



HOUSING  
RESEARCH

## Research Insight

OCTOBER 2022

# Incorporating the Impact of Climate Change into Models Related to Housing and Housing Finance: A Review of the Literature

CMHC has aspirations that cover both building climate compatible housing while maintaining affordability. Therefore, the inclusion of both considerations in research would provide greater information on potential trade-offs between the two. Housing supply and housing finance are areas with complex models to which climate change considerations can be potentially informative to understand the impact of both the physical risks and the transition risks of climate change. However, it is not always clear what climate change considerations can be evaluated or how to do so. Conducting such a review would add significantly to all projects.

## Project Overview

To deepen our understanding of what climate change questions models have been used to find answers for, CMHC commissioned Prism Economics and Analysis to conduct a comprehensive literature review of economic modelling of

climate change, related to housing and housing finance. In addition to the full analysis report, a descriptive bibliography is available to allow researchers to quickly assess what climate change factors can be incorporated into their research.

## About CMHC Data, Research and Analysis

CMHC exists to make housing affordable for everyone in Canada. To achieve our goal that everyone in Canada has a home that they can afford and then meets their needs, our data, research and analysis efforts will primarily focus on, but are not limited to:

- investments required for households in core housing need;
- market housing demand, supply gaps and affordability imbalances;
- racism and discrimination as a barrier to housing;
- the effects of climate change on housing;
- effectiveness of current housing policies and potential future policies; and
- working with Indigenous groups to understand their distinct housing needs.

As a trusted source of housing information, CMHC provides unbiased housing-related data, research and market information to help close knowledge gaps and deepen understanding of complex housing issues to inform future policy decisions.

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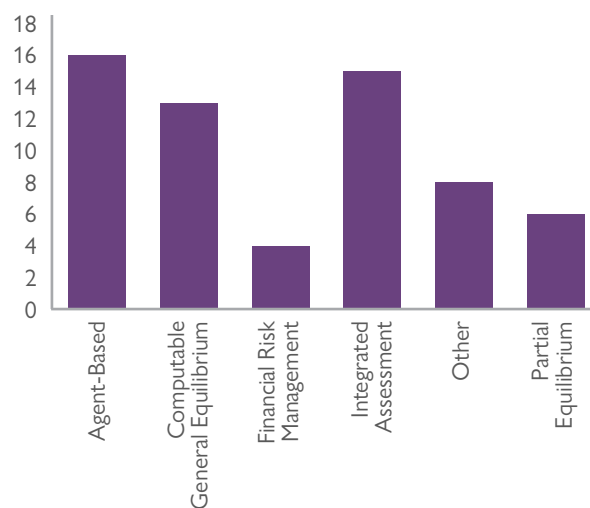


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## Key Findings

- Partial Equilibrium, Computable General Equilibrium and Dynamic Stochastic General Equilibrium models can all provide useful guidance on housing supply and demand, higher construction and operations costs, and changes in price dynamics due to changes in perceived risk.
- Integrated Assessment Models, Agent-Based Modelling, and Catastrophe Models are essential to understanding climate change because they are better suited to assess the impact of changes in housing design, the impact of heterogeneous demand patterns and risk perceptions, the impact of disclosure of information, and the appropriate pricing of catastrophic risk.
- None of the above models are suited to analyze financial risks of climate change. However, traditional risk management tools, such as value-at-risk analysis, scenario construction for stress testing, and credit scoring can all be augmented with climate change factors to fill that gap.
- The descriptive bibliography is available to assist researchers in more easily including climate change considerations into their research. See Figure 1 for a distribution of key papers in the descriptive bibliography.

**Figure 1: Number of Key Papers included in Descriptive Bibliography**



Source: Prism Economics and Analysis

## Implications for the Housing Industry

This research report allows researchers and industry professionals to quickly understand the best model to analyze a specific climate-related issue, and what issues may be incorporated into existing models. Ultimately, no model can capture all the implications of climate change on housing. Thus, its inclusion within current modelling can fill the gap in understanding the link between housing affordability and climate change. Especially relevant are the impacts climate change will have on housing supply and demand, and how risk is distributed through the financial system.

### Project Manager

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### Research Consultant

Prism Economics and Analysis



## Full Report

*Research Report: Impact of climate on models related to housing and housing finance, 2022*

[https://assets.cmhc-schl.gc.ca/sf/project/archive/research\\_6/20221003001\\_impact\\_of\\_climate\\_on\\_models\\_related\\_to\\_housing\\_and\\_housing\\_finance\\_oct\\_14.pdf](https://assets.cmhc-schl.gc.ca/sf/project/archive/research_6/20221003001_impact_of_climate_on_models_related_to_housing_and_housing_finance_oct_14.pdf)

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For more information, visit our website [cmhc.ca](https://cmhc.ca) or follow us on [Twitter](#), [LinkedIn](#), [Facebook](#), [Instagram](#) and [YouTube](#).

You can also reach us by phone at 1-800-668-2642 or by fax at **1-800-245-9274**.

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## Alternative text and data for figures

Figure 1: Number of Key Papers included in Descriptive Bibliography

Model	Number of Key Papers
Agent-Based	16
Computable General Equilibrium	13
Financial Risk Management	4
Integrated Assessment	15
Other	8
Partial Equilibrium	6

Source: Prism Economics and Analysis