Task Force for Housing & Climate

CLIMATE IMPACTS OF 5.8 MILLION NEW HOMES

November 2023

EXECUTIVE SUMMARY

Canada needs 5.8 million new homes by 2030 to restore affordability – which is more than one-third of Canada's existing housing stock all over again. How and where we build these homes carries major implications for greenhouse gas (GHG) emissions and for Canada's climate targets.

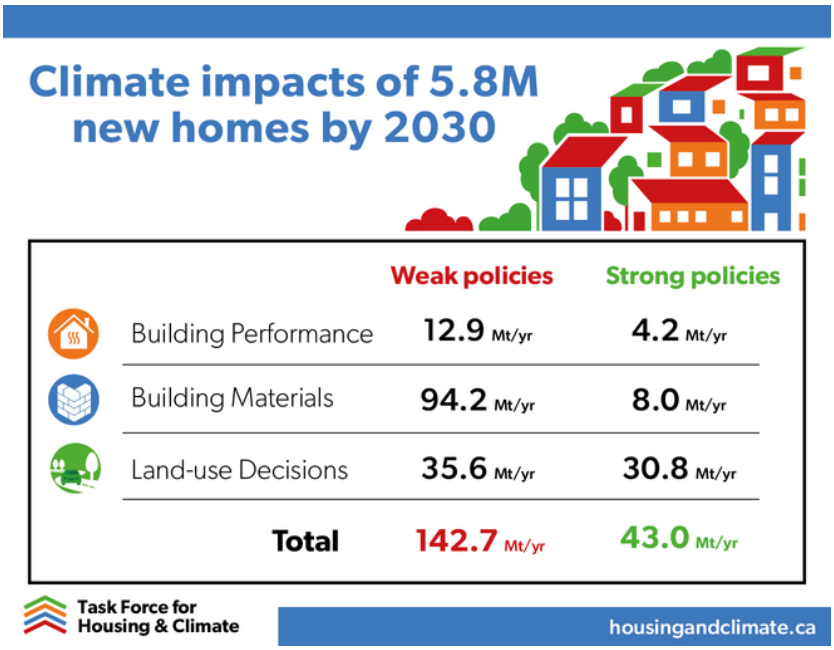
To date, however, the climate impacts of adding 5.8 million homes have been largely unknown. That's why, in Fall 2023, the Task Force for Housing & Climate commissioned three distinct GHG modeling reports. Together, these three analyses provide the most comprehensive modeling of the GHG implications of new housing ever conducted in Canada.

Collectively, the three research reports show that, with weak policy approaches, adding 5.8 million homes could lock in as much as 142.7 Mt in new annual greenhouse gas emissions in 2030. On the other hand, with aggressive policy approaches, adding 5.8 million homes could generate as little as 43 Mt of annual greenhouse gas emissions in 2030.

"Strong policy leadership could prevent up to 99 Mt of annual GHG emissions in 2030"

In other words, strong policy leadership at the federal, provincial and municipal levels could prevent up to 100 Mt of annual GHGs from new housing - the equivalent of 34% percent of Canada's 2030 GHG reduction target.

To arrive at these results, three research partners used state-of-the-art modeling approaches to explore the three biggest sources of GHG emissions associated with new housing: building energy performance; embodied emissions from construction materials and supportive infrastructure; and land use planning.



Efficiency Canada modeled the GHG emissions associated with building energy performance using Sustainability Solutions Group's Land Use Impact Calculator. It looked at emissions created by 5.8 million new homes by 2030 under three scenarios: a business-as-usual scenario in which there continues to be limited provincial implementation of the 2020 National Building Code; a second scenario in which all provinces move to Tier 3 of the National Building Code and Tier 2 of the National Energy Code for Buildings in 2025, and then rapidly progress toward the upper tiers' net-zero energy ready standard in 2030; and a third scenario in which the conditions of the second scenario are complemented with the electrification of all new buildings as of 2025.

Efficiency Canada finds that, under the business-as-usual scenario, there is an increase of 12.9 Mt in annual GHG emissions in 2030 as a result of the building energy performance of 5.8 million new homes. Under the second scenario, there is an increase of 10.4 Mt per year in 2030 - a savings of 2.8 Mt. And, in the third scenario, annual emissions are up just 4.2 Mt, meaning there is a savings of 8.7 Mt per year when it comes to the building energy performance of 5.8 million new homes compared with the business-as-usual scenario.

The Centre for the Sustainable Built Environment, led by Dr. Shoshanne Saxe at the University of Toronto, developed the FIG (Future Infrastructure Growth) model to analyze the impact of embodied GHG emissions associated with the construction of housing and supportive infrastructure like roads and water management. In the worst-case scenario modeled, in which all new housing is single-family detached homes built in greenfield areas using current GHG-intensive construction methods, 94.2 Mt of annual GHG emissions are generated in 2030.

In the lowest GHG scenario modeled, all new housing is in multi-unit buildings built within existing urban boundaries, is efficiently designed and minimizes demolition of older buildings. This scenario results in annual GHG emissions of only 8.0 Mt in 2030 as a result of embodied emissions associated with construction of housing and supportive infrastructure - a savings of 86.2 Mt/yr.

The PLACE Centre at Smart Prosperity Institute used an original model to project the GHG emissions from different land use planning scenarios for adding 5.8 million homes. In other words, it looked at how the location of new housing, either within or outside of existing urban boundaries, affects transportation-related emissions. In a business-as-usual scenario in which all new housing follows the same growth patterns of the last decade, it finds that annual GHG emissions increase 35.6 Mt in 2030. In the opposing scenario, where 5.8 million homes are added as infill in urban areas, and near transit in cities where that's possible, thereby limiting the number of cars owned and the number of vehicle kilometres traveled, annual emissions in 2030 are 30.8 Mt, resulting in a saving of 4.8 Mt/yr compared with the business-as-usual scenario.

To access all three modeling reports, please visit: housingandclimate.ca/ghgs