October 1, 2017

MEMORANDUM TO: Maxime Fortin  
Clerk of the Standing Senate Committee on Energy,  
the Environment and Natural Resources

FROM: Sarah Govan  
Manager, Corporate Relations

RE: Response to Questions of the Standing Senate  
Committee on Energy, the Environment and  
Natural Resources

During the September 21, 2017, meeting of the Standing Senate Committee on Energy, The Environment and Natural Resources, questions were taken on notice for follow-up by Canada Mortgage and Housing Corporation (CMHC). Please find attached CMHC's responses to these questions.

If you require additional information please do not hesitate to contact me at 613-748-2455.

Attachment
STANDING SENATE COMMITTEE ON ENERGY, THE ENVIRONMENT AND NATURAL RESOURCES
Committee Meeting of September 21, 2017 – Transition to low-carbon economy

Question 1:

Senator Griffin: Do you receive many applicants for your green home program?

Mr. Hill: You have me there. That’s a mortgage loan insurance program. We do work closely with NRCan because they provide the technical basis of the program that says they qualify for funding or don’t qualify. I can come up with the numbers for you both on the single-family homes and the multi-unit residential stock because their programs applied for both.

Senator Griffin: Thank you. If you’d send it to the clerk, then we’ll all get it.

Response:

The table below provides available information about the Green Home Program.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of premium refunds</th>
<th>Total amount refunded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>1,164</td>
<td>$1,604,308.40</td>
</tr>
<tr>
<td>2013</td>
<td>926</td>
<td>$1,018,522.28</td>
</tr>
<tr>
<td>2014</td>
<td>696</td>
<td>$613,628.12</td>
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<td>2015</td>
<td>448</td>
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<td>2016</td>
<td>432</td>
<td>$549,056.58</td>
</tr>
<tr>
<td>2017 (YTD)</td>
<td>466</td>
<td>$875,683.51</td>
</tr>
<tr>
<td></td>
<td>4,132</td>
<td>$5,103,799.37</td>
</tr>
</tbody>
</table>
Question 2:

Senator MacDonald: Mr. Hill, the data we have shows that the buildings, homes and institutional buildings in Canada include the electricity produced by 70 per cent of our greenhouse gas emissions. How do we compare to the Western world and other developed countries in terms of our building stock?

Mr. Hill: I would say roughly we compare well with the Americans in terms of how our stock performs. But in other places, particularly Germany and the UK and some of the other EU countries that are making headway on advancing energy efficiency in their buildings, we’re probably a little behind.

Again, we come back to a data question about, overall, how does the stock perform relative to other sectors. I don’t have the information on me that I can say that here is the pie for Canada’s buildings or the built environment versus transportation versus any of the other sectors and how that might change with countries, but we can see what we could provide to the committee if that’s what you’re looking at, the relativity of the percentage of where the built stock performs vis-à-vis the rest of the economy.

Senator MacDonald: Yes.

Mr. Hill: Certainly Natural Resources Canada publishes information in that regard, and I’ve seen reports from Environment Canada, but I don’t have the numbers with me.

Response:

Please find below information about the energy efficiency of Canada’s building stock.

Among the member countries of the IEA, Canada's energy profile is characterized by one of the highest rates of total primary energy supply per unit of GDP. The IEA notes that factors driving energy consumption in Canada are a significant concentration of energy-intensive primary industries; a cold and extreme climate; a small, highly dispersed population; a high standard of living with minimal constraints on space occupation; and vast geography (which affects population density and transportation needs). Canada has slightly higher-than-average rates of energy use per passenger-kilometres and ranks as one of the highest in terms of number of vehicle miles travelled per person in the IEA countries. Canada has the third-highest residential primary energy consumption per household and has among the highest energy intensities of IEA countries in the service sector (mostly due to energy use in buildings). Despite these challenges and steady growth in energy consumption, Canada has made significant improvements. Taking into account differences in economic structure, weather and other effects, energy efficiency improved by 25% in Canada between 1990 and 2010.
Question 3:

Senator Fraser: Let me plant the seed that if CMHC is meant to be a leader, maybe some action on this front might be constructive. Do you have any programs or incentives of any kind to move development away from flood plains?

Mr. Hill: No, not that I'm aware of. But that's another inquiry I can make internally.

Senator Fraser: If you would, I would be grateful. Thank you.

Response:

CMHC does not have any programs or incentives to move developments away from flood plains.

Note that in Canada the control of land and its uses is a provincial responsibility. Each province has established municipalities and regions that are empowered to control the use of land within their boundaries.
Question 4:

**The Chair:** I just have a few questions, sir. You say that net-zero energy housing is technically and financially achievable, and it's being done in a number of areas across the country. I assume those are net-zero homes that are being built or have been built in the recent past. Can you tell us where they are? If you don't have that information, can you at least provide it to us?

**Mr. Hill:** I have general information. But I have to tell you, when CMHC started on this path in 2006, it raised eyebrows as to what we were doing in this space when we were still dealing with mouldy houses or other common problems that needed our attention. Why were we dealing with net-zero? We took a bit of abuse for this, but we leaped in because we realized there were some leading builders already doing it and there were certainly international examples of doing it.

I'm not talking about off-grid houses because we know you can live in an off-grid house with varying degrees of comfort and how much work you have to put into it to make it work. We can do that. But when we start talking about grid-connected net-zero energy houses that are commercially viable that you can build in cities and they make sense, that was a new thought. So when we started, we didn't even know what kind of response we would get. We threw a request for information out and we got over 650 downloads of this request for information, and, of that, I think we ended up with 60 or so detailed plans from builders saying, "Yes, we want to participate in this demonstration initiative you're doing. We know you're not going to give us dollars for construction but we're going to do it anyways." Out of that we got 10 houses at the end of 2006 and 2007.

At the same time, organizations like the Canadian Home Builders' Association started their own net-zero energy committees and coalitions, and now they're out flogging to their members, the rank and file, the viability of this progress. For the leading home building organization in Canada to say this is something they're going to promote and asking their members to voluntarily do was a big change.

**The Chair:** I appreciate all that. Where are they and how much do they cost?

**Mr. Hill:** Actually, I was going to get to Natural Resources Canada. They also followed up with a demonstration of net-zero homes. It's ongoing.

**The Chair:** We met with them.

**Mr. Hill:** There is a variety of projects going on across Canada. I can't point to their locations, but we could follow up with NRCAN if they haven't already pointed them out. How much do they cost?

**The Chair:** You say there are several net-zero home building initiatives underway across the country. I want to know where they are and how much they cost.
Mr. Hill: I can’t point to individual projects except for the NRCan projects. I can look at what CHBA has achieved through its memberships. We’re not tracking them. We’re picking up anecdotally the stories going forward.

Response:

The 2017 Net Zero Energy Coalition Study “2016 Inventory of residential projects on the path to zero in the U.S. and Canada” reported a combined total of 8,203 single and multi-family zero energy housing units across the United States and Canada – a 33% growth over the previous study year. The report places Landmark Homes of Edmonton, Alberta was in the top ten home builders with 221 units delivered in 2016. Calgary, Alberta and London, Ontario were included in the top zero energy cities in the US and Canada with 209 and 101 homes delivered respectively. (ref. http://netzeroenergycoalition.com/2016-zero-energy-inventory/).

Habitat Design and Construction, a mid-size design-built company in Edmonton pioneered net zero energy healthy housing projects under CMHC’s EQuilibrium Sustainable Housing Demonstration Initiative. Since then the firm went on to build 5 more zero energy home in Canada and delivered the first Net Zero energy Church in Canada linked with a net zero energy affordable housing townhouse project. (ref. http://habitat-studio.com/sustainable-design/)

The website of the Canadian Passive House Institute (CanPHI), a registered non-profit educational organization, details 6 housing and building projects across Canada that achieve “net zero energy ready” levels of performance with space heating loads being 80% to 90% below conventional housing. For note is the Ottawa Salus project, a 42-unit, 4-storey affordable housing project. CMHC is working with the housing provider to monitoring the post-occupancy performance of the building to determine how close the project will come to its ambitious energy targets. (ref. http://www.passivehouse.ca/featured-projects)

The cost of net zero energy homes has decreased significantly in the last decade. The houses constructed under CMHC’s EQuilibrium Sustainable Housing Demonstration Initiative were generally estimated to have cost up to $100k more than their code built equivalents. Much of this incremental cost was due to the solar photovoltaic (PV) electricity generating systems installed on the homes – an expensive inclusion at the time. Since then, the price of PV has fallen dramatically along with the cost of delivering other energy efficient technologies and practices. The Net Zero Energy Coalition study notes that Landmark Homes now markets a $399k single detached net zero energy home in Edmonton that is competitive with other “market” housing. The study also references 10 year payback periods which mean that owners would enjoy the benefits of net zero energy homes at no additional costs until such time their PV systems would require replacing some 15 years (or more) later.