WHISTLER

REPORT | ADMINISTRATIVE REPORT TO COUNCIL

PRESENTED:	July 10, 2018	**REPORT:**	18-093
FROM:	Corporate, Economic & Environmental Services	**FILE:**	A073
SUBJECT:	BUILDING AND PLUMBING REGULATION AMENDMENT BYLAW (ENERGY STEP CODE) NO. 2197, 2018		

COMMENT/RECOMMENDATION FROM THE CHIEF ADMINISTRATIVE OFFICER

That the recommendation of the Director of Corporate, Economic & Environmental Services be endorsed.

RECOMMENDATION

That Council consider giving first, second, and third readings to, "Building and Plumbing Regulation Amendment Bylaw (Energy Step Code) No. 2197, 2018", and

That Council direct staff to continue to provide Power Down Home Energy Assessment incentives to help support the transition to the new Energy Step Code performance regulations, and

That Council direct staff to advise the Province of BC's Energy Efficiency Policy, Electricity and Alternative Energy Division that the RMOW will provide $2,000 top-up incentive funding for eligible heat pump conversions, to a maximum of $50,000 over two years, in support of the upcoming Home Renovation Rebate - Retrofit Partnership program.

REFERENCES

Appendix "A" – Summary of Energy Step Code Performance Requirements for Part 9 Buildings in Climate Zone 6.

Appendix "B" – Letter of Support/Comment from the Sea to Sky Chapter of the Canadian Home Builders Association (S_2S CHBA)

PURPOSE OF REPORT

The purpose of this Report is to seek Council direction regarding two important initiatives designed to improve the energy efficiency of the residential building stock in Whistler. The first initiative is to seek first, second and third readings for, "Building and Plumbing Regulation Amendment Bylaw (Energy Step Code) No. 2197, 2018"; and the second initiative is to seek Council direction to provide 'top-up' funding for the Province's upcoming Home Renovation Rebate program within Whistler.

DISCUSSION

Buildings in Whistler consume approximately two thirds of the total energy, produce approximately one third of the total greenhouse gas emissions (GHGs), and expend more than $45 million annually on energy utility costs. The Whistler Official Community Plan (OCP) includes a goal of reducing community-wide GHGs to 33% lower than 2007 levels by 2020, and while the estimated 2016 community-wide GHG footprint was 9% lower than 2007 levels, current trends indicate that the community will not meet the OCP target for emission reductions by 2020.

Due partially to Whistler's reliance on stable snow patterns, this community has historically prided itself as a leader in GHG and energy management. There have been many examples of this leadership, from developing the first Integrated Energy, Air Quality and GHG Emissions Management Plan in Canada and its early adoption of the FCM Partners for Climate Protection Program as well as the UBCM Climate Action Charter, to early support for passivhaus construction, solar hot water, and district energy systems, and on to the fact that its local government operations have operated 'carbon neutral' every year since 2010.

However, despite this historic leadership and the associated accomplishments, Whistler's total community GHG and energy consumption footprints have both increased each of the last three years.

The development of the 2016 Community Energy and Climate Action Plan identified key areas for improvements within the community, and extensive work has been undertaken to reduce emissions and energy consumption from leading sources of emissions – i.e. from passenger vehicle emissions in particular. Work has also continued to support homeowner improvements through home energy assessment rebates and the use of green building covenants registered on title whenever possible.

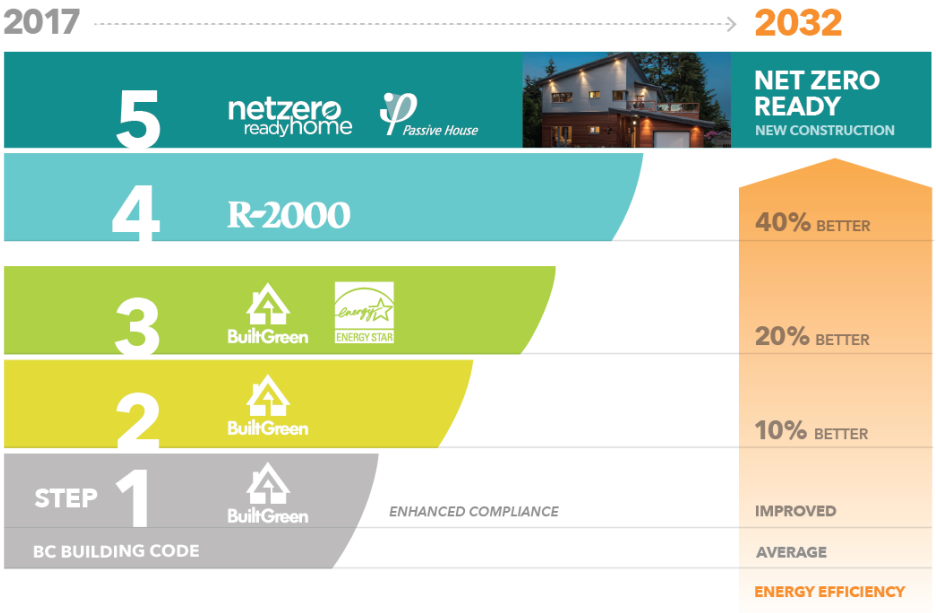
Recently however, important new opportunities to increase the energy efficiency of residential buildings have become available to local governments. Two of these opportunities are the subject of this report.

Improving New Buildings – the Energy Step Code

What is the Energy Step Code?

The BC Energy Step Code (ESC) is an optional compliance path in the BC Building Code that local governments may use, if desired, to incentivize or require a level of energy efficiency in new construction that exceeds the requirements of the base BC Building Code. It consists of a series of steps, representing increasing levels of energy-efficiency performance.

FIGURE 1. Conceptual Overview of the BC Energy Step Code showing existing program equivalencies



The ESC was developed in alignment with recent changes to the Building Act, and was undertaken with the collaborative input of builders, developers, governments, utilities, professional associations, and other stakeholders. The intent of the ESC is to:

1. reduce and/or eliminate the existing patchwork of compliance requirements used across the regulatory and incentive frameworks (e.g. CanPHi, Energy Star, ASHRAE, Built Green, LEED, R-2000 etc…),
2. to provide a standardized method for collectively achieving energy efficiency goals, and
3. to define a feasible path toward the goal of all new buildings being net-zero ready by the year 2032.

Over the past decade, significant advances in building science have yielded new approaches that allow for more energy efficient and low emission buildings that remain cost-effective to build. The BC Energy Step Code is designed to bring these new practices into the broader market, reducing energy demand across the board.

Municipal staff and the local building sector have been working with the Provincial government and the Energy Step Code Council for two to three years on the development of the ESC framework, and are supportive of the current opportunities and structure that it provides. As part of the changes brought about by the adoption of the Building Act, any references local governments had to alternative energy efficiency certifications and/or frameworks in policies or bylaws (but not s219 covenants) had to be updated to reference the new ESC levels or would be declared unenforceable as of December 15, 2017. It is worth noting that the RMOW did not have to make changes in this respect as all related energy performance references were included in s219 covenants rather than within bylaws.

However, the ESC regulation is now referenced in the BC Building Code and in relation to the conservation of energy and the reduction of greenhouse gas emissions, the a local government may reference and implement, in whole or in part, the BC ESC.

The BC Energy Step Code is performance based. It establishes measurable performance-based energy-efficiency requirements for new construction. To demonstrate compliance, a builder must prove to building officials that his or her building meets or exceeds a set of defined metrics. The standard uses the same metrics for each step, with progressively more demanding targets all the way up to the highest step, which represents a net zero ready level of performance.

To meet the requirements of a given step of the BC Energy Step Code, a builder needs to prove to building officials that the building meets or exceeds a set of defined metrics. The measurement and verification requirements include:

- **Energy modelling**: Prior to construction, builders must commission an energy model for their proposed building. This is already common practice for high-efficiency buildings in BC, and is already an optional compliance path for meeting the energy efficiency requirements in the existing BC Building Code.

- **Airtightness testing**: A certified energy advisor must complete a blower door test for all steps and all building types after construction and before occupancy.

This approach eliminates the prescriptive energy-related requirements of the BC Building Code. Instead of prescribing what builders and developers need to do to, the ESC sets the level of performance they need to reach, and leaves it up to the design/build team as to how to do it. This allows for more innovation, enabling the market to develop the most cost-effective methods and materials to meet the

end target, while providing certainty to building owners and governments that new buildings are designed and built to meet their objectives.

The ESC approach focuses first on performance requirements for building envelope (known as an 'envelope-first' approach). It also sets requirements for equipment and systems, such as ventilation equipment, heating and cooling, and boilers. Finally, the third pillar is modelling at the front end of the process, and measuring once construction is complete, using a blower door test, to confirm air tightness. More specific information about the ESC approach is available at www.energystepcode.ca, and a summary of the specific performance metrics associated with each step are provided for reference in Appendix A of this report.

Integration in Other Communities

In terms of relevant implementation references, all north shore communities have already adopted regulatory references to the ESC in their respective Building and/or Construction Bylaws with all three communities aligned to require Step 3 performance for new Part 9 residential buildings beginning on July 1st of this year. Moreover, the City of Vancouver has required Step 3 performance since 2017; Squamish is working toward Step 2 in 2018 and Step 3 for July 1st 2019; the City of Richmond is transitioning to Step 3 for smaller Part 9 buildings and requiring Step 3 for larger Part 9 residential buildings in 2018; New Westminster is moving to Step 3 in 2019; and Kelowna is moving to Step 3 in 2020. In total, 28 BC communities are either currently consulting with their respective communities on ESC integration, or are already referencing the ESC in local building regulations. Cumulatively, these 28 communities represent more than 70% of all annual housing starts in the province.

Integration Approach in Whistler

In response to the ESC opportunity and the movement of regional communities toward ESC integration, RMOW staff continued to work with Provincial counterparts toward an integration plan for Whistler. A local ESC Stakeholder Working Group was convened representing builders (both members and non-members of the S_2S CHBA), real estate and developer representatives, trades, architects, municipal building and planning staff as well as a community-at-large member from the CECAP Community Advisory Group. This Stakeholder Working Group discussed and evaluated the ESC opportunity, considered barriers and challenges that might be associated with the integration or the ESC, and developed a conceptual integration approach for further consideration.

The Stakeholder Working Group's conceptual approach was to recommend that Whistler move straight to ESC Step 3 for Part 9 residential buildings, but to delay the 'effective' date until Jan 1, 2019 to allow sufficient time for in-progress design projects to be completed, and new projects to be aware of the pending changes. It was felt that the complexity of many local residential building projects warranted this delay due to the longer duration of the design phase relative to buildings in many other communities. It was felt that a move straight to Step 3 would be quite achievable (and often already being achieved) given the current standard of construction within the community. Further it was also felt that a move straight to Step 3, followed by 3-5 years of a stable regulatory environment would be preferable to more frequent changes (i.e. a move to Step 1 then one to two years later to Step 2, followed 1-2 years later by Step 3), thereby allowing builders time to optimize new techniques and preferred equipment/insulation combinations within a single set of rules.

It was also noted by the Stakeholder Working Group that the transition process to Step 3 would need to be supported locally through access to training programs, site visits and opportunities to both learn about the specific requirements of the ESC, but to also have hands-on opportunities to learn more about energy modelling on actual build site(s) with certified energy assessment professionals

demonstrating relevant tools and methods that are used within the energy modelling and verification processes - a requirement of all levels of the ESC.

Ongoing discussions with the Stakeholder Working Group and municipal staff developed two additional policy options for the integration of the ESC that have been considered and implemented in other communities.

1. The first policy option is to require slightly higher energy performance (Step 4) for any new Part 9 residential buildings located on lands wherein an owner-initiated application to amend the Zoning Bylaw to increase the permitted density of residential development, or permit additional uses has been approved by Council.

   In general this means that any properties that have benefited from a rezoning should have to build slightly more energy efficient buildings than the base requirement (note that this would only apply to rezoning that occur after Jan 1, 2019).

   As reference, the first policy option (i.e. rezonings requiring +1 Step performance) has been adopted, or is being considered for adoption by most of the communities in the process of integrating the ESC into their local regulations (19 communities in total). In fact, it is estimated that the communities that are integrating the rezoning (+1 Step policy) will represent more than one third of all housing starts in BC on an annual basis by 2020.

2. The second policy option was to require any new Part 9 homes that include the construction of "in-ground basement floor area" that is excluded from gross floor area calculations under Part 5 of the Zoning Bylaw to be designed and constructed to meet the performance requirements specified in Step 4 of the Energy Step Code (rather than the base Step 3).

   In general this means that any new residential buildings that include the construction of additional in-ground (excluded) basement floor area would have to build a slightly more energy efficient building (Step 4).

   With respect to the second policy option, previous reports to Council regarding the uptake of the 'excluded space provisions' for new homes have indicated that there has been consequent increases in total building energy consumption associated with the use of these Part 5 provisions of the Zoning Bylaw (excluded basement space). For this reason, staff feel that there is suitable rationale for requiring these new larger homes (i.e. homes with greater total floor area than the base GFA permitted by the Zoning bylaw) to achieve higher levels of whole-building energy performance. Requiring Step 4 performance levels would reduce whole building energy performance by an additional 10% versus Step 3, thereby moderating or eliminating the potential additional energy consumption associated with the incremental 'excluded basement area' of these new homes.

Both of these policy options were shared and discussed at the Public Information Session, and were included within the ESC Public Opinion Survey.

Municipal staff in collaboration with the local building industry (CHBA representatives, and Bob Deeks co-vice chair of the Energy Step Code Council, a member of Codes Canada's Standing Committee for Energy Efficiency, and chair of the Canadian Home Builders Association's Net Zero Energy Ready Housing Council) developed public information session materials, the public opinion survey, and hosted a public information session on April 26 to share the information and solicit input on the proposed ESC integration approach. Approximately 40 people attended the public information session and 85 individuals responded to the associated public opinion survey. Survey respondents included local

builders, developer, designers and architects, local homeowners and renters, as well as a small number of interested 'corridor homeowners'.

Results of the survey are summarized for reference below:

Question 1

Please indicate your level of agreement with the following statements:	strongly disagree	disagree	neutral or no opinion	agree	strongly agree
Whistler should implement policies and initiatives that lead toward more energy efficient buildings.	1%	6%	2%	24%	66%
I generally support the integration of the BC Energy Step Code into Whistler building code regulations.	5%	8%	5%	28%	54%
I believe that more energy efficient buildings will cost less to operate (i.e. save money on utility bills).	0%	7%	4%	25%	64%
I am worried that requiring the construction of more energy efficient buildings will make new homes more expensive.	13%	23%	14%	27%	23%
I am comforted that the Energy Step Code was collaboratively created by the building, development and public sector together.	5%	6%	27%	36%	27%
Generally, I think that very large homes should be required to be even more energy efficient than smaller ones.	2%	6%	14%	16%	61%
I am confident that the local building industry will have the capacity to meet the new energy step code requirements.	5%	10%	17%	37%	31%
I think it's important that the RMOW continue to provide energy modeling rebates/incentives to help support the transition to the new energy performance regulations.	5%	6%	6%	25%	58%

Question 2

In your opinion, what is the primary reason that Whistler should consider integrating the Energy Step Code into our local regulations.	
Climate Change - reduce our contribution to climate change	60%
Affordability - reduce energy utility bills for homeowners	8%
Energy production impacts - reduce the potential negative impacts of new energy generation facilities	14%
None – we should not integrate the Energy Step Code	10%
Other (please specify)	7%

Question 3

After reviewing the available information, and understanding that West Vancouver, City of North Vancouver, and the District of North Vancouver will require Step 3 energy performance for residential construction (Part 9 of the BC Building Code) on July 1, 2018, please indicate you level of agreement with the following statements.	**strongly disagree**	**disagree**	**neutral or no opinion**	**agree**	**strongly agree**
I think that Whistler should move to the same Step as the North Shore communities (Step 3).	5%	12%	9%	27%	47%
I am supportive of Whistler moving to Step 3 as soon as is practical.	8%	5%	7%	33%	47%
I think that Whistler should move more slowly than these communities, and consider only moving to Step 1 or 2 in the next year or two.	43%	30%	7%	12%	7%
I would rather Whistler **not** integrate any parts of the Energy Step Code locally.	72%	12%	5%	5%	6%

Question 4

For this question, 'rezoning' in the following proposed policy refers to properties where Council has approved an owner-initiated application to change their zoning to increase density, or expand permitted uses.After reviewing the available information, and considering the proposed policy that would require all homes built on properties that have been rezoned after Jan 1, 2019 to achieve higher energy performance levels (i.e. Step 4), please indicate which statement most closely matches your opinion:	
I am generally in favour of further consideration of this policy approach (i.e Step 4 for rezoned properties)	67%
I am not in favour of further consideration of this policy approach (i.e Step 4 for rezoned properties)	17%
I do not have strong feelings on this proposed policy	16%

Question 5

For this question, 'in-ground basement floor area' refers to basement floor area in a new residential construction project that would be 'excluded' from gross floor area calculations under Part 5 of the Whistler Zoning and Parking Bylaw (commonly known as 'GFA Excluded Space').After reviewing the available information, and considering the proposed policy that would require all homes with additional 'in-ground basement floor area' to achieve higher energy performance levels (i.e. Step 4), please indicate which statement most closely matches your opinion:	
I am generally in favour of further consideration of this policy approach (i.e. Step 4 requirement for properties that build additional 'in-ground basement floor area')	65%
I am not in favour of further consideration of this policy approach (i.e. Step 4 requirement for properties that build additional 'in-ground basement floor area')	17%
I do not have strong feelings on this proposed policy	18%

Results of the opinion survey and the discussions at the Public Information Session are well-aligned with the input of the Stakeholder Working Group, and are also largely aligned with the proposed amendments to the Building Bylaw included within this report.

In addition, the majority of open-ended comments received within the survey were also generally supportive of the proposed direction, but responses did include some opposing comments related to the potential length of payback period associated with building more energy efficient buildings; the

potential negative impact on the cost of new buildings, some general opposition to the large size of new residential buildings in Whistler, opposition to government regulation generally, as well as the need to apply the Step Code to Part 3 buildings (generally, commercial or more complex buildings) in addition to Part 9 residential buildings.

It is also important to note, if the integration of the Energy Step Code is supported locally, the Stakeholder Working Group also suggested an approach for co-delivering training opportunities over the summer and fall in preparation for the integration of the new requirements.

Construction Cost Analysis

The cost implications of the proposed integration of the ESC have been well researched, compiled and made available to local government and building industry representatives through one of the largest cost impact assessment[1] ever undertaken for a code change in Canadian history. The report was prepared for BC Housing and Energy Step Code Council in partnership with BC Hydro, the Province of BC's Building and Safety Standards Branch, the City of Vancouver, and included additional support from Natural Resources Canada. For Part 9 buildings, the report evaluated 6 different building archetype, modelled over five climate zones, with many thousands of combinations of potential ECMs (energy conservation measures) to determine the least cost alternatives to meet each Step of the ESC in each climate zone.

The Metrics Research report generally found that for Part 9 buildings, there are only modest incremental capital costs overall, "builders can achieve the majority of the steps for less than a 2% capital cost premium above the cost of convention construction – this is particularly true for multi-unit residential buildings, row houses and larger single family archetypes. – each of which can reach Step 4 for less than a 2% cost premium in Climate Zones 4 through 6." Whistler is in Climate Zone 6.

Two relevant examples (Climate Zone 6) from the report are included for illustrative purposes:

Row Houses (i.e. Townhomes)

Building a six-unit row house project to the lower steps of the Step Code in Surrey will increase the construction cost of each unit by between a few hundred and a few thousand dollars for lower steps, and $5,500 to $9,400 for higher steps. For most steps, cost premiums are actually lower in Prince George and Kamloops, as buildings are able to meet the Step Code with lower-cost building envelopes than those prescribed by the BC Building Code. For example, in Prince George, Steps 2 and 3 can be built for a lower construction cost than to the BC Building Code.

[1] BC Energy Step Code Metrics Research Report - a comprehensive exploration of the energy, emissions and economic impacts of the BC Energy Step Code Summary report (PDF, 2MB)

Location: Prince George
Unit Size: 1,720ft²
Climate Zone: 6
Sample Sales Price per Unit: $320,000 - $360,000

Step 1: A construction cost premium of $500 above the cost of building to the prescriptive requirements of the *BC Building Code*.
Step 2: Increasing performance to Step 2 may result in a construction **cost savings** of about $365 per unit due to the building being able to meet the Step Code requirements with equipment and building materials lower cost than the BCBC prescriptions.
Step 3: As with the next-lower-step, building to this level may **save** builders about $365 per unit compared with the costs of a conventionally constructed home.
Step 4 & 5: Building to the very high-performance levels of the Upper Steps may require new building practices and materials. Our modelling revealed a construction cost premium of between $4,400 (Step 4) and $16,650 (Step 5) per unit.

Medium-Size Single Family Dwelling

Building a single-family home project in Surrey to the lower levels of the Step Code will increase the construction cost by between $1,000 and $3,950. Construction costs of the same-size building in Prince George and Kamloops will be significantly lower; in Prince George, using Step 2 will actually save builders money over not doing so. This is because the buildings can meet the Step Code with building envelopes that cost less than BCBC-prescribed envelopes.


Source: realspace

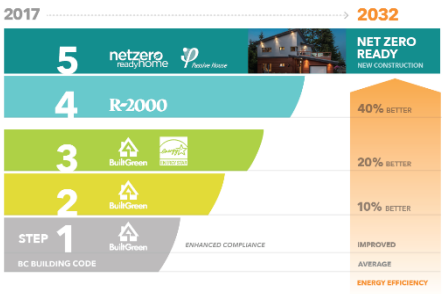
Location: Prince George
Unit Size: 2,551ft²
Climate Zone: 6
Sample Sales Price: $400,000 - $500,000
Step 1: A construction cost premium of $1,325 above the cost of building to the prescriptive requirements of the *BC Building Code*.
Step 2: A 0.4 percent construction **cost savings**, about $1,980.
Step 3: This level of energy efficiency performance may result in a cost saving of about $1,610.
Steps 4 & 5: Building to the very high-performance levels of the Upper Steps may require non-conventional building practices, so our modelling revealed a construction cost premium of between $7,210 (Step 4) and $50,840 (Step 5).

After more than a year of evaluation, wherein the contributing author's developed and peer reviewed, "literally millions of calculations and developed hundreds of scenarios", the report goes on to recommend that local governments, "begin at Step 3 of the Step Code", and that, "…as industry gains experience with energy efficient construction practices – and energy efficient products become more readily available, cost premiums will further decrease."

The report also concludes, "the projected impacts on cost are lower than typical variations in construction rates from year to year over the past ten years, and are unlikely to impact housing affordability based on the data available." Locally, conversations with the building community have generally aligned with the findings of the Metrics Report, and some builders suggesting that the actual premium for Step 3 or 4 in Whistler are likely to be even lower than projected due to the generally higher level of finishing and construction costs common across the local market.

Finally, it is important to note that while energy-retrofit funding programs for existing buildings will be important to meeting our climate targets (as per section below), but the most cost-effective time to invest in a building's energy efficiency is during the building's initial construction.

Anticipated Future Regulatory Timeline



As per Figure 1 (shown to the right for reference), the intention of the ESC is to provide a roadmap for ensuring that all new construction is built to Net Zero Energy Standard by the year 2032 (consistent with the Province of BC's Climate Leadership Plan). While this report and the associated Building Amendment Bylaw are proposing that Whistler adopts ESC Step 3 for Part 9 residential buildings beginning in 2019, it is important to note that the intent of staff, the Stakeholder Working Group, and the CHBA is that Whistler would adopt progressively higher steps over the next 10 to 13 years to align our regulatory framework with the 2032 target.

The specific details of this transition have not yet been determined, but for Part 9 residential buildings, it is anticipated that the base performance requirement would increase to Step 4 sometime between 2023 and 2026; and would further increase to Step 5 between 2028 and 2032. The specific timing of these future changes will be subject to continued engagement with the building community, discussions with other regional communities, as well as monitoring the outcomes of the transition to Step 3 over the next few years.

It is further anticipated that integration of the ESC to Part 3 (complex, commercial, institutional and industrial buildings) will be reviewed and considered once this integration is available for communities in Climate Zone 6 (likely in 2019 or 2020).

Improving Existing Buildings - Home Renovation Rebate, Retrofit Partnership program

In September of this year, the Province of BC will be launching a new Home Renovation Rebate – Retrofit Partnership (HRR-RP) program with funding provided by the federal Low-Carbon Economy Leadership Fund. The identified objectives of this Provincial program are:

1. to accelerate the reduction of GHGs from the existing building sector,
2. to reduce energy bills and improve affordability,
3. to support future energy codes and standards by increasing market share of energy efficient building technologies and retrofit approaches,
4. to improve the quality of installations and ensure efficiency potential is reached, and consumer expectations are met, and
5. foster improved standards and skills in related trades.

At present, the new HRR-RP program funding is assured for two years. Provincial staff have indicated that the intention is to migrate the program into a larger, longer running program, however with a long term funding mechanism yet to be determined.

The HRR-RP program will be fully integrated with the existing Home Renovation Rebate (HRR) program to maximize incentive dollars and minimize participant confusion, and will continue to be administered by the utility sector (primarily BC Hydro and FortisBC, as well support from BC Housing). The new program will be integrated with the existing BC Energy Coach online interface for further end-user consistency. The new provincial rebates included within the HRR-RP are specifically designed to maximize the GHG reduction potential of the retrofits (thereby aligning with the Federal Low Carbon Economy Leadership program goals), and to fill identified gaps in the existing HRR program offerings.

Stakeholder consultation with local governments, utilities and building system professionals have been undertaken over the last 6-8 months to identify the best retrofit opportunities for achieving the identified

program objectives. In order to maximize program deliverables, the Provincial government has offered local governments the opportunity to 'top-up' planned HRR-RP rebate levels in order to increase retrofit uptake levels, and maximize GHG reductions within our respective communities.

The 'top-up' option is entirely voluntary by the local governments, but it does provide a very efficient and integrated delivery mechanism for deploying rebates and incentives into the Whistler residential sector without having to take on the administrative burden of managing and processing the incentives locally. In this HRR-RP model, the Province is responsible for the planning, management, branding and promotion for the program, and the utilities are contracted out to take care of all day-to-day administration of the incentive applications and related program oversight. The local government simply provides the 'top-up' funding for any successful applications that occur within their local jurisdictions as well as any additional local marketing that they wish to contribute. After engagement with local governments, the Province is currently offering the following incentive 'top-up' options for local government consideration:

A Energy Assessments: $150
B(1) Fuel Switching Incentive: $350 (oil/propane/ng to electric heat pump)
B(2) Fuel Switching Incentive: $2,000 (oil/propane/ng to electric heat pump)

Staff have reviewed these opportunities and are recommending the B(2) option for the following reasons:

- **Option A** is redundant in structure (and lower in value in comparison) to the existing RMOW Power Down incentive structure. The RMOW already provides Energy Assessment funding to eligible homeowners (generally at $250 per assessment), so topping up in this manner would not improve local incentive levels.
- **Option B(1) and B(2)** have the potential to accelerate a shift to significantly more energy efficient HVAC systems in Whistler's residential sector. The shift from a natural gas or propane-based furnace (system efficiencies generally between 65% - 95%) to an electrical heat pump system (efficiencies generally between 200% - 300%) would typically yield the single most substantive GHG reduction potential of any available retrofit strategy for these homes (approximately an annual reduction of 4,000 – 10,000 kgCO2e per retrofit).
    - The base fuel switching incentive that will be provided by the Province for the shift to an electric heat pump will be $2,000 provided the retrofit meets the criteria listed in the table below.
    - A typical upgrade to a heat pump system for an existing home will range from $10,000 to 12,000 to potentially as much as $17,000 for larger, or more complicated installations.
    - The Provincial incentive alone would represent a rebate of value of 12%-17% of the capital cost (incl. labour), and depending on the size and thermal integrity of the building would likely represent a *negative* internal rate of return (IRR) and a simple pay back (SPB) of 25 years or longer.
    - The **B(1)** option would represent a capital cost rebate of 14%-20% and an estimated IRR of close to zero, with a SPB of 20-25 years.
    - The **B(2)** option would represent a capital cost rebate of 24% - 33% and an estimated IRR of 2% and a SPB of a little less than 20 years.
    - Note that heat pump conversions will also provide air conditioning service post retrofit. The value of this air conditioning service has not been factored into the aforementioned financial analysis, but for some homeowners would be a likely be a contributing rationale for choosing to undertake the retrofit.

- Finally, note as well that all aforementioned numbers are premised on regular natural gas rates. If renewable natural gas was used as the baseline (i.e. zero-carbon natural gas purchased through FortisBC) instead of fossil fuel based natural gas, the financial metrics change considerably – IRRs range from 9% - 20%, and SPBs for the option noted above would range from 5-7 years. While this approach would be a fair comparison from an equalized carbon footprint perspective, this is not the likely to be the actual price comparison experience of local homeowners. From a purely financial perspective, it is therefore not reasonable to assume that many gas to heat pump retrofits would occur in the absence of meaningful rebate values.

Table 1 Provincial Criteria for Fuel Switch to Heat Pump Eligibility

Measure	Incentive Level	Criteria
Fuel Switch: Air-source heat pump for space heating	$2,000	• Must be switching from fossil fuel (e.g. NG, oil, propane) • Heat pump must be providing the primary heating for the home • Air-to-air: Seasonal Energy Efficiency Ratio (SEER) of 15 or higher and Heating Seasonal Performance Factor (HSPF) of 8.5 8.5 BTU/watt-hr or higher for Region IV as tested by CSA standard C656-14 (equivalent to HSPF 7.4 for Region V) • Air-to-water or combined space & water heating: contact MEM program staff to determine product eligibility BEFORE installation

Research on rebates and incentives suggest that uptake levels are very sensitive to capital cost retrofit upgrades in this price range, and that capital cost rebate levels >20% and SPBs of ten years or less are generally necessary to engender significant program uptake. The current assessments indicate that from a purely financial lens, the economic return on this type of retrofit is modest, and without substantive incentives, there will be limited conversion between gas systems and electric heat pump. It is however also true that shifting from fossil fuel space heating systems to an electric heat pump based systems is a critical component of a required shift to a lower carbon building sector (4-10 tCO2e reductions/yr, per retrofit).

For the reasons noted above, staff recommend funding the $B_{(2)}$ top-up option for a period of two years (2019 and 2020), up to a maximum total incentive funding level of $50,000 (i.e. up to 25 successful retrofits). Recent experience and ongoing financial analysis suggests that it will be challenging to fully deploy the entire maximum value even at the 'topped-up' level, however this limit will allow staff the opportunity to evaluate program uptake and overall project success prior to committing further potential funds, restructuring the program, or potentially discontinuing it in the future.

As a point of reference, ongoing discussions with the provincial staff indicate that three communities (including Vancouver) are already committed to providing HRR-RP top-up funds within their jurisdictions, and that another five communities are currently in the process of confirming Council support for their jurisdictional involvement as well.

Staff further suggest that the source of the municipal top-up funding to support these retrofits be allocated from the existing balance of Climate Action Revenue Incentive Program (CARIP) funds. The CARIP funds currently held in 'deferred contributions' total approximately $175,000 and are a product of the municipality's carbon tax rebates associated with municipal operations over the last 3-5 years. As a matter of policy, municipal CARIP funds are kept out of the general revenue stream (in deferred contributions) and are intended to be used to accelerate GHG reduction and energy efficiency improvements across RMOW corporate operations, and to accelerate and build capacity for energy efficiency and GHG management capacity within the community. Staff feel that this opportunity is well aligned with the purpose of these rebate revenues.

WHISTLER 2020 ANALYSIS

W2020 Strategy	TOWARD Descriptions of success that resolution moves us toward	Comments
Built Environment	Building design, construction and operation is characterized by efficiency, durability and flexibility for changing and long-term uses.	The integration of the ESC will accelerate the community's shift to more energy efficient new residential buildings. The support for air source heat pump retrofits will meaningfully reduce the GHG footprint of participating homes.
	The new and renovated built environment has transitioned towards sustainable management of energy and materials	
	Streamlined policies, regulations and programs have helped to efficiently and effectively achieve green development	
	Whistler's green building sector contributes to the local economy	The integration of the ESC in Whistler will support the development and viability of the green building sector in our community by entrenching energy assessment and modelling services, energy efficient design expertise, as well as the sale and servicing of more energy efficient products and systems. Support for air source heat pump retrofits will also help support the growth of energy efficient HVAC systems and equipment within the corridor.
Energy	Energy is generated, distributed, and used efficiently, through market transformation, design, and appropriate end uses	The integration of the ESC will accelerate our community's shift to more energy efficient new residential buildings. The support for air source heat pump retrofits will meaningfully reduce the GHG footprint of participating homes.
	Residents, businesses and visitors understand energy issues	Both the ESC regulations and the new Home Renovation Rebate program will raise energy literacy for homeowners and associated businesses about the importance of energy efficiency.
	Whistler's actions will positively influence other communities' and stakeholders' movement toward sustainability	Integrating the ESC locally will help accelerate future shifts toward increased energy efficiency within the BC Building Code, and may help build momentum for other local governments to adopt the ESC within their respective jurisdictions.
Resident Housing	Housing is healthy and livable, and housing design, construction and operations are evolving toward sustainable and efficient energy and materials management	The integration of the ESC will accelerate our community's shift to more energy efficient new residential buildings. The support for air source heat pump retrofits will meaningfully reduce the GHG footprint of participating homes.

The recommended resolution has the potential to move our community away from the following Whistler2020 Descriptions of Success.

W2020 Strategy	AWAY Descriptions of success that the resolution could move us away from	Comments
Resident Affordability	Residents have access to affordable goods and services that meet their needs	Engagement with the local development community suggests that the majority of newly built residential buildings are already achieving Step 2-3 (some even higher). For new buildings the incremental cost of meeting Step 3 will be close to nil. Substantive research undertaken by independent consultants, and supported by the ESC Council have calculated that the cost premium for Step 3 construction of Part 9 bldgs is 0-1.5% (vs. the base BCBC), and is generally less than annual fluctuations in the price of trades/materials.

OTHER POLICY CONSIDERATIONS

The resolutions contained in this report are also consistent with the Official Community Plan, OCP Amendment Bylaw 1983, 2011 as well as recent related updates to same; the UBCM Climate Action Charter (to which the RMOW is a signatory); the RMOW Community Energy and Climate Action Plan (CECAP); the RMOW's commitments within the FCM Partners for Climate Protection program, the RMOW Corporate Plan as well as with Council's 2018 Strategic Priorities (in particular, to facilitate improved community environmental performance).

BUDGET CONSIDERATIONS

Building Bylaw Amendment:

The amendments of the Building Bylaw do not create any incremental costs beyond those associated with the community and stakeholder engagement mentioned within this report, legal review, and the training programs planned during the five to six month transition period. All of these aforementioned costs are included within existing 2018 project budgets. No additional budget is required or requested.

Power Down Home Energy Assessments:

This existing Power Down incentive program has been in effect since August of 2014, and all ongoing incentives noted within this report are included within the current Five Year Financial Plan. No additional budget is required or requested to support this program.

BC Home Renovation Rebate - Retrofit Partnership program, 'Top-Up Incentives':

As noted in the discussion section of this report, the recommended 'top-up' incentives would total a maximum of $50,000 over a two year period (2019 & 2020), and would be drawn from existing Climate Action Rebate Incentive Program (CARIP) rebate funds currently held in deferred contributions. These CARIP funds are intended to be used to support GHG reduction and increased energy and GHG management capacity, and staff feel that this program is a suitable use for these funds. CARIP rebates are equivalent to the annual carbon tax burden of municipal operations and total approximately $35,000 to $45,000 per year.

COMMUNITY ENGAGEMENT AND CONSULTATION

As noted in the discussion section of this report, the development of the Energy Step Code approach was developed in ongoing dialogue with representatives from the Provincial government; provincial utilities; discussions with building, development, energy management and planning department staff from neighbouring and regional local government staff; as well as a local Stakeholder Working Group. A Public Information Session was hosted on April 26 at Myrtle Philip Community School. This session was advertised in local papers, on the municipal website as well as through Whistler Today, the RMOW Facebook page, and physically at both the Building Department and Planning Department front desks; the event was also shared and promoted through Stakeholder Working Group networks. Approximately 40-45 people attended the Public Information Session.

The S2S CHBA has been actively involved in the development and consideration of both the proposed integration of the BC ESC, as well as the process to ensure an informed, and successful transition to the new regulatory approach. A letter of support (including some partial opposition) from the S2S CHBA is attached as Appendix B.

As per the Appendix B, the CHBA is highly supportive of the move to ESC Step 3 for Part 9 residential buildings. Representatives from the CHBA have been actively involved in the Stakeholder Working Group, the Open House and ongoing work on the development of the Building and Plumbing Amendment Bylaw. The CHBA is also supportive of the Step 4 requirement for Council approved, owner-initiated rezoning as noted as 13.1.2 in the Amendment Bylaw.

It is noted that the CHBA does not support Step 4 requirements being applied to buildings that intend to include the construction of “in-ground basement floor area” that is excluded from gross floor areas calculations consistent with Part 5 of the Zoning Bylaw (Clause 13.1.3); nor did they support clause 13.2 related to general ESC reporting requirements.

Staff reviewed (the previous) clause 13.2 and noted that this particular bylaw language was used in only one of the precedent community bylaws, and that the removal of the clause did not materially impact the management of future energy reporting requirements. It is the intent of staff to leverage the new provincial templates for ESC energy reporting (shared with CHBA), and submission requirements for all aspects of the permitting process are adequately dealt with within the existing Building and Plumbing Bylaw. As such, staff were agreeable to the removal of clause 13.1.2 as suggested.

The CHBA letter contends that any additional requirements of any type that would be placed on owners that intend or desire the opportunity to build additional “in ground basement” floor area will lead to the re-emergence of the illegally constructed space, thereby potentially compromising occupant life safety. Notwithstanding the CHBA position on this matter, the discussions at the Public Information Session, the results of the Survey, and the opinion of staff all support the continued inclusion of clause 13.1.3.

Staff believe that the risk that owners will knowingly build new illegal space to avoid the requirement of constructing a 10% more energy efficient building is very low. Staff rationale for this position are as follows:

1. The current regulatory environment for new buildings is fundamentally different, covenants are no longer used as a tool to regulate void spaces within construction
2. New basements are large excavations easily identified by inspectors,
3. The price premium of a 10% increase in energy efficiency is small relative to the investments that are being made in new “in ground basement spaces”. Increasing energy efficiency from Step 3 to Step 4 requires a 10% improvement in overall building energy efficiency. The construction cost increase between Step 3 and 4 will vary based on the type of construction,

methods used, and other variables, however the incremental cost is forecasted to be between 0.5% to 1.5% (vs. Step 3) for Climate Zone 6. As such, a 3,500 ft^2 house constructed at prime cost of \$350/ft^2 would incur a potential increased cost of construction related to the energy performance requirements of between \$1.80 to \$5.30/ft^2, or an incremental cost of \$6,000 to \$18,000 for the entire home. Over the last three years, the reported prime cost value of the in-ground basement space for new Part 9 residential construction has averaged \$660,000 and an average size of 1,764 ft^2. Staff feel strongly that the additional Step 4 energy requirement will not create a regulatory environment that would encourage new illegal construction driven by energy performance requirements, and would provide meaningful energy efficiency improvements to the approximately 66% of new residential homes that choose to include in ground basement space in their new homes.

4. Finally, staff believe that owners generally want to build legal, conforming spaces that are energy efficient.

Finally, in addition to above, an ESC public opinion survey was developed and promoted for the three weeks immediately after the Public Information Session. The results of Opinion survey are presented in the Discussion section above. Approximately 90 people responded to the survey.

All materials developed through this process have also been shared with neighbouring local governments.

SUMMARY

This report requests Council's consideration of first, second and third reading for Building and Plumbing Regulation Amendment Bylaw (Energy Step Code) No. 2197, 2018. The report also requests that Council direct staff to continue the delivery of the Power Down Home Energy Assessment Incentive program, and to direct staff to provide 'top-up' funding in support of the Province of BC's upcoming Home Renovation Rebate - Retrofit Partnership program.

Respectfully submitted,

Ted Battiston
DIRECTOR, CORPORATE, ECONOMIC AND ENVIRONMENTAL SERVICES
and
Joe Mooney
MANAGER, BUILDING DEPARTMENT
for
Jan Jansen
GENERAL MANAGER OF RESORT EXPERIENCE

Appendix A
Building and Plumbing Regulation Amendment Bylaw (Energy Step Code) No. 2197, 2018
July 10, 2018

Table 9.36.6.3.C Requirements for Buildings Located Where the Degree-Days Below 18°C Value is greater than 3999 (Climate Zone 6, 7a, 7b, and 8)[1]

Forming Part of Sentence 9.36.6.3.(1)

STEP	AIRTIGHTNESS (AIR CHANGES PER HOUR AT 50 PA PRESSURE DIFFERENTIAL)	PERFORMANCE REQUIREMENT OF BUILDING EQUIPMENT AND SYSTEMS	PERFORMANCE REQUIREMENT OF BUILDING ENVELOPE
1	N/A	EnerGuide Rating % lower than EnerGuide Reference House: not less than 0% lower energy consumption or Conform to Subsection 9.36.5.	
2	≤ 3.0	EnerGuide Rating % lower than EnerGuide Reference House: not less than 10% lower energy consumption **or** mechanical energy use intensity ≤ 100 kWh/m².year	Thermal energy demand intensity ≤ 70 kWh/m².year **or** Peak thermal load ≤ 55 W/m²
3	≤ 2.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 20% lower energy consumption **or** mechanical energy use intensity ≤ 85 kWh/m².year	Thermal energy demand intensity ≤ 60 kWh/m².year **or** Peak thermal load ≤ 50 W/m²
4	≤ 1.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 40% lower energy consumption **or** mechanical energy use intensity ≤ 55 kWh/m².year	Thermal energy demand intensity ≤ 50 kWh/m².year **or** Peak thermal load ≤ 45 W/m²
5	≤ 1.0	Mechanical energy use intensity ≤ 25 kWh/m².year	Thermal energy demand intensity ≤ 15 kWh/m².year **or** Peak thermal load ≤ 10 W/m²

CANADIAN
HOME BUILDERS' ASSOCIATION
SEA TO SKY

Good morning, Ted.

Thank you for the feedback. On June 20th the CHBA Sea to Sky chapter reviewed the proposed bylaw and have the following thoughts on it. I will keep this short and to the point.

13.1.1 - The CHBA Sea to Sky chapter supports this bylaw as noted.
13.1.2. - The CHBA Sea to Sky chapter supports this bylaw as noted.
13.1.3. – The CHBA Sea to Sky chapter do not support this bylaw.
13.2. – The CHBA Sea to Sky chapter do not support this bylaw.

Notes:

13.1.1 – The proposed bylaw confirms to the intent of the Step code and reflects, what we believe, the Whistler community and contractors think the energy requirements of Whistler Part 9 buildings should be build too.

13.1.2. – The proposed bylaw reflects, what we believe, would be a reasonable requirement for increased density and use.

13.1.3. – The proposed bylaw compromises the intent of the bylaw 26.1. (ii). Bylaw 26.1.(ii) was created primarily to ensure that the life-safety concerns with unpermitted construction is encouraged to be permitted and in the process ensured to be 'safe'. The CHBA Sea to Sky Chapter is concerned that ANY additional requirements put on top of the studied and approved bylaw will discourage/hinder the intent of bylaw 26.1(ii). We understand that other municipalities have similar bylaws but believe that other municipalities do not have the same problem with development of previously undeveloped basements.

13.2. The bylaw as proposed allows for inconsistency in the minimum documentation requirements for building permits conformity with the bylaw proposed in 13.1.1. The provincial requirements for energy modeling requirements are very clear and as such we would encourage an amendment by the building permit 'check-list' that include the energy modeling documentation. This will ensure that applications can be made/accepted with complete documentation.

If you would like to discuss, please contact David Girard and or Derek Venter who has been assigned to this task.

Kind regards,
Derek Venter
Vice President,
CHBA Sea to Sky Chapter