transformation without regulation.

The conclusions are summarized in Table 9; pathways are examined in detail below.

Table 9. Summary of conclusions for the five pathways

Pathway	Conclusion
1. Direct to point of sale	Reaches desired outcome but politically difficult
2. Building code to point of sale	Reaches desired outcome through straightforward regulatory changes
3. Local government bylaw to provincial regulation	Reaches desired outcome through phases that allows for capacity building, familiarity with rating and growth of ERS delivery network
4. Local government bylaw, replicated	May reach desired outcomes with much replication
5. Non-regulatory	Does not reach desired outcomes, but supports and is critical to market transformation

1. **Direct to point of sale:** Similarly to what was attempted in Ontario, the provincial government could simply legislate a requirement for home energy labelling (i.e. assessment, reporting and disclosure) at point of sale. It would apply to new and existing houses.

Pros	Cons
• Most direct regulatory route to broad adoption of labelling • Once regulation implemented, desired outcomes could be achieved within reasonable timeframe	• High political risk • Education must target builders, realtors, and home sellers all at once • Need to ramp up CEA capacity quickly

2. **Building code to point of sale:** This is a phased approach, in which the province first requires energy labelling for new houses through the building code,[116] and once a certain

[116] Note that the Energy Efficiency Act might be another possible avenue for this requirement.

level of comfort is gained across the industry, extends the reach to existing buildings by mandating labelling and disclosure at point of sale.

Pros	Cons
• Straightforward adoption through provincial regulations • Mandatory blower door test as part of B.C. Building Code not a new idea • Phased approach allows time for builder, then realtor education, ensuring familiarity with EnerGuide rating and use of the rating on MLS; also allows time to build CEA capacity • Assessment for new homes yields opportunities to educate builders about energy efficiency and improve design • Desired outcomes could be achieved within reasonable timeframe	• Dependent on provincial leadership and political champions • Risk of political pushback by from builders, and/or rural/remote communities due to lack of CEA capacity and assessment cost

3. **Local government bylaw to provincial regulation**: A phased approach, this pathway begins at the local level with the adoption of labelling bylaws for new homes by one or several local governments.[117] Scale is gained eventually by having the province adopt a province-wide policy, either through a change to the building code, as outlined in (2) above, or directly through a requirement at point of sale, as outlined in (1). Either way, we assume that the creation of political capital for this provincial scale-up is dependent on the initial leadership and success of one or more local governments, in contrast to the previous two pathways, which depended on provincial leadership from the onset.

Pros	Cons
…Same as (2) above plus: • Local government pilot programs build comfort with program and political capital for province-wide adoption • Can start with champion local government even if province not yet ready to move • Creates pressure for a province-wide program by demonstrating support and raising the threat of further differentiation between LGs permitting requirements • Desired outcomes could be achieved within reasonable timeframe	• Limited time window for local government pilots before next scheduled revision in building code • Requires effort to identify and engage champion LGs • Requires labour and cost investment from local governments to implement • May conflict with provincial desire to homogenize permitting requirements

4. **Local government bylaw, replicated**: Another way in which the efforts of leading local governments can be brought to scale is by having other municipalities and regional districts adopt similar bylaws. In this pathway, bylaws for the labelling of new construction, possibly

[117] See *Energy Labelling for New Homes* for discussion and bylaw language.

tied with labelling at point of renovation bylaws (similar to that adopted by the City of Vancouver) are piloted in one or two communities, and then ultimately replicated in communities across B.C.

Pros	Cons
• No provincial government legislation or regulation needed • Enables interaction with all REBs across the province as bylaws are adopted	• High effort and low likelihood to get critical mass of LGs adopting bylaws • Exacerbates differences between permitting processes of different LGs • Depends on labelling requirements at point of renovation to reach existing building stock • Desired outcomes unlikely to be achieved within reasonable timeframe

Note: Given the significant costs and political efforts needed to replicate bylaw adoption across most B.C. local governments, the added complexity of non-uniform requirements, and the limitation to penetration in the existing building stock, we do not consider likely that this path would yield the critical mass of labelled homes needed for market transformation.

5. **Non-regulatory**: This pathway posits that labelling can be brought to scale without regulations, through a natural evolution of the market spurred by industry leaders and supported by government (or utility) incentives and education programs.

Pros	Cons
• Low political risk • Significant opportunities for industry leadership	• High cost of incentive programs • Low rates of disclosure expected if disclosure remains voluntary • Pool of realtors and builders that can be convinced to change practice through education is limited; a significant portion will only change when required to do so

Note: Given the significant costs of incentive programs and the significant barriers to voluntary disclosure, we do not consider likely that this path would yield the critical mass of labelled homes needed for market transformation. However, this path is critical for preparing the ground and, when combined with the desired outcomes of the regulatory pathways, for reaching market transformation.