

## Input to Public Review of Proposed Green Code Changes

This submission comments on the proposed energy efficiency changes to the BC Building Code. Comments with respect to the water efficiency proposals have been provided independently. The recommendations have been developed and endorsed by the following organizations and municipalities:

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## Overview

The proposed changes are welcome first steps that we are supportive of. However, we do see some missed opportunities in the proposed changes that, if acted upon, would allow homes and buildings to play a larger role in achieving BC's greenhouse gas reduction targets. In each of these cases we provide recommendations that could be integrated into the current code updates to help further innovation in BC's homes and buildings.

We note that some of the comments on the code make reference to a broader market transformation strategy that is beyond the scope of the specific code changes. They are included in this submission because we recognize that the code will not be the only tool used to advance green buildings in BC. As such, we see the code updates as an opportunity to better articulate the linkages between the code and the broader market transformation strategy.

## Comments Relevant to Part 3 and Part 9

### *Schedule of updates*

In order to provide maximum flexibility to the construction industry, it is recommended that the code include a schedule of updates. Given that the province already has a building strategy with clear objectives for 2010, that would be the next logical year in which to update the code. Following 2010, a three-year cycle would be appropriate.

### *Indicate Potential Revisions in Future Code Updates*

In addition to a schedule of updates, we are recommending that the code indicate potential revisions in future code updates. These will provide the construction industry with as much advance notice as possible regarding the changes and/or levels of energy performance that are going to be considered in future code changes. For example, the code could signal that by 2010, minimum requirements for on-site renewable energy will be considered in the same way that the Merton rule sets such standards in the UK. For Part 3 buildings, the code should signal that updates to the ASHRAE standards will be considered. This would help the construction industry plan, as well as provide an incentive for companies to adopt impending energy-efficiency measures before they are required in the code in order to gain a competitive advantage. Once a longer term building strategy is in place (see comments below), it would also be appropriate to incorporate some of those anticipated future performance levels into the code.

### *Performance Labeling*

The owners and renters of homes and buildings need to be given the necessary information if they are to be a driving force in the innovation of green buildings in BC. As such we are recommending that the code require by 2010:

- All new homes and buildings have an energy performance rating
- All existing homes and buildings to have an energy performance rating at the time of sale.

Energy performance labeling is required in the automotive industry and on most equipment, so a similar requirement for homes and buildings is reasonable. The European Union has also required all member nations to develop and mandate building labeling programs for new and existing buildings (see article 7 in Directive 2002/91/EC at <http://www.aereco.com/page/en/data/pdf/epbd.pdf>). Allowing a full two years for the adoption of this requirement provides sufficient time to select and/or develop the most appropriate labeling standard.

Mandatory performance labeling on existing homes and buildings will also enable future code changes that set minimum energy performance standards for existing homes and buildings. This would be similar to policies already in place in Berkeley, California.

#### *Feedback and Evaluation*

An effective feedback and evaluation process allows for regulators to transparently and accurately assess the effectiveness of code changes, and for the construction industry and other interested parties to suggest future changes. We recommend that these feedback loops be embedded into the code process. Useful examples to consider include the UK, where they have instituted a feedback system to enable timely input into the code as it evolves. Also, in the UK, a continuous ongoing assessment process is in place to monitor the results of regulations and the alignment of the outcomes with regional priorities. BC does not currently provide an ongoing on-line feedback process that is easy to use or accessible to the breadth of users.

#### *Timing*

We recognize that the further improvements recommended in these comments will place additional demands on design professionals, builders, and building officials and inspectors. As such, we would be supportive of an additional two months to phase in the proposed changes so that the industry has a total of 6 months to adjust if deemed necessary by industry.

### **Comments Specific to Part 3**

ASHRAE 90.1 (2004) is a good first step, but we note that it will need to be advanced by 2010 in order to achieve the Province's target of having all new Part 3 buildings be 25% more efficient than the Model National Energy Code for Buildings (MNECB).

#### *Addressing Limitations of the ASHRAE Standard*

ASHRAE 90.1 does not enforce energy intensity targets and does not specifically articulate carbon emissions reduction performance. It is equipment focused and does not reward passive solar design strategies, natural ventilation or the elimination of certain equipment such as chillers. We recommend that a 2010 update of the code find ways to address these shortcomings once the construction industry has had time to familiarize themselves with the base requirements. For residential high-rise construction, these updates should also consider minimum thermal performance values for the envelope (this would include the insulation of slab edges – even at balconies and overhangs), individual suite meters, and maximum glazing percentages. This could possibly be accomplished

through advancements in the ASHRAE standard, BC specific additions to the ASHRAE requirements, or adoption of an updated MNECB.

### *Compliance*

In addition to the letter of assurance, we would recommend that compliance be evaluated based on an assessment of energy consumption between 3 and 5 years after construction. This additional requirement would provide valuable information into the feedback and evaluation process so that actual building performance could be compared against pre-construction modelling. Comparative data would be particularly helpful in understanding certain aspects of building performance that are not currently well captured by building models (e.g. thermal bridging and air leakage). Although it would be necessary in all buildings, full energy audits on a sample of buildings would provide even more detailed information to facilitate a comparison between actual and modelled performance.

## **Comments Specific to Part 9**

The current BC target for new single family detached and attached housing is that all new homes achieve an Energuide rating of 80 by 2010. Based on August 2007 studies completed for the Ministry of Energy, Mines, and Petroleum Resources, these requirements would be cost effective in 2008 under most of the geographic, pricing, and fuel scenarios modeled. The incremental capital costs ranged from \$3,257 to \$5,388 with only electric heated single detached homes in the south coastal and southern interior regions having negative life cycle costs in the mid-range price scenario. After energy savings were considered, electrically heated single detached homes in these regions ended up being \$1,692 and \$607 more expensive on an energy-cost life cycle basis, respectively. All other scenarios based on mid-range costs resulted in net savings. However, as the recent Green Value report concluded, the value added to a building from green building goes far beyond energy savings. Houses that meet the Energuide 80 rating will have significantly better indoor air quality and higher comfort levels since these homes are well ventilated, and enjoy near-constant air temperatures. Not least, these benefits these translate into reduced health care costs for asthma and respiratory illnesses, and higher productivity rates for residents.

Because achieving this level of energy performance is either cost effective or a small additional cost on new housing, and because the target was developed in advance of the Province's greenhouse gas reduction target, we recommend adjusting the code requirement to achieve the target by 2008. The following sub-sections provide recommendations that would allow the code to enable this achievement.

### *Attic Insulation*

Insulation in attics is key element in reducing heating and cooling costs. In the summer months, temperatures in attics can rise to well above 50 degrees C, in winter it can drop to -20 degrees C. No other part of a home has a greater degree fluctuation. Therefore it is recommended that the level of thermal resistance (RSI) in attics be increased to 8.8 in both less than 3500 degree days and up to 4500 degree days. We also suggest that homes in the category, more than 4500 degree days, be increased to 9.6.

### *Heat Recovery Ventilators*

We recommend that the code require heat recovery ventilators (HRVs) in all new construction. In addition to the energy benefits achieved by HRVs, they will also lead to improved indoor air quality that wouldn't otherwise be possible in high efficiency homes.

### *Solar Readiness*

We recommend that the code include requirements for solar readiness to ensure that the costs of installing a solar hot water system post construction are as inexpensive as possible. Solar readiness would entail having the pipe and sensor wire (for automatic control of the system) be in place from the roof to the mechanical room at the time of construction. On its own this is unlikely to dramatically increase the use of solar technologies in the province, but it will help prepare the building industry for increased use of on-site renewable energy technologies and reduce the cost of future installations of those systems.

The solar readiness requirement could be accomplished by requiring it for all new construction or by including an optional clause in the code that municipalities could adopt if they chose to. This second approach would be similar to the way the Water Conservation Plumbing regulation was advanced, and could also provide a model in other areas of the code for municipalities to help advance green buildings in BC. California utilizes a similar approach where they allow local governments to adopt and enforce standards that are more stringent than statewide standards ([http://www.energy.ca.gov/title24/2005standards/ordinances\\_exceeding\\_2005\\_building\\_standards.html](http://www.energy.ca.gov/title24/2005standards/ordinances_exceeding_2005_building_standards.html)).

### *Revised Performance Standard*

If the above requirements are integrated into the code, new housing will achieve an Energuide level of 80. As such, we recommend that the performance based compliance path be replaced with Energuide 80.

## **Comments Falling Outside the Scope of the Current Code Changes**

The Green Building Code will be a key tool in advancing green buildings in BC, but we do not expect it to be the only tool. The code needs to be clearly situated within a broader market transformation strategy that continues to see innovative techniques pushing beyond the code so that the stage is set for ongoing improvements in the code. The goal should be to get the industry to continually innovate towards increasingly improved performance. This trend and the policy tools driving it need to apply to both new and existing homes and buildings. The following comments relate to this broader market transformation strategy and how the code changes fit within it.

### *Clearly define the overall medium and long-term targets for green buildings in BC*

We recommend that the BC building strategy be updated to include energy performance and greenhouse gas reduction targets for all homes and buildings. This series of targets should extend to 2020 so that it is clear what role homes and buildings are expected to play in meeting the provincial GHG targets. Examples to consider would be UK's 2016 target for net zero GHG, California's 2020 targets, or the Architecture 2030 approach.

*Clearly define the role of the Code and other policies in achieving those targets*

We recommend that the BC building strategy be updated to clearly communicate the mix of policies that will be used to achieve the targets described above. Some of this will be accomplished with updates to the building code, some will come from consumer education, and some will come from economic signals such as carbon taxes or incentives and disincentives linked to efficiency and/or greenhouse gas intensity.

*Training*

We acknowledge that there is a need to increase skills and capacity in the construction industry if they are going to be able to effectively meet the challenge of greening BC's buildings. The province will have a key role in ensuring that this training is available and affordable for the industry.

*3rd party technical support*

As the code begins to transition to a performance based approach, regulators must be not only trained to adequately engage with technologies and solutions, but also be back-stopped with appropriate 3rd party technical expertise. Examples include the British Research Establishment and INREB Faraday. Currently, Canadian testing agencies are retained by manufacturers and only review specific prescribed components and assemblies.

*Code enforcement*

The code is only as good as it is enforced and it should be enforced equally across jurisdictions. A larger strategy needs to address the quality of enforcement. At the very least, the province should consider maintaining a central database to document all variances and equivalencies so that inspectors and officials can share information and create precedence (see Alberta's STANDATA system).

*Innovation and liability*

Each high-performance building is an opportunity for innovation in both design and in the use of specific technologies. If we are truly going to harness the power of innovation and if we want to become leaders in the field, then a larger green building strategy needs to examine the role of liability in hindering/promoting innovation, specifically: (1) how municipal liability restricts regulatory approval for innovations (joint & several vs. proportional), (2) how green technologies are tested and certified, (3) how green technologies/designs/buildings are insured.