NRC'S CODES CANADA EVALUATION

Office of Audit and Evaluation

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ACRONYMS

- **ABCB:** Australian Building Codes Board
- **CCBFC:** Canadian Commission on Building and Fire Codes
- **DIBt:** German Institute for Construction Technology
- **HVAC:** Heating, ventilation and air conditioning
- **NRC:** National Research Council Canada
- **PTPACC:** Provincial/Territorial Policy Advisory Committee on Codes

EXECUTIVE SUMMARY

The National Research Council (NRC)'s Codes Canada is a partner in the National Model Codes Development System. It provides administrative and technical support to the Canadian Commission on Building and Fire Codes (CCBFC), an independent committee of volunteers who, along with the Provincial/Territorial Policy Advisory Committee on Codes (PTPACC), are responsible for developing and publishing the national model codes. The evaluation covered 2014-2015 to 2019-2020. Lines of evidence included document/data review, external and internal interviews, and a staff survey. The key findings and recommendations of the evaluation were as follows:

Findings

NRC's role and activities

The NRC plays a unique role in the National Model Codes Development System, with its neutrality, national scope and access to in-house and external research capabilities. However, the NRC's role relative to other partners is not well understood by stakeholders. In addition, while the NRC is accountable for the CCBFC, it must balance this while maintaining the independence of the CCBFC. In some cases, this has contributed to imprecise accountabilities in the code development system. The value brought by the NRC's in-house research capabilities to the National Model Codes Development System was not well documented.

Partners and stakeholders value the administrative and technical support provided by NRC's Codes Canada to the National Model Codes Development System. However, a lack of human resources affected the extent to which it was able to do so efficiently. As a result of insufficient human resources, and challenges with key communication channels used by NRC's Codes Canada to engage stakeholders (e.g., website), there was an overall lack of awareness of the code development process among stakeholders. Additional human resources have been provided and more are expected, and should help address some of these challenges (e.g., reduced support to the CCBFC, delays in publishing supporting material for the codes, time available for stakeholder engagement).

Aligning codes with needs and responding to priorities

While some progress was made to align the national model codes with partner/stakeholder needs, opportunities exist for greater alignment. Challenges with the CCBFC's priority-setting process and operations of CCBFC committees limited the extent to which the needs of Partners (i.e., CCBFC and PTPACC) and stakeholders were considered. The operation of CCBFC committees also contributed to inefficiencies and some delays in developing the codes. In addition, several risks to consensus-based decision making – a key principle of the National Model Code Development System that ensures all partner opinions are considered and discussed when developing the codes – were identified. PTPACC and CCBFC are currently seeking strategies to address shortcomings in the implementation of the governance model. In addition to these factors, the limited time that NRC's Codes Canada staff had for communication and engagement with stakeholders, and the resulting lack of awareness of the code development system, contributed to the perception that needs were not always considered, even if this was not the case.

EXECUTIVE SUMMARY

Performance of national model codes

The central objective of national model codes is to harmonize building regulations across Canada to reduce interprovincial trade barriers. Provinces and territories, however, have not uniformly adopted the national model codes. As a result of the Canadian Free Trade Agreement, efforts are underway to improve harmonization of building regulations across Canada. The NRC is contributing to these efforts through the introduction of free electronic model codes, which have led to increased code access. Despite variations in the use of / adoption of the national model codes between provinces and territories, they have nonetheless resulted in societal benefits. This includes positive impacts on the health and safety of Canadians, the structural protection of buildings and the environment.

Recommendations

The findings from the evaluation resulted in four recommendations for NRC's Codes Canada:

1. NRC's Codes Canada should work with the CCBFC to ensure that challenges with the current governance are addressed, including the: priority setting process used by the CCBFC; transparency of the CCBFC and its committees selection processes; operation and coordination of the CCBFC committees; and need for greater clarity around accountabilities in the national model code development system.
2. NRC's Codes Canada should clearly communicate to stakeholders the roles and responsibilities of the partners involved in the National Model Codes Development System.
3. NRC's Codes Canada should improve awareness of the code development process amongst stakeholders, with a particular emphasis on the: public review process; process to submit a code change request; selection and decision-making processes for the CCBFC Executive Committee and its Standing Committees; timing of CCBFC and its sub-committee meetings.

   To implement these improvements, NRC's Codes Canada could consider strategies to improve the Codes Canada website and make better use of social media and advertising campaigns. Consideration of how to reach and engage stakeholders not already involved in the National Model Codes Development System is also needed.
4. NRC's Codes Canada should identify a way to capture its research contribution (and any associated impact) to changes or proposed changes to the national model codes. These measures should be tracked and monitored on a regular basis to ensure that NRC is continuing to add value from its research contributions, different than what could be provided by external laboratories.

INTRODUCTION • Codes Canada

An evaluation of Codes Canada was conducted in 2019-2020. It assessed the NRC's role in the National Model Codes Development System, including its activities, as well as alignment of the national model codes with stakeholder needs and the extent to which the codes were developed in response to Partner priorities. The evaluation also examined the performance of the national model building codes. This report provides an overview of the main findings and conclusions as well as recommendations for NRC's Codes Canada.

INTRODUCTION

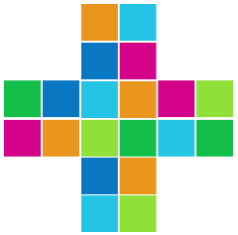
An evaluation of Codes Canada was conducted in 2019-2020 to address NRC Senior Executive information needs and the requirements of the Treasury Board *Policy on Results*. The evaluation covered 2014-2015 to 2019-2020, and is the first evaluation to examine NRC's Codes Canada activities in support of the National Model Codes Development System on their own. These activities were previously included in an evaluation of the Construction Research Centre in 2013-2014. Not included in the evaluation were: Building Regulations for Market Access, Canadian Construction Materials Centre, National Master Specifications, and Construction Research Centre facilities.

This report begins by providing a profile of the National Model Codes Development System. It then presents the evaluation findings on the NRC's role in the National Model Codes System, including its activities, as well as alignment of the national model codes with stakeholder needs and the extent to which the codes were developed in response to partner priorities. The report ends with an examination of the performance of the national model building codes. Following the conclusion, the evaluation's three recommendations are presented.

In this report, you will see the following symbols:

This symbol indicates information that is useful to know to help understand the findings

This symbol indicates a quote that helps illustrate or support the main findings.



This symbol indicates information that supports equity, diversity and inclusion, and Gender-Based Analysis+ (i.e., factors that illustrate how diverse groups may experience policies, programs and initiatives).

Sources: These are the methods from which the findings are drawn. The sources are listed at the bottom of each page.

EVALUATION APPROACH

Methods

Mixed methods were used to collect data for this evaluation. This approach also allowed for cross validation of results based on the following methods:

- document/literature review
- data review (financial and administrative data)
- staff survey (n=29)
- internal interviews (n=5)
- external interviews (partners n=38; stakeholders n=15)

For more detailed information on these methods, including challenges and limitations, refer to Appendix A.

Approach

NRC's Codes Canada provides administrative and technical support to the National Model Codes Development System. However, the decision-making related to the policy direction and technical content of the national model codes rests with the CCBFC, the system's independent governing body.

As such, it is important to note that, while some of the evaluation questions assess outputs and activities within the NRC's control (questions 1-3), others assess constructs that the NRC has contributed to (questions 4-8).

Questions

NRC's role and activities

1. What is NRC's role in the National Model Code Development System? Is the role clear and well understood?
2. How is NRC delivering its Codes Canada activities? Within the context of the National Model Code Development System, what are the efficiencies and inefficiencies?
3. To what extent has there been engagement with partners and stakeholders? What process is used by NRC-Codes Canada to engage with partners and stakeholders?

Aligning codes with needs and responding to priorities

4. To what extent are the codes addressing partners' and stakeholders' needs? Is NRC well-positioned to address future needs?
5. To what extent does the governance model of the National Model Code Development System support its objectives (i.e., development and publishing of the national model codes in response to the priorities of the provinces and territories and the Canadian Commission for Building and Fire Codes)?

Performance of national model codes

6. To what extent was provincial and territorial commitment to the national model codes renewed? How has the National Model Code Development System lead to increased adoption rates and uniformity of codes in Canada?
7. How did NRC-Codes Canada activities contribute to reduced interprovincial trade barriers?
8. How did the National Model Code Development System result in societal benefits (i.e., health, safety, accessibility, environment and protection of buildings)?

Note: Use of the wording "Codes Canada" in questions 5 and 6 was replaced with "National Model Code Development System" for greater clarity on what was assessed.

PROFILE • Code development system

The National Model Codes Development System is a collaborative initiative that is supported by federal, provincial and territorial governments which assembles building expertise from the entire construction sector. It develops consensus and research-based code changes to produce harmonized, accessible building codes that the provinces and territories can adopt for use in their jurisdiction. NRC’s Codes Canada is a partner in the National Model Codes Development System. They offer technical and administrative support to an independent volunteer committee called the CCBFC, who are primarily responsible for decision making related to the development of the national model codes, including the processes used.

NATIONAL MODEL CODES DEVELOPMENT SYSTEM

In Canada, national model codes are developed through a centralized collaborative process involving partners (i.e., NRC, CCBFC, PTPACC) and stakeholders (e.g., fire and building officials, construction industry and the general public). Partners develop and publish the national model codes, whereas stakeholders participate in the code development process by offering technical expertise via committee membership, proposing changes to the codes or participating in the annual public review/consultation of proposed changes. Specific roles and responsibilities of the code development partners include:

NRC's Codes Canada

NRC's Codes Canada is a neutral partner that hosts the activities of the CCBFC – an independent decision-making body established by the NRC to provide direction and oversight to the National Model Codes Development System. NRC's Codes Canada provides administrative and technical support to the CCBFC and its associated committees (discussed further on slide 13), and is responsible for producing and disseminating the national model codes on behalf of the CCBFC. More broadly, NRC's Construction Research Centre provides unbiased technical information to support provisions in the codes. Research outputs are also used to assess the effectiveness of technical changes.

Canadian Commission on Building and Fire Codes

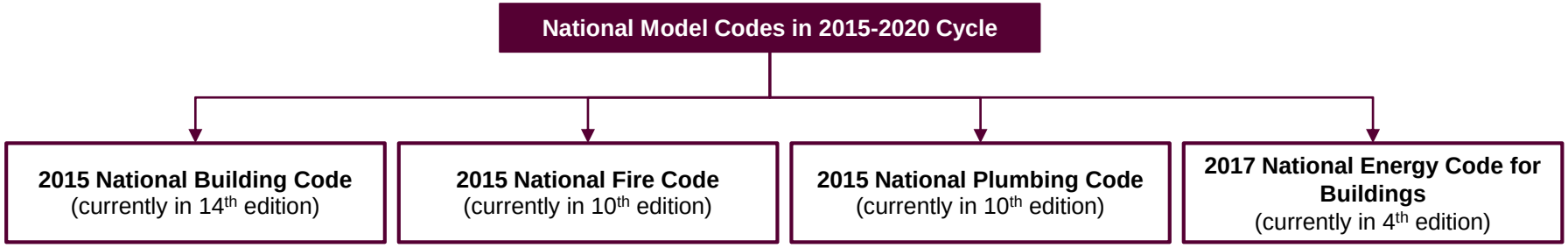
The CCBFC is responsible for all decision-making related to the code development process, code content, national code policies and code development priorities, and oversees this work through its various sub-committees. The Executive Committee is responsible for the day-to-day management of all CCBFC business between committee meetings, and there are nine Standing Committees that are each responsible for a model code or a section of a code. In addition, task groups and working groups are established to assist the CCBFC and Standing Committees in undertaking detailed investigations of complex issues.

Provincial and Territorial Policy Advisory Committee on Codes

The PTPACC brings together senior representatives from the provincial and territorial ministries responsible for building, plumbing and fire safety regulation to coordinate input from their jurisdictions and provide policy advice to the CCBFC.

Source: Document review

NATIONAL MODEL CODES



National model codes

The national model codes provide objective-based regulations regarding the minimum requirements to ensure the safety, accessibility, and energy efficiency of new Canadian buildings. There are four codes within the national model codes (as indicated in the boxes above), which form the basis for provincial/territorial building codes. In addition, a National Farm Building Code is developed and maintained when sufficient demand exists; it has not been updated since 1995. The intent of the model codes is to be easily adapted or adopted by provinces and territories in their respective building construction and safety regulations. The national model codes do not become law until they are adopted by provinces and territories. The use of objective-based codes provides flexibility to accommodate innovative designs and practices. The objectives describe the overall goals that the codes are intended to achieve. By explaining every requirement in terms of its underlying aim, objective-based codes help users clearly understand the rationale for the requirements.

Model code development

The national model codes are updated on a cyclical basis – most recently, every five years. The national model code development process is intended to be open, balanced and committee-based. The process relies on volunteers from the CCBFC and its associated committees and groups as well as the general public. Anyone can submit a code change request, which is then reviewed by the CCBFC and its committees for technical merit. Proposed code changes are put out for public review/commentary before they are approved by the CCBFC and integrated into the national model codes. Typical revisions to the national model codes include those to accommodate new construction techniques and systems, clarifying requirements, updating references to standards and proposing expansion of the scope/objective of existing regulations. The current time required from receipt of a code change request to an approved code solution is up to 18 months for simple changes, 2 to 3 years for significant changes and between 3 to 8 years for complex changes. While the national model codes are produced on a five-year cycle, interim changes can be published to address potentially dangerous situations or economic hardships. This occurs on average once per code cycle.

Source: Document review

NRC'S CODES CANADA – HUMAN RESOURCES

To fulfil its roles and responsibilities within the National Mode Code Development System, NRC's Codes Canada has 42 employees (as of May 2020). These employees are located in Ottawa and distributed among three groups:

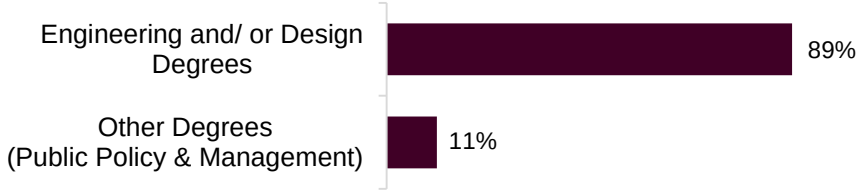
Codes Development System – 10% of NRC's Codes Canada staff are responsible for policies and procedures and supporting the CCBFC, its Executive Committee and PTPACC.

Regulatory Solutions – 38% of NRC's Codes Canada staff support the CCBFC's Standing Committees, Task Groups and Working Groups. Within this group, technical advisors make up the majority of staff (i.e., 95%).

Production and Marketing – 52% of Codes Canada employees are involved in editing, translating, communicating, and disseminating the codes (e.g., sale of codes/access to free online codes).

Breadth of education in NRC's Codes Canada technical advisors

Technical advisors act as expert resource persons for the national model codes and their content, providing objective, fact-based advice to Committees in an effort to achieve a sound consensus decision. Technical advisors make up the largest employee group within NRC's Codes Canada (i.e., 45%), and come from a wide range of fields including aerospace and aeronautical engineering, architecture, civil engineering, electrical engineering, geotechnical engineering and materials science. Most of the technical advisors have engineering/design degrees that align with their job descriptions.

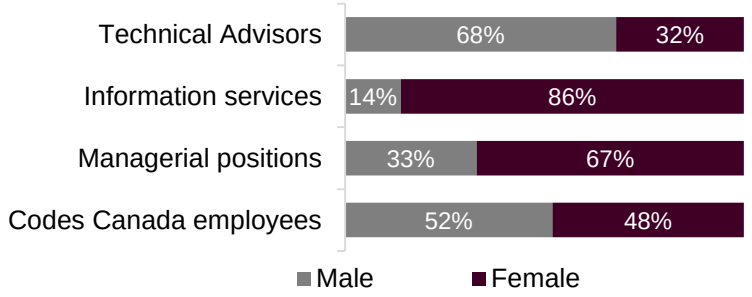


A significant percentage of these advisors (79%), also hold a post-graduate degree in their respective fields: 58% hold Master's Degree and 21% have a PhD.

Source: Data review

Gender representation varies across roles

As of May 2020, employees in NRC's Codes Canada were fairly evenly distributed in terms of gender. However, some variations across job categories can be seen, particularly for managers and information service staff where a greater proportion of staff were female, and for technical advisors, where a greater proportion of staff were male.



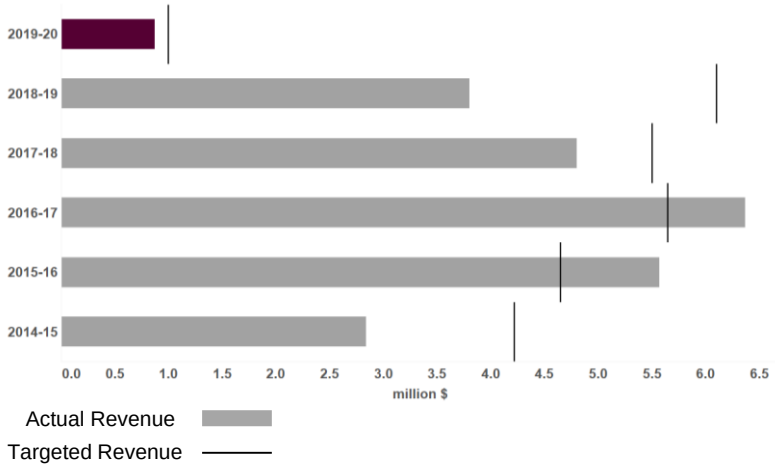
Note: NRC Equity, Diversity and Inclusion data were not available for NRC's Codes Canada as this information is collected at the Research Centre level.

NRC'S CODES CANADA - FINANCIAL RESOURCES

NRC's Codes Canada spent $28.28M to fulfil its roles and responsibilities in support of the National Model Codes Development system between 2014-15 and 2019-20. The majority of these expenses were for salaries (89.6%) with the remaining on operational costs. The 2019-20 portion of these costs were funded via dedicated Treasury Board funding to make codes freely available and to improve harmonization and timely adoption.

Revenue targets for sales and royalties not consistently met due to code cycle

Over the evaluation period, through the sale of national model codes (i.e. 88%) and royalties (i.e. 12%), NRC's Codes Canada generated a total of $24.24M in revenues. NRC's Codes Canada fell short of its revenue targets in all but two years, but this could be attributed to the code cycle meaning that sales for the 2015 codes would be expected to be higher in 2016 and 2017, and lower ahead of the release of the 2020 codes. Contributing to the increased revenues in 2015-2016 is the release of the new national model codes. The noticeable decrease in 2019-2020 is driven by the introduction of free codes.

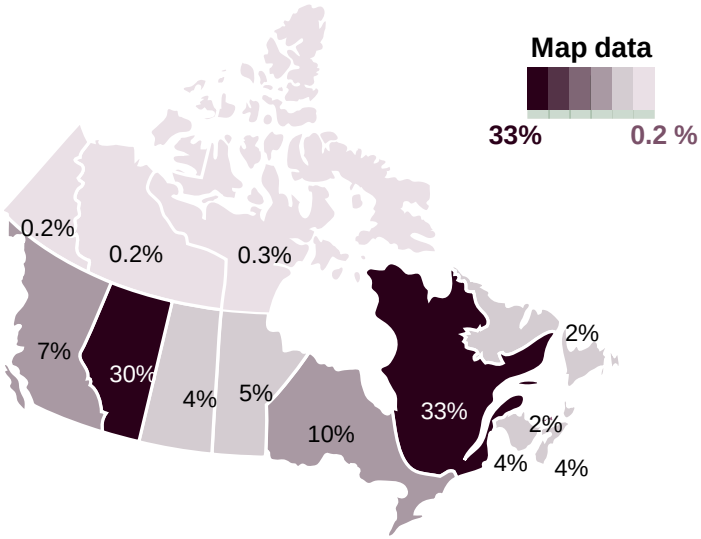


Sources: Data review

Revenues from provinces varied

In 2019-2020 (until January), close to two-thirds of NRC's Codes Canada revenues came from two provinces - Quebec and Alberta. This is a result of the agreements NRC's Codes Canada has in place to publish the Quebec Construction Code; the Quebec Plumbing Code; the Quebec Safety Code; the Alberta Building Code and the Alberta Fire Code.

Percent of NRC's Codes Canada Revenue



Note: does not add up to 100% due to rounding

NRC'S ROLE: What is NRC's role in the National Code Development System? Is the role clear and well understood?

Overall finding: The NRC is involved in every aspect of the development of the national model codes, from providing administrative and technical support to the CCBFC and its sub-committees to producing and disseminating the codes. The NRC's role is unique compared to partners due to its neutrality, national scope and access to in-house and external research capabilities. Even though there are a few specific differences, the NRC's role is consistent with other international federal organizations involved in the development of national model codes. That said, the NRC's role relative to other partners' (e.g., CCBFC, PTPACC) is not well understood by stakeholders. There is an opportunity for NRC's Codes Canada to address this through its communications with stakeholders. In addition, while the NRC is accountable for the CCBFC, it must balance this with maintaining the independence of the CCBFC. This has contributed to some confusion over accountabilities in the code development system.

ROLES AND RESPONSIBILITIES

Roles and responsibilities of partners and stakeholders within the National Model Codes Development System were well documented. NRC's role was better understood by partners involved in the code development system than by stakeholders. In addition, because the NRC must maintain accountability for the CCBFC while still affording it its independence, the line between the two can be blurry at times.

Documented roles and responsibilities

The roles and responsibilities of partners (i.e., CCBFC, NRC, provincial and territorial authorities) and stakeholders (e.g., fire and building officials, construction industry, the general public) within the National Model Codes Development System are defined in a public document (*Policies and Procedures* – CCBFC 2016). NRC's Codes Canada provides technical and administrative support to the CCBFC and its associated committees, which includes conducting technical analyses and research to support proposed code changes, organizing and administering meetings, and communicating with and engaging stakeholders on behalf of the CCBFC. NRC's Codes Canada is also responsible for editing, translating, publishing and disseminating the national model codes and related materials (e.g., guides). The NRC, through the Construction Research Centre, also provides unbiased technical information to support provisions in the codes, and is ultimately accountable to ensure that the CCBFC achieves its mandate. As the NRC must walk a fine line of allowing the CCBFC to maintain its independence while still being accountable for it, the lines between the NRC and the CCBFC can become blurred.

Communication of roles and responsibilities

Partners involved in the National Model Code Development System have a better understanding of the roles and responsibilities of each partner (e.g., specific differences between the NRC, CCBFC and provinces and territories) than do stakeholders. Stakeholders highlighted the following aspects of NRC's Codes Canada's role as requiring greater clarity:

- **The roles and responsibilities of NRC's technical advisors**. Although they are currently described in the *Policies and Procedures* (2016), the responsibilities and extent of involvement of technical advisors were not well-defined.
- **NRC's role and input into the Codes**. There appears to be a lack of understanding that decisions are made based on the technical expertise of volunteer experts (CCBFC), rather than the government or the NRC itself. Contributing to this was the loss of the CCBFC's independent website, which was amalgamated with that of the NRC in 2015-16 (discussed further on slide 24).

Clearer communication between partners and stakeholders, including the use of distinct branding and communications channels, may help reduce the confusion.

Sources: Document review, internal and external interviews, staff survey

UNIQUENESS OF NRC'S ROLE IN THE NATIONAL MODEL CODES DEVELOPMENT SYSTEM

Overall, the NRC's role in the National Model Codes Development System is complementary to that of other partners, and is distinguished by its neutrality, national perspective, in-house research capabilities and connections to other research organizations.

NRC plays a complementary role

Overall, partners expressed that NRC's role does not duplicate that of the other partners in the national model code development process. However, there is occasional overlap between the NRC and:

- Some provinces that have their own code development bodies (i.e., Ontario, British Columbia).
- Standards organizations (e.g., Canadian Standards Association)

To mitigate this overlap, the NRC and its partners in the National Model Codes Development System often liaise with these stakeholders and reference existing standards, where applicable, in the national model codes. Greater consistency in the use of the national model building codes between provinces and territories may reduce this duplication.

Value-add of the NRC in the code development system

The NRC brings with it the following advantages to the National Model Codes Development System:

- Neutrality and impartiality
- National perspective
- In-house research capabilities to support the assessment of proposed code change requests
- Network and connections with other research organizations, should NRC be unable to conduct the research needed

NRC's involvement in the national codes development process lends credibility to changes made to the national model codes.

> *NRC is "the only body that has the full weight of the government behind them. And theoretically, they don't have skin in the game since they don't implement the codes"* — External partner

Sources: Document review, internal and external interviews

NRC'S ROLE – COMPARISON TO OTHER COUNTRIES

The NRC's involvement in the development of national model codes is consistent with that of other similar federal organizations in Australia and Germany. There is, however, some variation in the specific roles and responsibilities of these federal organizations in developing national model codes.

Federal involvement in code development in Australia and Germany

NRC's Codes Canada's roles and responsibilities were compared with those of the Deutsches Institut für Bautechnik (DIBt) in Germany and the Australia Building Codes Board (ABCB) in Australia – two federal organizations that play a similar role to the NRC within their respective code development systems. The DiBt is a technical authority based in Berlin that fulfils various construction-related public tasks, including the development of the national model codes on behalf of the 16 federal states and the Federation. The ABCB is responsible for Australia's national construction code – a joint initiative that involves all levels of Australian Government and is recognized by all states and territories as the official building regulations.

Despite the similarity in federal involvement, it is important to highlight that the national model codes in Canada have no legal status until they are adopted by the provinces and territories, while Australia and Germany are abided by law to provide and develop national model codes. Other similarities and differences include:

Activities	NRC's Codes Canada	DIBt	ABCB
Code development relies on a governance model involving multiple regulators	✓	✓	✓
Provides administrative and technical support related to the development of codes	✓	✓	✓
Provides clarification/interpretation to stakeholders regarding technical provisions of codes	✓	✓	✓
Conducts research that supports code changes or material conformance assessments	✓	✓	×
Provides accreditation, approval, certification, and licensing services	×	×	✓
Provides regular, formal training for code users, such as technical seminars and workshops	× *	✓	✓
Enforces the use of model codes across jurisdictions	×	×	×

**NRC's Codes Canada provides training for stakeholders on changes to the model codes an ad-hoc/as requested basis only.*

Sources: Document review, internal and external interviews

NRC’S CODES CANADA ACTIVITIES: How is NRC delivering its Codes Canada Activities? Within the context of the National Model Codes System, what are the efficiencies and inefficiencies?

Overall finding: The administrative and technical support provided by NRC’s Codes Canada to the National Model Codes Development System is valued by partners and stakeholders. However, human resources were insufficient to meet the many demands posed by the National Model Codes Development System. Insufficient human resources contributed to reduced support to CCBFC committees, delays in the production and dissemination of material to support new model codes, and limited time dedicated to stakeholder engagement and communication initiatives. While the NRC also supports the National Model Codes Development System by conducting research on the technical merit of proposed code changes, the extent to which it did so was not well documented.

SUPPORTING NATIONAL MODEL CODES DEVELOPMENT SYSTEM

Partners and stakeholders valued the support provided by NRC's Codes Canada to the National Model Codes Development System. However, insufficient human resources affected the extent to which it was able to do so efficiently.

Valued support

The NRC provides research and technical expertise as well as administrative support to the CCBFC and its sub-committees. This includes conducting technical analyses and research to support proposed code changes, organizing and administering meetings, communicating with and engaging stakeholders, as well as producing and disseminating the codes on behalf of the CCBFC.

Overall, partners and stakeholders felt that NRC's Codes Canada's activities in support of the National Model Codes Development System were effective. CCBFC committee members felt that NRC's Codes Canada staff were professional and knowledgeable, and partners reflected that the meetings run by NRC's Codes Canada staff were well managed, with the meeting minutes being of high quality. The technical support provided by the NRC to the CCBFC and its sub-committees was characterized as "excellent".

Human resource limitations

Despite their success in these areas, NRC's Codes Canada's ability to deliver on its mandate was hindered by a lack of human resources. There was general consensus from partners and NRC's Codes Canada alike that the group lacks sufficient staff to address the volume of work that it has, both in terms of the number of positions that exist and the number of positions filled at any given time. Additionally, the volume of work being assigned to the Standing Committees (and consequently, to NRC's Codes Canada) by the CCBFC was found to be largely unregulated, without any feedback mechanism to account for the availability of resources or prioritization of work. A survey of NRC's Codes Canada staff indicates that nearly half (48%) of respondents do not feel as though their group currently has sufficient human resources to achieve objectives.

The average turnover rate between 2014-2015 and 2018-2019 was 6%, with an increase to 10% in 2016-2017. NRC's Codes Canada lost a number of employees due to the high demands of the job, including issues with workload, overtime and travel. There is an especially high burden on technical advisors, whose responsibilities range broadly from providing administrative support to research analysis, and from drafting conference presentations to policy papers. Prior to 2018, NRC's Codes Canada had only 12 of 21 technical advisor positions staffed.

In addition to insufficient critical mass, more than half of technical advisors (10 out of 19, 53%) have spent less than three years at NRC's Codes Canada. NRC's Codes Canada managers revealed that it can take between two to five years of training to become an effective technical advisor; therefore, every loss in that area creates a significant competency gap.

Sources: Document review, internal and external interviews, staff survey

SUPPORTING NATIONAL MODEL CODES DEVELOPMENT SYSTEM

Impacts from limited resources

Partners and stakeholders highlighted several challenges resulting from NRC's Codes Canada limited human resources, spanning its different roles / responsibilities. These included:

- Reduced support to Standing Committees, requiring volunteer members that compose the Standing Committees to do more work and/or resulting in lower quality Standing Committee reports on proposed code changes
- Delayed responses to stakeholder and partner inquiries, particularly related to code change requests or interpretation of the codes, resulting in perception that the code development system is not responsive and that stakeholder/partner needs are not considered
- Limited time to dedicate to stakeholder engagement and communication initiatives, resulting in stakeholder perceptions that the code development system is not transparent or clear
- Insufficient training for stakeholders post-code publication, limiting the extent to which they are aware of and understand code changes
- Delayed production of user guides and intent statements that accompany the codes, limiting stakeholders' understanding and use of new code requirements

Additional human resources on the way

It is expected that new funding in support of the free national model codes will allow NRC's Codes Canada to hire up to 23 new full-time equivalents by fiscal year 2022 to support code development activities. This includes several technical advisors as well as 6 new positions to support code-related research and development. According to both NRC's Codes Canada staff, CCBFC and PTPACC representatives, this should greatly improve their ability to achieve objectives and better support the needs of CCBFC and PTPACC, as well as stakeholders.

Sources: Document review, internal and external interviews, staff survey, data review

RESEARCH AND TECHNICAL SUPPORT PROVIDED BY THE NRC

There is an opportunity for NRC's Codes Canada to better demonstrate the value brought by the NRC's in-house research capabilities to the National Model Codes Development System, and to address inconsistencies between its impact analyses – an issue that is currently being explored by a joint CCBFC/PTPACC task group.

For a proposed code change to be considered for approval, it must be supported by:

- research, demonstrating the technical merit and superior performance of the proposed change as compared to previous code provisions, and
- an impact analysis, demonstrating any intended benefit(s) or potential adverse consequences of the proposed change relative to the cost to implement.

Opportunities to demonstrate NRC research value-add

Code change requests submitted to NRC's Codes Canada sometimes require additional research to develop proposed change forms. NRC's Codes Canada is uniquely positioned to fill this gap by leveraging the organization's in-house construction expertise and facilities, or by tapping into its expansive research network to facilitate contact with an external laboratory.

The NRC's ability to access high-quality supporting research was consistently highlighted as one of its unique contributions to the National Model Codes Development System. However, the nature, extent and frequency of these contributions has not been well documented, making it difficult to ascertain the degree to which NRC research impacts and/or benefits the code development process.

Inconsistent depth and rigour of impact analyses

Impact analyses are conducted by the CCBFC Standing Committees, with support from NRC's Codes Canada technical advisors. They make use of the research conducted by NRC (or others) on the technical merit of a code change. While all proposed change forms include an impact analysis, they vary in complexity. Minor changes do not require the same level of rigour as more substantial code changes. However, the level of rigour – relative to the magnitude of the proposed code change – was inconsistent. While these analyses can be difficult to conduct with the benefits in the future and often indirect, and highly dependent on data availability, the following factors contributed to the observed inconsistencies:

- Gaps in expertise across the Standing Committees and NRC's Codes Canada's technical advisors
- Lack of standardized procedures for developing impact analyses
- Varying workloads across the Standing Committees, affecting the capacity of some to conduct rigorous impact analyses
- Primary focus on highly technical wording of proposed code changes, leaving little time to conduct impact analyses

It was also unclear to partners and stakeholders why some proposed changes with less rigorous impact analyses were accepted, while others with more in-depth impact analyses were not. The CCBFC is addressing these issues by way of a joint CCBFC/PTPACC Task Group.

Sources: Document review, internal and external interviews, staff survey

STAKEHOLDER ENGAGEMENT: To what extent has there been engagement with partners and stakeholders? What process is used by NRC's Codes Canada to engage with partners and stakeholders?

Overall finding: As part of its administrative support to the CCBFC, NRC's Codes Canada is responsible for managing communications and engagement with partners and stakeholders and used a number of different communications strategies to do so. Despite this, there remains an overall lack of awareness of the code development process among stakeholders, due in part to insufficient human resources and challenges with key communication channels. Enhanced communication would address the perception that the process is not clear, transparent, or responsive. This would also facilitate greater stakeholder participation in the public review process used in developing the national model codes and key to ensuring that stakeholder input is considered in changes to the codes.

STAKEHOLDER AND PARTNER ENGAGEMENT

There are opportunities for NRC's Codes Canada to increase the transparency and responsiveness of the National Model Code Development System through greater communication of committee business, processes and rationale behind decision-making.

Unique relationship with partners and stakeholders

NRC's Codes Canada is unique from the rest of NRC's Construction Research Centre in that it does not rely on stakeholder/partner engagement to attract business, conduct its research, or – since the implementation of free codes in 2019 – generate revenue. Rather, NRC's Codes Canada interacts with its partners and stakeholders in an effort to:

- disseminate pertinent and timely information regarding the codes, ensuring an open and transparent process
- seek input into the development of, or changes to, the national model codes, ensuring an inclusive and informed process.

Need for increased responsiveness and transparency

Within the National Model Codes Development System, NRC's Codes Canada is responsible for managing engagement and communications with stakeholders on behalf of the CCBFC. However, despite NRC's Codes Canada's efforts to keep stakeholders informed, many perceive the system as a "black box" lacking responsiveness and transparency. Several communications-related challenges were identified as contributing to this perception:

- **Responsiveness** – A common challenge raised by stakeholders pertained to delays in receiving responses to inquiries, noting that e-mails to NRC's Codes Canada often went unanswered for days. Additionally, some partners and stakeholders revealed that, upon submitting a code change request, there was no feedback or communication provided beyond a computer-generated acknowledgement of receipt. Finally, some stakeholders expressed that it takes too long to see changes made to the codes – a perception that may be altered with better communication surrounding the decisions and processes that contribute to these delays.
- **Transparency** – The selection processes for the CCBFC and its sub-committees are well-defined and publicly available. However, the communications channels used to advertise selection processes (i.e., NRC website and e-mails) tend to only reach audiences already connected with the system, contributing to the perception that committee members are selected from within "closed circles". Further, to protect the privacy of committee applicants, interviews and review of applications must be conducted behind closed doors, resulting in little public visibility.

Wider communication of the rationale behind CCBFC decisions, pertaining to both code changes and committee membership, would help improve the perceived transparency of the system.

Sources: Document review, internal and external interviews

STAKEHOLDER AND PARTNER ENGAGEMENT

There are opportunities for NRC's Codes Canada to increase stakeholder awareness of and engagement with the code development process, particularly as it pertains to public review – an important process that ensures stakeholder input is considered in any changes made to the national model codes.

Stakeholder participation in code development

Stakeholders play an essential role in the National Model Codes Development System, acting as proponents of code change requests, members and/or observers of the CCBFC and its sub-committees, and participants in public review consultations. While code change requests can be submitted by anyone at any time and committee meetings are held regularly, public review typically occurs only once a year over a two month period. The public review process is managed by NRC's Codes Canada, and is key to ensuring that stakeholder input is considered in any proposed changes to the national model codes, which in turn supports provincial and territorial adoption of the codes.

Lack of clarity surrounding the code development process

Many stakeholders reported not knowing how to submit a code change request, and/or being unaware that the process was open to the public. Similarly, the main reason provided by stakeholders for not participating in committee meetings was not knowing when or where they were taking place. There was also limited awareness amongst certain stakeholder groups regarding the public review process, except for interested lobby groups who tend to provide the greatest proportion of comments received during public review.

The code development processes have been defined (e.g., in the Policy and Procedures Manual, 2016) and are publicly available on NRC's Codes Canada webpage – the main vehicle for distributing information regarding the codes. However, the site is difficult to navigate and often out-of-date, meaning that information regarding code change requests, committee meetings and public review may be hard for stakeholders to find, or not available at all. In order to elicit greater awareness of and participation in the code development process, an easily accessible, simple and interactive interface will help. Recent recommendations to the CCBFC from the Joint CCBFC/PTPACC study of the National Model Codes Development System include creating an easy-to-use online portal as well as increasing the breadth of stakeholder and public involvement while decreasing lobby comments.

Though insufficient human resources affected the amount of time that NRC's Codes Canada could spend on stakeholder engagement and communication, there is an opportunity for NRC's Codes Canada to take more of an active approach to increasing stakeholder awareness of the code development process, particularly since new hires are planned (as discussed on slide 19).

Sources: Document review, external interviews

ENGAGEMENT AND COMMUNICATION STRATEGIES

NRC's Codes Canada use of code seminars, webinars, presentations and information booths were successful communication strategies to engage with stakeholders that should be continued.

Effective engagement strategies

Partners and stakeholders highlighted several communication and engagement strategies that NRC's Codes Canada has successfully used. These include:

- **Code seminars:** Code seminars are a useful learning tool for stakeholders, albeit costly to the host organization who must cover not only the cost of the event, but the travel expenses for NRC's Codes Canada employees. In an effort to make these seminars available to a wider audience, they are recorded and made available for free through the NRC virtual store.
- **Webinars:** An economical alternative to Code seminars, webinars are an equally useful and interactive learning tool for partners and stakeholders, alike.
- **Presentations:** Technical- or policy-focused presentations at conferences, workshops and other events are well-received and increasingly sought after by certain groups – such as architects, engineers, builders and First Nations – who may be interested in accessing the latest Code changes and/or updates in advance of the Codes being published.
- **Information booths:** Set up at trade shows and other industry events, information booths provide an opportunity to network with stakeholders and distribute promotional materials.

It should be noted that COVID-19 restrictions have and will continue to affect NRC's Codes Canada's ability to implement some of these engagement strategies moving forward.

Sources: Internal and external interviews, document review

ENGAGEMENT AND COMMUNICATION STRATEGIES

There are opportunities for NRC's Codes Canada to improve its website, use of social media, advertising and direct mail campaigns to enhance its communications and engagement with stakeholders in the National Model Codes Development System. Consideration of how to reach and engage stakeholders not already involved in the National Model Codes Development System is also needed.

Opportunities for improvement

Some of NRC's Codes Canada's engagement strategies have been less effective than others. A recent internal survey revealed that less than a quarter of NRC's Codes Canada staff (23%) rated Codes Canada's stakeholder engagement activities as highly effective. Additionally, some of NRC's communication strategies are uni-directional, which limits NRC's Codes Canada's ability to engage with partners and stakeholders. Partners and stakeholders identified specific strategies that NRC's Codes Canada has used, but with challenges. These include:

- **Codes Canada website:** The current Codes Canada web pages, available through the NRC website, are difficult to navigate and often out-of-date, meaning important information may be hard to find or not available at all for stakeholders.
- **Social media:** Since 2014, social media campaigns have had to be launched via the NRC's corporate social media accounts. These accounts are targeted primarily towards researchers and do not necessarily reach Codes Canada's unique audience, thereby limiting their effectiveness as an outreach mechanism.

> *"The website is a bit difficult to navigate and find important things. Some quick links would be useful."* — Partner

- **Advertising:** As paid advertising is not permitted across the NRC, unpaid advertising campaigns have been used to reach stakeholders. For example, NRC's Codes Canada received complaints after the launch of the 2015 model codes because they were unable to advertise and therefore their target audience was left unaware of the launch. The general sentiment was that, to date, they were limited in their reach to stakeholders. There are opportunities to broaden the stakeholders targeted through advertising campaigns.
- **Direct mail and email campaigns:** While targeted mail and e-mail campaigns have been an efficient and cost-effective way to communicate with both partners and stakeholders, to date this has only reached those stakeholders who are already engaged with the system and have provided their contact information. Consideration needs to be given to strategies to reach those that are not currently involved in the code development system.

Sources: Internal and external interviews, staff survey, document review

COMMUNICATION SUPPORT

One factor that affected NRC's Codes Canada's ability to communicate with and meet the needs of its partners and stakeholders was the NRC-wide shift towards centralized corporate communications services. In partnership with NRC's Communications branch, NRC's Codes Canada is working to address some of the challenges.

Shift towards centralized corporate communications services

Prior to the cyber intrusion in 2014 that took NRC servers offline for several months, NRC's Codes Canada managed its own communications. This included the development and distribution of communications products, as well as the administration of an independent website that – while hosted on NRC servers – was not affiliated with the federal government. As the NRC slowly came back online between 2015-2016, and in response to the evolving federal context at that time, the organization made a shift towards a more secure, centralized corporate service structure, which included centralized management of all communications. For NRC's Codes Canada, this also meant the amalgamation of its former website with that of the NRC.

Impact of the shift towards centralized communications services

NRC's Codes Canada currently faces a number of communications-related challenges that impact their ability to meet partner and stakeholder needs. For example:

- As discussed on slide 24, the structure and limited functionality of the current website makes codes content less accessible to partners and stakeholders.
- The current website branding gives the impression that NRC is responsible for the content of the national model codes (model codes products are under the banner of NRC rather than the CCBFC who write the codes), leading to misinformation about NRC's role in the code development system. Additionally, some CCBFC members noted that NRC's Codes Canada products are often so extensively edited by NRC Communications that they no longer reflect the CCBFC's voice as an arms-length decision-making body.
- All external communications products must undergo a rigorous review, translation and approval process by NRC Communications, which often results in significant delays and limits NRC's Codes Canada's ability to publish time-sensitive information via the website or social media channels, or to quickly respond to stakeholder inquiries.

The way forward

The CCBFC and its partners are aware of these challenges and have proposed solutions by way of a draft stakeholder engagement and communications plan, developed in consultation with NRC's Codes Canada. This plan includes strategies such as the use of distinct branding, creation of independent social media channels, and creation of an independent website – similar to the one that existed prior to the cyber intrusion. NRC's Communications branch has begun working with NRC's Codes Canada to address some of the challenges.

Sources: Internal and external interviews, document review

ALIGNMENT WITH NEEDS: To what extent are the codes addressing partners' and stakeholders' needs? Is NRC well-positioned to address future needs?

Overall finding: The needs of partners and stakeholders are identified for each code cycle through a priority-setting process involving the provinces, territories and other stakeholders (e.g. industry). Although there was general consensus that the National Model Codes Development System had struck a balance between considering the costs involved in making code changes with societal expectations and the impact on Canadians, challenges were identified that affected the extent to which stakeholder and partners needs were addressed in the national model codes. There are opportunities for even greater alignment with partner and stakeholder needs in key areas.

MEETING PARTNER AND STAKEHOLDER NEEDS

While there were challenges that affected the extent to which partner and stakeholder needs were met, there is a perception amongst partners that the National Model Codes Development System has struck the right balance between considering the costs involved in making code changes with societal expectations and the impact on Canadians.

A balancing act between cost, benefit and expectations

The CCBFC is responsible for establishing the priorities of each code cycle, and achieves this through a consultative, priority-setting process involving the PTPACC (representing the interests of the provinces and territories) and the CCBFC Standing Committees (representing the interests of industry). As part of its priority-setting process, the CCBFC must weigh the diverse and often conflicting needs of its partners and stakeholders against their associated cost, societal expectations and the ultimate impact on Canadians.

As the national model codes aim to provide provisions that ensure minimum acceptable levels of performance at an effective cost, it can be particularly difficult to align them with stakeholder needs in the areas of accessibility, environment and energy efficiency, which often demand higher standards despite a higher cost. To maintain the independence of the system, NRC's Codes Canada does not influence the priorities of the codes.

Challenges in meeting partner and stakeholder needs

The success of the National Model Codes Development System relies on the effective interplay between the roles and responsibilities of its partners and its established policies and procedures. Several factors affected the extent to which the system was perceived to have aligned the national model codes with partner and stakeholder needs, including:

- **An unstructured priority setting process:** Prior to 2016 and the implementation of a priorities task group, the CCBFC's priority-setting process was inconsistent and unstructured, which resulted in the under-representation and/or mis-communication of the needs and priorities of certain partners and/or stakeholder groups.
- **Governance challenges:** Inefficiencies in the operations of the CCBFC and its subcommittees, including gaps in representation of partners and stakeholder groups across committees, contributed to delays in making code changes and influenced the extent to which all partner and stakeholder needs were taken into consideration (discussed further on slide 31).
- **Limited communication:** Due in part to insufficient human resources, NRC's Codes Canada was limited in its ability to follow-up and communicate with stakeholders regarding CCBFC decision-making processes and rationale, which in some cases contributed to stakeholders' perception that their needs were not considered.

Despite these challenges, there is a perception amongst partners that, overall, the system has struck the right balance.

Sources: Internal and external interviews, document review

MEETING PARTNER AND STAKEHOLDER NEEDS

There are opportunities to better align the national model codes with partner and stakeholder needs in fire and structural protection of buildings, accessibility, health and safety, and the environment.

Partner and stakeholder priorities generally align with the overarching objectives of the national model codes (e.g., fire and structural protection of buildings, accessibility, health and safety, and the environment), but within these objectives, there are opportunities for the National Model Code Development System to better respond to specific needs of its partners and stakeholders. In order to achieve harmonization of building regulations across Canada, the national model codes must align with the needs of the provinces and territories. However, in order to remain relevant and unbiased, they should also consider the needs of stakeholders. Opportunities for greater alignment include:

❖ **Fire and structural protection of buildings:** Some partners and stakeholders raised concerns that the existing provisions in the national model codes are based on outdated research (e.g., for the minimum standard for firefighter response rates), outdated construction techniques and technologies, and have a limited focus on buildings of a given size (e.g., the combustion performance of 2-3 storeys). Additionally, and although sprinkler provisions have been strengthened in recent versions, some stakeholders noted that the national model codes could further align with their needs by requiring sprinklers in new buildings, in particular for senior care facilities and residential buildings up to three storeys. These proposals, however, have already been fully reviewed and considered by the CCBFC, and there is no consensus to move forward with these changes.

❖ **Health and safety**: Some stakeholders highlighted that more could be done to improve health and safety. For example, while the CCBFC has made changes to the codes in support of stairway safety, it was suggested that code provisions could be further strengthened to reduce stairway-related injuries and falls.

❖ **Accessibility:** Some partners and stakeholders do not feel as though the codes sufficiently address issues of accessibility. For example, some provinces and territories choose to adopt international accessibility standards as opposed to the national model codes as they contained greater requirements for barrier-free accessibility (e.g., Nova Scotia and Manitoba).

❖ **Environment:** Partners and stakeholders feel that are opportunities for the national model codes to push the boundaries to meet overall provincial and territorial climate change goals, the commitment to net-zero ready building codes, and energy efficient alterations to existing buildings.

Sources: Document review, external interviews

NATIONAL MODEL CODES IN INDIGENOUS COMMUNITIES

NRC's Codes Canada recognizes supporting Indigenous communities as a long-standing federal government priority, and as such has begun work towards addressing the need for the model codes to consider the specific conditions in the North.

Indigenous Housing – Need for a tailored code

Supporting Indigenous communities is a long-standing federal government priority. In 2016-2017, a Senate Standing Committee on Aboriginal Peoples recommended that there is a need for formal adaptation of the national model codes to address the conditions in the North.

According to the Inuvialuit Regional Corporation, housing in the North has been designed and constructed per southern perspectives and practices, identifying in particular the National Building Code and various green building rating systems, which in all cases are primarily intended for a southern context. Examples identified by the Standing Committee's reports included:

- Use of wood can be inappropriate as it bends and sags under extreme variations in temperature experienced in the North
- Codes are missing key features essential for homes in the North, such as wind barriers, which results in homes being too cold in winter and too hot in summer

The NRC recognizes the need to support Indigenous communities and has begun work to address the need for the model codes to consider the conditions specific to the North.

Codes Canada is currently taking a number of steps to address the gap

NRC's Codes Canada is looking at the content of the model codes to see how they could be adapted for the unique challenges faced by Indigenous communities in remote Northern locations. In collaboration with the First Nations National Building Officers Association, the NRC is developing the Technical Construction Guidelines for Adaptable Housing in First Nations Communities in Canada. This guide will include recent research on adaptation for Northern climates. Based on an update provided by NRC's Canadian Construction Materials Centre to the CCBFC in fall 2018, the adaptation guide is expected to be completed by 2021.

Source: Document review

RESPONDING TO PRIORITIES: To what extent does the governance model of the National Model Codes Development System support its objectives (i.e., development and publishing of the national model codes in response to the priorities of the provinces and territories and CCBFC)?

Overall finding: The National Model Codes Development System has an established governance model designed to support the development of national model codes that are responsive to the needs and priorities of its partners and stakeholders. However, there have been challenges in the implementation of the governance model that have influenced its ability to do so effectively. In addition, a number of risks linked to consensus-based decision making, a core principle of the National Model Codes Development System, were identified. Recognizing that there have been shortcomings in the governance model, the CCBFC and its partners have conducted several reviews of the National Model Codes Development System.

GOVERNANCE MODEL – COMMITTEE EFFECTIVENESS

Challenges with the implementation of the National Model Codes Development System's governance model have contributed to inefficiencies and delays in developing the national model codes, and consequently delays in addressing the needs and priorities of partners and stakeholders.

The objective of the National Model Codes Development System is to develop and publish national model codes in response to the priorities of the provinces, territories, and the CCBFC. In support of this, a governance model has been established. The implementation of this model is supported by the CCBFC's *Policies and Procedures* manual, which documents the system's operating procedures, terms of reference for the CCBFC and its sub-committees, and a description of the supporting role of NRC.

Inherent to the success of the governance model is effective coordination between all parties - this includes the CCBFC, its associated committees (i.e., Executive Committee, Standing Committees, Task Groups and Working Groups) and PTPACC. The evaluation identified several challenges with the operation and coordination of the CCBFC and its committees, affecting the efficient and timely development of the national model codes:

- **Uneven Standing Committee workloads:** The CCBFC has nine Standing Committees, each of which is responsible for a distinct model code or section of a model code. However, the workloads between them vary, with five of the Standing Committees reviewing over 70% of all code change requests.
- **Minimal cross-committee coordination:** Standing Committees often work on proposed changes that may affect other sections of the model code(s). In these cases, cross-committee coordination is needed to ensure the early detection of consequential changes and/or conflicts, limiting discrepancies, duplication of efforts and further delays. However, there is currently no defined trigger or process to support cross-committee coordination.
- **Limited frequency of CCBFC meetings:** The CCBFC typically meets face-to-face only once a year to discuss and approve proposed code changes. As such, any business that cannot be resolved during its annual two-day meeting may be deferred to the next session for approval, which results in a one-year delay in the code development process. Some partners also expressed concern that annual meetings do not allow for CCBFC members to remain engaged, and that some may lose touch with the current affairs and priorities of the National Model Codes Development System.

The CCBFC is aware of these challenges and working to improve the effectiveness of its committees by redistributing workloads, adjusting the frequency and content of meetings, and increasing communication and engagement with members.

Sources: Document review, internal and external interviews

GOVERNANCE MODEL – CONSENSUS-BASED DECISION MAKING

There are risks to the effectiveness of consensus-based decision making, a key principle in the governance model to ensure that the priorities of partners have been discussed and considered in the development of the national model codes. These risks include gaps in representation on the CCBFC and its Standing Committees, varying understanding of consensus-based decision making and barriers to meeting attendance.

In order to ensure that the national model codes respond to the priorities of partners, the National Model Codes Development System's governance model uses consensus-based decision making, whereby decisions are made based on substantial agreement of members on CCBFC and its associated committees (e.g., Standing Committees, Task Groups). Consensus does not imply unanimity, but refers to the substantial agreement of committee members (i.e., 67%) after all opinions have been considered and discussed. Several challenges present risks to the effectiveness of consensus-based decision making.

Identified gaps in committee representation

The CCBFC, Standing Committees and Task Groups aim to ensure a geographically-balanced representation of industry, regulatory and general interest groups to ensure all perspectives are considered in developing the national model codes. Despite this requirement, certain stakeholder groups have been underrepresented across both the CCBFC and Standing Committees (i.e., professional associations of engineers, architects, builders; public health advocacy groups; energy and climate change; accessible design, and international code development).

The CCBFC is aware of these gaps and is working to identify new candidates that will help restore the balance to the CCBFC and its Standing Committees. In addition, CCBFC is looking to attract younger candidates, more female candidates (an average of 19.5% of members are women), and representatives from northern and indigenous communities to address gaps in minority representation.

Varying understanding of consensus-based decision making

The concept of consensus-based decision making is documented in the CCBFC's *Policies and Procedures* guide and explained during the first orientation session of the new code cycle. However, some Standing Committee members do not have a sound understanding of the consensus principle or how it is achieved. Contributing to this is the finding that consensus-based decision making does not appear in the Standing Committee terms of reference and as it is explained only at the onset of each code cycle, any new member that joins the committee mid-cycle (e.g., as a result of turnover), may not be informed.

Sources: Document review, internal and external interviews

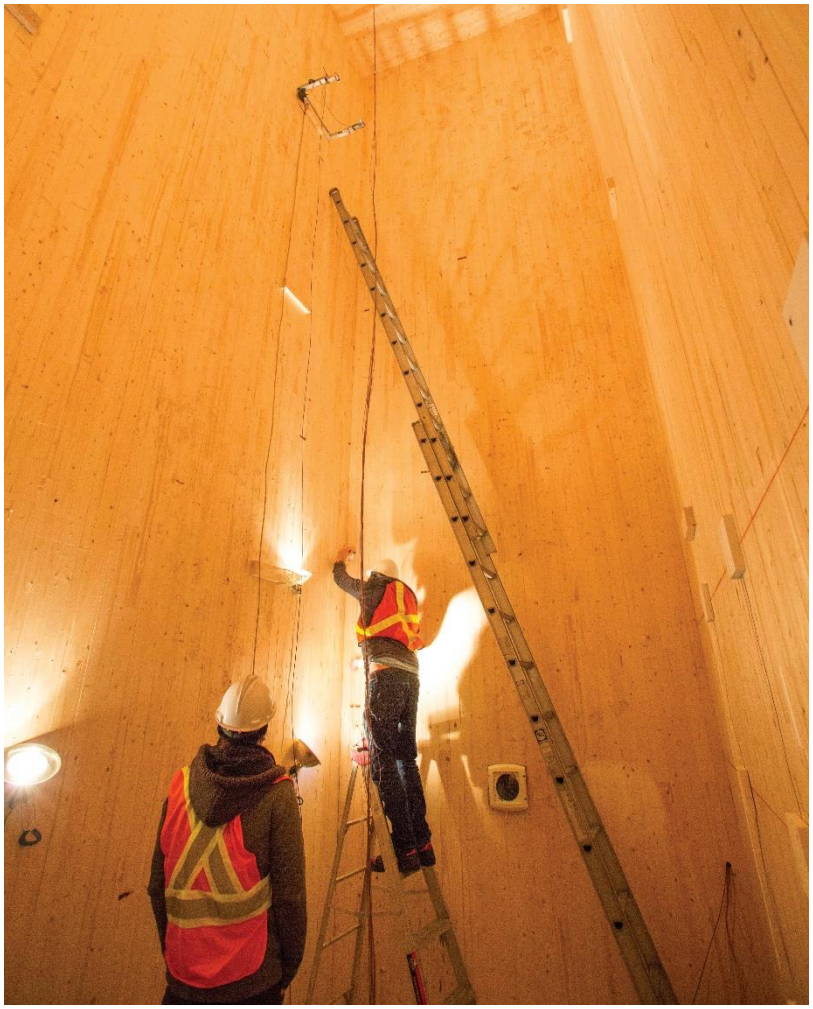
GOVERNANCE MODEL – CONSENUS BASED DECISION MAKING

Meeting attendance

Consensus-based decision making requires that at least 50% of the voting members on a committee be present for a decision to be made. Barriers to meeting attendance present a risk to this requirement, and includes:

- **Timing of meetings:** A majority of Standing Committee members sit on more than one committee, and Standing Committee meetings may occur at the same time and/or in different locations (requiring travel).
- **Length of meetings:** CCBFC meeting minutes revealed that members were often only available to attend one of the two consecutive days scheduled for their annual meeting.

Given that some Standing Committees have a recommended minimum number of voting members as low as 16, the absence of a few voting members may significantly impact representation from a particular interest group and the committee's ability to ensure unbiased discussion and decision making.



Sources: Document review, internal and external interviews

ONGOING GOVERNANCE REVIEWS

There have been several CCBFC and PTPACC governance and process reviews conducted in an ongoing effort to improve the operations of the National Model Codes Development System to better support the achievement of its objectives.

The partners of the National Model Codes Development System (i.e., NRC, CCBFC and PTPACC) have long recognized that there is room for improvement with the existing model. To this end, they have commissioned several reviews in an effort to improve the governance model and better support the objective of producing national model codes that respond to the priorities of partners.

Review of the code development system

In 2016, a Joint CCBFC-PTPACC Task Group conducted an extensive review of the performance of the National Model Codes Development System, including an assessment of the effectiveness of the system acting as a coordinated unit. This review produced 27 recommendations for improvement, which addressed issues related to the support and participation of the provinces and territories, engagement of stakeholders in the system, and the funding mechanisms required to sustain a coordinated codes development system. Almost all of these recommendations have either been implemented or are in progress.

Review of processes used in code development

A follow-up review was conducted in 2019 by another Joint CCBFC-PTPACC Task Group, with a focus on the processes used to develop the national model codes (i.e., code change requests, task approvals, priority setting, public review, CCBFC approval and publication). The 2019 review, which also produced a series of recommendations, is to be approved by all partners by fall 2020.

Review of governance model

In addition to the above, and resulting from the 2017 Canadian Free Trade Agreement Regulatory Reconciliation and Cooperation Table agreement's objective to increase harmonization of the national model codes across provinces and territories, NRC's Codes Canada commissioned the Institute on Governance in 2019 to conduct a review of the system's governance model. The review sought to identify challenges in the current governance model, the ideal state, and identify alternative options that would better support the objectives of the National Model Codes Development System.

A working group led by the provinces and territories (with support and participation from the CCBFC and NRC's Codes Canada) is currently weighing these options and has committed to implementing a new code development system, including governance model, by December 2021.

Source: Document review

PROVINCIAL HARMONIZATION: To what extent was provincial and territorial commitment to the national model codes renewed? How did Codes Canada activities lead to increased adoption rates and uniformity of codes in Canada and contribute to reduced interprovincial trade barriers?

Overall finding: National model codes were designed to reduce variations in provincial and territorial building regulations, minimize interprovincial trade barriers, and improve the competitiveness of the Canadian economy. However, variations between provincial and territorial codes still exist; harmonization has not yet been achieved. As a result of the Canadian Free Trade Agreement, efforts are underway to address provincial and territorial regulatory differences in an effort to increase harmonization. In support of increased harmonization of the codes across provinces and territories, NRC's Codes Canada introduced free electronic model codes in 2019. This has resulted in increased access to the codes. While the ultimate goal of free electronic model codes is to support increased harmonization to reduce trade barriers between provinces and territories, it is too early to assess this.

HARMONIZATION OF CODES

Harmonization of building, fire, plumbing and energy codes across provinces and territories has not yet been achieved in Canada – variations in provincial and territorial regulations still exist. While more provinces and territories have adopted the latest versions of the national model codes than the 2010 versions, the length of time it took to adopt them was slightly longer than in the previous code cycle.

Harmonization for economic gain

"Harmonization" is the term used to describe federal and provincial efforts to align building, fire, plumbing and energy regulations across the provinces and territories, in an effort to reduce interprovincial trade barriers and improve the competitiveness of the Canadian economy. Harmonization would promote the consistent and timely adoption of the national model codes and significantly reduce the input and/or compliance costs for the construction industry. An internal NRC estimate produced in 2012 projected that a 5% increase in code harmonization could reduce compliance costs for manufacturers and designers by $440 million. The stated increase in harmonization was also projected to reduce waiting and inspection time for builders by 16 weeks.

Varying degrees of adoption / adaption between provinces and territories

As building, fire, plumbing and energy regulations are ultimately governed at the provincial/territorial level, provinces and territories have the ability to: adopt the national model codes as they are or with few variations, adapt the national model codes in order to publish their own codes, with more substantial variations or neither adopt nor adapt the national model codes.

According to NRC's Codes Canada's website, a greater number of provinces and territories have either adopted or adapted the latest (2015) versions of the national model codes than the 2010 versions, thus demonstrating increased commitment to the national model codes. That said, the time it took for these provinces and territories to adopt the 2015 National Fire Code and National Building Code also increased as compared to the 2010 code cycle. The exception was 2015 National Plumbing Code, which took less time to adopt compared to the 2010 version (i.e., three months faster).

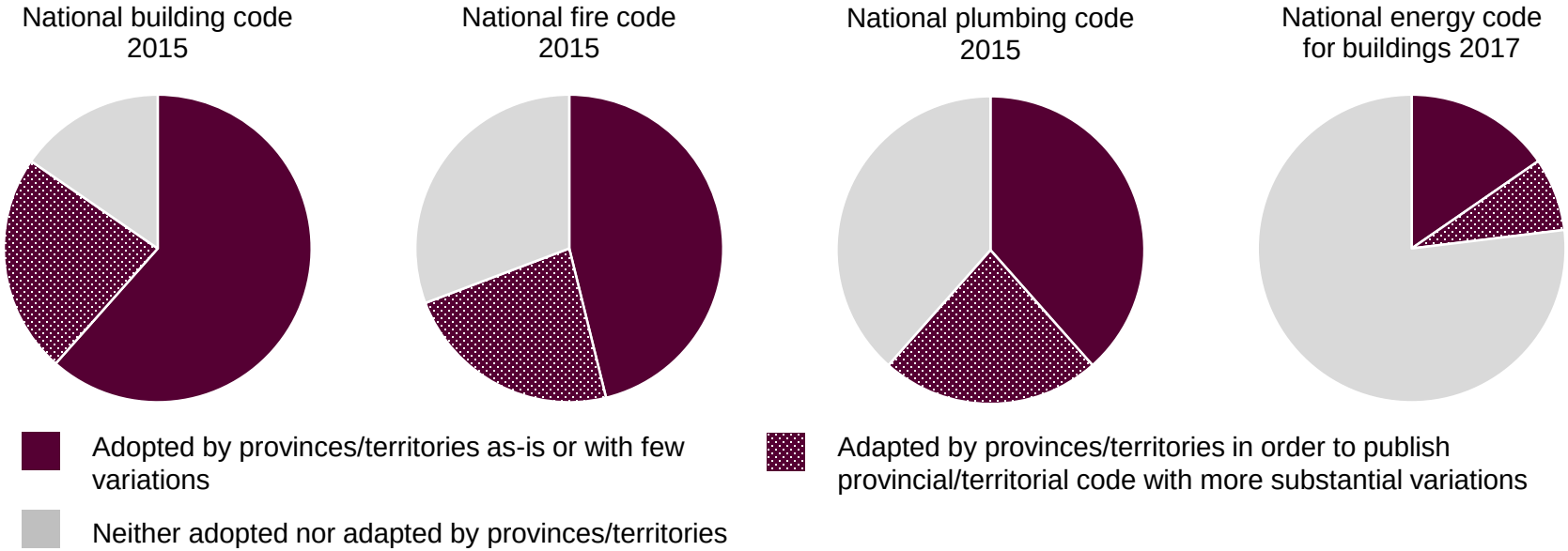
Sources: Document review, data review

HARMONIZATION OF CODES

While many provinces and territories have adopted the national model codes with few to no variations, there are four provinces (i.e., Ontario, Quebec, Alberta and British Columbia) that have previously published their own codes, adapting only components of the national model codes. While this is due in part to societal, economic, environmental and political factors (e.g., legislative requirements; see next slide for other factors), these variations contribute to continued interprovincial trade barriers. Specific examples include:

- Alberta and British Columbia use their own building, fire and plumbing codes, with adaptations from the national model codes.
- Quebec uses its own building and plumbing codes, with adaptations from the national model codes, but its major municipalities adopt the national fire code.
- Ontario codes differ significantly in content and scope from the national model codes, with estimated variations as high as 30%.

Provinces and territories more readily adopted or adapted regulations based on the national building code than any other model code:



Sources: Document review, data review

Source: NRC's Codes Canada website

FACTORS INFLUENCING HARMONIZATION

Provinces and territories readiness to adopt/adapt the national model codes for harmonization is influenced by political, societal, economic and environmental factors. However, as a result of the Canada Free Trade Agreement, efforts are underway to address regulatory differences and increase harmonization of codes across the provinces and territories.

Several factors influence timely code adoption

There are a number of factors that influence provincial and territorial readiness to adopt the national model codes, including:

- Political – political will and interests of the governing provincial and territorial parties; legislative requirements
- Societal – societal pressure after a tragedy (e.g., a call for tougher fire codes after a major fire)
- Economic – provinces and territories tend to prioritize their more prosperous industries (e.g., provinces with rich forestry industries may prefer the use of wood products)
- Environmental – some provinces and territories are more proactive about climate change and may require more stringent rules

Changes for timely adoption and increased harmonization

Delays in code adoption/adaption can result in unnecessary costs and duplication of efforts. As a result of the 2017 Canadian Free Trade Agreement, the provinces and territories have recently committed to working with its partners in the code development system to achieve harmonized codes. To facilitate this process, the partners within the National Model Codes Development System have agreed to increase harmonization by:

- Reducing and eliminating variations in construction codes' technical requirements – to this effect, efforts are underway to address the technical differences between provincial, territorial and national model code requirements in an effort to increase harmonization
- Transforming the national code development system to meet the needs of all parties **–** to this effect, a review of the governance model used in the National Model Codes Development System began in 2019-2020
- Ensuring timely adoption of construction codes – to this effect, a recent joint study by the CCBFC and PTPACC identified several steps to accelerate adoption processes across provinces and territories (e.g., ensuring that partners understand their responsibilities as they pertain to code implementation, developing guidance documents to ensure a consistent and timely approach to model code adoption, implementing a formal process to involve provinces and territories in decisions related to code publication, revising the administrative requirements of national model codes)
- Offering free electronic national model codes – to this effect, in April 2019, the Government of Canada, through NRC's Codes Canada, introduced free online access to the national model codes

Sources: Document review, data review

IMPACT OF FREE CODES ON HARMONIZATION

In 2019, the NRC's Codes Canada began offering free electronic model codes in an effort to reduce trade barriers and encourage harmonization of codes. While this change resulted in an increase in access to the codes within the construction industry, it is too soon to assess the impact on interprovincial trade barriers.

In response to the Canadian Free Trade Agreement, NRC's Codes Canada has committed to working with the provinces and territories towards the timely adoption and harmonization of building regulations across Canada. In support of these efforts, the Government of Canada, through NRC's Codes Canada, introduced free online access to the national model codes in April 2019, and significantly reduced the price of printed copies of the national model codes and technical guides.

Increased accessibility of codes

The introduction of free electronic codes has positively affected the accessibility of the national model codes. In the first 8 months of free electronic access, the number of electronic code orders rose to approximately 78,500 – a number more than 2000% greater than that of orders placed during the same 8-month period the previous fiscal year (i.e. 3,665). Free online codes have also increased access among engineering and architecture students. Prior to free access, students were only able to discuss sections of the codes as professors were not permitted to copy the codes due to copyright laws and most students did not own their own copies because they were too costly for them. Now, these students will be able to study the codes in depth, contributing to better trained graduates.

With that said, there were some concerns highlighted by partners and stakeholders that not everyone in the industry was aware that the electronic codes are available for free. Although a targeted and time-limited communications plan was developed to promote the transition to free Codes in early 2019, the evaluation found that important components of the campaign, including a media release, were never actioned.

Interprovincial trade barriers still present

Given that free codes were only introduced in April 2019 and within the last code cycle, it is too early to assess whether the adoption rate of provinces and territories has increased and, consequently, whether free codes have had an impact on interprovincial trade barriers. Moving forward, NRC's Codes Canada will continue to collect data to measure these expected medium- and long-term results. With that said, there is a consensus amongst partners and stakeholders that – while making the national model codes free was a step in the right direction – there will be no reduction in trade barriers until the national model codes are harmonized.

Sources: Document review, internal and external interviews

IMPACTS: How did Codes Canada activities result in societal benefits?

Overall finding: NRC's Codes Canada has contributed to societal benefits through the administrative and technical support it provided to develop the national model codes. Changes made to the 2010 and 2015 national model codes have contributed to economic, environmental, health and safety impacts for Canadians as well as improved structural protection of buildings. Proposed changes to be made to the 2020 codes are expected to also have positive benefits for society.

SOCIETAL BENEFITS

All proposed changes to the national model codes are expected to be in line with each code's objectives (i.e., health; safety; accessibility for persons with disabilities; environment; and fire and structural protection of buildings) and must contribute to societal benefits. However, it is difficult to quantify the extent of these contributions.

Code changes must be aligned with societal benefits

The first national building code was produced in 1941, setting the minimum acceptable requirements for safety, accessibility and efficiency of new buildings in Canada. However, as construction technologies, materials and techniques changed over time, so did the societal understanding and expectation of what is acceptable. In an effort to ensure that the latest standards and innovations are applied safely by the construction industry to new buildings, the national model codes are updated on a cyclical basis – most recently, every five years.

As discussed on slide 20, proposed changes to the national model codes must be supported by research and analyses to demonstrate their technical merit and superior performance over existing regulations, as well as any other intended or unintended impact the change may have on society. Additionally, all proposed changes are expected to be in line with the objectives of the national model codes, i.e., health; safety; accessibility for persons with disabilities; environment; and fire and structural protection of buildings.

While it is understood that the National Model Codes Development System (and, inherently, NRC's Codes Canada) contributes to societal benefits (e.g., fewer fire-related deaths, fewer building collapses, fewer major disasters) through the provision of updated standards and regulations, it is challenging to measure the extent of their impact, given the number of other factors that may be involved. Societal benefits linked to changes made to the model codes may also take decades to be realized, which is due – in part – to the variation in provincial and territorial adoption rates.

Sources: Document review, external interviews

IMPACTS OF MODEL CODE CHANGES

Changes made to the 2010 and 2015 national model codes have contributed to economic benefits, environmental outcomes, enhanced structural integrity of buildings and improved health and safety of Canadians.

The 2010 national building codes included many changes from previous code versions. These changes have resulted in new or refined requirements for buildings that will in turn contribute to societal benefits, including improved health and safety and protection of buildings. Examples of these include:

Code change	Societal benefits
The 2010 national building code introduced provisions to reduce radon exposure in buildings	**Health**: New radon requirements increased builders' knowledge and awareness of the risks associated with radon exposure. The new requirements will lower radon concentration levels and will contribute to a reduced rate of lung cancer among Canadians. This change is thought to have more impact than any kind of healthcare intervention (i.e., medication) in reducing the risk of lung cancer.
The 2010 national fire code introduced requirements for audible fire alarms	**Safety**: As a result of audible fire alarms, fires can be detected earlier. This is especially important for certain populations who may be slower to respond to auditory cues, such as the elderly, school age children, those who are alcohol-impaired, persons with hearing impairment, people in care homes, residential units, multi-home units, and homeless facilities. **Fire protection of buildings**: Audible fire alarms lead to earlier detection and faster emergency response times which help protect homes and other buildings from extensive smoke and water damage due to fires.

Sources: Document review, external interviews

IMPACTS OF MODEL CODE CHANGES

Building on the 2010 national building codes, further improvements were made to the 2015 national model codes that have resulted in new or refined requirements for the built environment that will contribute to societal benefits, including improved health and safety and protection of buildings. Examples of these include:

Code change	Societal benefits
The 2015 national building codes allowed for buildings constructed from combustible materials (i.e., wood) to increase from four storeys to six, and included new protection measures for wood buildings (e.g., sprinklers on balconies, non-combustible materials, stair signs and street addresses)	**Economic**: As a result of these changes, mid-rise combustible construction expanded to provinces beyond British Columbia, who had introduced these provisions in 2009. As wood is cheaper to use than concrete in some provinces and territories (e.g., British Columbia), this offers a more affordable option for home buyers. **Environmental**: The construction of wood buildings has resulted in lower greenhouse gas emissions, due to the lower level of energy and carbon needed to produce wood. **Safety**: New protection and security measures for wood buildings have reduced the risk of injury due to fire and structural collapse in existing buildings and those under construction.
The 2015 national building code introduced a new apparent sound transmission class metric to provide a more accurate measurement of the sound level experienced by building occupants	**Health**: The new apparent sound transmission class metric provides a more accurate measurement of the sound level experienced by building occupants by capturing noise from both direct and indirect sound transmission. As such, it contributes to improved health outcomes, such as reduced stress, stronger immune systems, reduced levels of depression, better sleep and lower blood pressure.

Sources: Document review, external interviews

IMPACTS OF MODEL CODE CHANGES

Code change	Societal benefits
The 2015 national building codes introduced updated seismic hazard values for 679 geographical locations across Canada, used when determining the requirements needed for a building to withstand seismic activity	**Economic**: Changes to the seismic hazard values have resulted in better estimates of actual seismic hazards, and help to minimize the damage to buildings in the event of an earthquake – limiting disruptions to businesses and reducing post-earthquake response and recovery costs. An unintended economic impact, beyond the built environment, was also identified. The updated hazard model resulted in better earthquake data that was then used in decisions to better protect certain Canadian locations, key to our economy, from seismic activity. This includes the Vancouver port, in which major Canadian exports go through, and the northern region, which has a reservoir of rich natural resources. **Structural protection of buildings**: These new requirements led to the development of an earthquake model for buildings and better collection of earthquake data, which is used to improve the design and construction of new buildings. **Safety**: Seismic hazard values help inform the design and construction of buildings such that they can withstand major earthquakes and structural collapse, thereby protecting human life. New requirements also prevent breaking and falling glass, thereby decreasing harm to occupants.

Sources: Document review, external interviews

POTENTIAL IMPACTS OF FUTURE CODE CHANGES

Proposed changes to be made to the 2020 national model codes are projected to have positive impacts on health, safety and the environment.

Proposed code changes expected to have positive impacts

The 2020 national model codes are set to be published in 2021. Changes to the codes in this latest edition are expected to continue having positive benefits for society. Impact analyses conducted as part of the code change request process demonstrate the following examples as potential impacts:

- Safety & economic impacts – it is estimated that installation of grab bars in bathtubs and showers could – under the best case scenario – prevent fall-related injuries and deaths by up to 50%, for a reduction of up to $2.7B CAD in direct and indirect health care costs by 13 years post-installation.
- Accessibility impacts – it is estimated that the building costs associated with expanding the barrier-free path of travel to all storeys in buildings is similar to that of installing an elevator, and would help ensure the accessibility of all floor levels even in the absence or malfunction of elevators or similar equipment.
- Environmental impacts – improved air infiltration rates in buildings is expected to result in an average of 5,6% - 12.6% of energy savings, and reduced maximum allowable prescriptive window and door area to gross wall area ratio to reduce energy consumption and energy loss (e.g., air leakage, thermal heat transfer) is expected to result in average energy savings upwards of 11%.

Sources: Document review, external interviews

CONCLUSIONS AND RECOMMENDATIONS • Codes Canada

CONCLUSION

NRC's role and activities

The NRC's role in the National Model Codes Development System is consistent with that of other federal organizations in comparable countries, and is complementary to that of the other national partners. The NRC adds value to the codes development system through its neutrality, national perspective, in-house research capabilities and connections to other research organizations. There are, however, opportunities for the NRC to better demonstrate and improve the contribution it makes to the national model codes through its research. While the roles and responsibilities of the NRC, the CCBFC and the provinces and territories are well documented, stakeholders did not understand the NRC's role relative to that of other partners and accountabilities are not always clear.

The extent to which NRC's Codes Canada was able to efficiently support the National Model Codes Development System was affected by insufficient human resources. Resulting impacts included reduced administrative and technical support provided to the CCBFC and delays in the production and dissemination of material to support new codes. Limited time was also available for NRC's Codes Canada to support engagement and communication with partners and stakeholders. This, in addition to other factors, resulted in an overall lack of awareness of the code development process amongst stakeholders. Addressing challenges with the website, use of social media and direct mailing and advertising campaigns may help address the perception that the code development process is not clear, transparent, or responsive as well as elicit greater stakeholder participation in the process. Additional resources are planned and expected to help NRC's Codes Canada deliver on its mandate in support of the National Model Codes Development System.

Aligning codes with needs and responding to priorities

Opportunities for better alignment between the national model codes and the needs of partners and stakeholders were identified. Challenges with the CCBFC's priority-setting process and operations of the CCBFC and its committees affected the extent to which the needs of all partners and stakeholders were addressed by the codes. These challenges also contributed to inefficiencies and sometimes delays in the publication of the codes. Risks to consensus-based decision making, a key principle used by the CCBFC to ensure all partner opinions have been considered and discussed when developing the codes, were identified. As a result of several governance reviews, the CCBFC and its partners are seeking strategies to address the short comings in the implementation of the current governance model. In addition to these challenges faced by the CCBFC, the limited time that NRC's Codes Canada staff had for communication and engagement with partners and stakeholders, and the resulting lack of awareness of the code development system, contributed to the perception that stakeholder needs were not always considered.

Performance of national model codes

The national model codes were designed to reduce variations in provincial and territorial regulations to minimize interprovincial trade barriers and improve the competitiveness of the Canadian economy. However, variations continue to exist due to political, societal, economic and environmental factors. The Canadian Free Trade Agreement has resulted in efforts to address these provincial and territorial regulatory differences. To support harmonization of codes across provinces and territories, the NRC introduced free electronic model codes in 2019. While this has resulted in increased access to the codes, it is too early to assess their impact on interprovincial trade barriers given that they have only been in place for just over a year. That said, the national model codes, which the NRC has contributed to, have had positive impacts on the health and safety of Canadians, the structural protection of buildings and the environment.

RECOMMENDATIONS

Recommendation	Rationale
1. NRC's Codes Canada should work with the CCBFC to ensure that challenges with the current governance are addressed, including the: a. priority setting process used by the CCBFC b. transparency of the CCBFC and its committees selection processes c. operation and coordination of the CCBFC committees d. need for greater clarity around accountabilities in the national model code development system.	Several challenges with the implementation of the National Model Code Development System were identified, particularly related to the operation of the CCBFC and its processes used. This includes uneven Standing Committee workloads, limited cross-committee coordination and frequency of CCBFC meetings, gaps in representation of partners and stakeholder groups across various CCBFC committees, varying understanding of consensus-based decision making (a key principle to ensure that all stakeholder/partners needs are considered) and barriers to meeting attendance. The priority-setting process used by the CCBFC is inconsistent and unstructured. In addition, stakeholders did not view the selection process used by the CCBFC as transparent. Recognizing that there have been shortcomings in governance, the CCBFC has conducted several reviews, which have identified similar challenges as those highlighted by the evaluation. While the CCBFC is responsible for addressing the shortcomings in its operations, NRC's Codes Canada is accountable to ensure that these actions are completed. As the NRC must walk a fine line of allowing the CCBFC to maintain its independence while still being accountable, it is recommended that the NRC take steps to add greater clarity around its accountabilities in the national model code development system.

RECOMMENDATIONS

Recommendation	Rationale
2. NRC's Codes Canada should clearly communicate to stakeholders the roles and responsibilities of the partners involved in the National Model Codes Development System.	Roles of responsibilities of partners and stakeholders in the National Model Codes Development System are outlined in the 2016 *Policies and Procedures* document; however, stakeholders are still unclear as to how the NRC's role differs from that of the CCBFC and provinces and territories. Furthermore, there is a lack of understanding that National Model Code decisions are made by an independent body of experts. NRC's Codes Canada has an opportunity to clarify misunderstandings by clearly communicating the roles and responsibilities of those involved in the code development system. This could include removing barriers that are contributing to the confusion, such as the absence of a distinct CCBFC website.
3. NRC's Codes Canada should improve awareness of the code development process among stakeholders with a particular emphasis on the: a. public review process b. process to submit a code change request c. selection and decision-making processes for the CCBFC Executive Committee and its Standing Committees d. timing of CCBFC and its sub-committee meetings To implement these improvements, NRC's Codes Canada could consider strategies to improve the Codes Canada website and make better use of social media and advertising campaigns. Consideration of how to reach and engage stakeholders not already involved in the National Model Codes Development System is also needed.	NRC's Codes Canada engages stakeholders to share information regarding the national model codes and seeks input into the development of changes to the codes. While the code development processes have been defined and are publicly available on the NRC website, awareness of these processes is limited among stakeholders. Prior to 2014, NRC's Codes Canada managed its own communications, including the development and distribution of communications products and administration of an independent website. Since then, it has been a challenge to reach stakeholders, particularly given that the NRC's website is difficult to navigate and the information is often out-of-date. Moreover, NRC's Codes Canada has struggled to reach its intended audience through current advertising and social media campaigns. Often, such advertising campaigns have only reached stakeholders already involved in the code development system. Enhancing communications with stakeholders would increase their understanding of the system.

RECOMMENDATIONS

Recommendation	Rationale
4. NRC's Codes Canada should identify a way to capture its research contribution (and any associated impact) to changes or proposed changes to the national model codes. These measures should be tracked and monitored on a regular basis to ensure that NRC is continuing to add value from its research contributions, different than what could be provided by external laboratories.	Partners and stakeholders noted that the NRC has research expertise that supports the National Model Codes Development System and adds credibility to the entire process. The evaluation found evidence that NRC research is used to support proposed changes. However, NRC's research contribution, or the associated impacts from its research on the national model codes, are not well tracked. Improvements to tracking would help demonstrate NRC's contribution to the overall National Model Codes Development System.

Management response and action plan foreword / context

As part of the ongoing implementation of the Regulatory Reconciliation and Cooperation Table (RCT) agreement, stemming from the 2017 Canadian Free Trade Agreement, the National Model Code Development System is being transformed. The transformation includes re-defining roles and responsibilities of partners, revising the procedures to increase efficiency of the system, and also includes drafting and implementing a Communications Plan to inform stakeholders of details of the new transformed system. A gradual transition to the new code development system will take place, scheduled to be completed in December 2021.

The current governance system will remain operational and the evaluation recommendations will be implemented during this time. Where appropriate, the recommendations will also be taken into account when defining the implementation plan for the new governance system of the transformed system.

MANAGEMENT RESPONSE AND ACTION PLAN

Recommendation 1			
NRC's Codes Canada should work with the CCBFC to ensure that challenges with the current governance are addressed, including the: priority setting process used by the CCBFC; transparency of the CCBFC and its committees selection processes; operation and coordination of the CCBFC committees; and need for greater clarity around accountabilities in the national model code development system. **Risk-level associated with not addressing recommendation: High**			
Management Response	**Measure of Achievements**	**Proposed Person(s) Responsible**	**Expected Date of Completion**
Response: Agreed. **Action**: Develop and implement, in collaboration with the CCBFC, a plan to address governance challenges in the current National Model Code Development System. This includes identification of what can be changed under the current system versus what will be addressed as part of the transformed system. In collaboration with provinces/territories, ensure that challenges from the evaluation are considered by the RCT Transition Committee, who is responsible for deciding and implementing the improved governance model in the transformed National Model Code Development System.	Plan to address specific governance challenges is developed and approved by the VP, Engineering. Recommendations from the evaluation are communicated to the RCT Transition Committee working. Changes are made, as per the plan. Goals and progress on changes to the current system are reported on by the CCBFC in the annual report to the NRC.	Director General, Construction	December 2020 May 2021 December 2021

MANAGEMENT RESPONSE AND ACTION PLAN

Recommendation 2			
NRC's Codes Canada should clearly communicate to stakeholders the roles and responsibilities of the partners involved in the National Model Codes Development System. **Risk-level associated with not addressing recommendation: High**			
Management Response	**Measure of Achievements**	**Proposed Person(s) Responsible**	**Expected Date of Completion**
Response: Agreed. **Action:** Develop and implement, in collaboration with NRC Communications Branch, a plan for disseminating information that clarifies the roles and responsibilities of partners. This will include the use of a variety of communication channels (e.g., web sites, social media, direct email, levering association newsletters, webinars, presentations).	NRC's Codes Canada Communications Plan is developed, and includes: • consideration and coordination with communication / engagement efforts by partners (specifically, CCBFC) • exploration of a variety of communication channel options (including a distinct CCBFC website from the NRC website) • key milestones for the dissemination of information on the roles and responsibilities' of partners using different channels. Planned actions to disseminate information on the roles and responsibilities of partners implemented.	Director General, Construction	June 2021 December 2021

MANAGEMENT RESPONSE AND ACTION PLAN

Recommendation 3			
NRC's Codes Canada should improve awareness of the code development process among stakeholders with a particular emphasis on the: public review process; process to submit a code change request; selection and decision-making processes for the CCBFC Executive Committee and its Standing Committees; and timing of CCBFC and its sub-committee meetings. To implement these improvements, NRC's Codes Canada could consider strategies to improve the Codes Canada website and make better use of social media and advertising campaigns. Consideration of how to reach and engage stakeholders not already involved in the National Model Codes Development System is also needed. **Risk-level associated with not addressing recommendation: High**			
Management Response	**Measure of Achievements**	**Proposed Person(s) Responsible**	**Expected Date of Completion**
Response: Agreed. **Action:** Develop and implement, in collaboration with NRC Communications Branch, a plan for disseminating information that explains key steps in the codes development process, and invites stakeholder engagement using a variety of communication channels (e.g. web sites, social media, direct email, levering association newsletters, webinars, presentations).	NRC Codes Canada Communications plan is developed, which includes: • consideration and coordination with engagement/communication efforts by partners (specifically, CCBFC) • exploration of different communication channel options (including a distinct CCBFC website from the NRC website) • key milestones for the dissemination of information on key steps in the codes development process using different channels. Planned actions to disseminate information on key steps in the codes development process implemented.	Director General, Construction	June 2021 December 2021

MANAGEMENT RESPONSE AND ACTION PLAN

Recommendation 4			
NRC's Codes Canada should identify a way to capture its research contribution (and any associated impact) to changes or proposed changes to the national model codes. These measures should be tracked and monitored on a regular basis to ensure that NRC is continuing to add value from its research contributions, different than what could be provided by external laboratories. **Risk-level associated with not addressing recommendation: Low**			
Management Response	**Measure of Achievements**	**Proposed Person(s) Responsible**	**Expected Date of Completion**
Response: Agreed. **Action:** CONST will put into place a mechanism that aligns research activities to respond to code development priorities as defined by provinces and territories and the CCBFC, as well as responding to knowledge gaps identified by Standing Committees. CONST will make use of the 'NRC Report' to the CCBFC to report on these research activities and their impact. CONST will build into its project management framework procedures to track, and report of Codes-related research and integration of research outputs into code development.	Linkages to codes development priority setting are defined. Methodology to inform deployment of R&D to support/enable code changes and harmonization are developed and implemented. Methodology is developed and implemented for identifying and tracking NRC and external R&D used by codes development committees and working/task groups. Use and impact of NRC R&D on code changes are communicated annually to codes development committees and working/technical groups.	Director General, Construction	June 2021

APPENDICES • Codes Canada

APPENDIX A – METHODOLOGY

Document Review

Internal and external documents were reviewed to provide context and to complement other lines of evidence in assessing relevance, performance, and efficiency of NRC's Codes Canada operations.

Internal documents included, but were not limited to, presentations, meeting minutes, impact analyses and reports, the CCBFC *Policies and Procedures* guide, the published national model codes and various internal reviews.

External documents included ministerial correspondences and media analyses.

Staff Survey

A survey was administered to NRC's Codes Canada staff (n=46) between December 9 and 22, 2019. The survey was composed of four major sections, and the response rate (n=29) varied by section: Demographics (62%), relevance (62%), performance (56%; including stakeholder engagement and quality of communication), and efficiency of Codes Canada operations (50%).

Key Informant Interviews

A total of 58 interviews were conducted for this evaluation. This included 53 external interviews (e.g., CCBFC, n=19; Standing Committees, n=10; PTPACC representatives, n=9; and stakeholders, n=15) and 5 NRC staff interviews. This information was used to complement other lines of evidence and to contextualize quantitative information.

Data Review

NRC's Codes Canada program administrative for 2014-2015 to 2018-2019 were reviewed to provide information on program inputs (e.g., resources), and outcomes. This included financial data, human resources data and provincial and territorial adoption data.

APPENDIX A – METHODOLOGY

Limitations and Mitigation Strategies

Availability of interviewees

Several reviews of the National Model Codes Development System had occurred within the past year before the evaluation began. One review was still ongoing as the evaluation had commenced data collection. These reviews included interviews as part of their methodology, and as a result some interviewees were not willing to participate in the evaluation due to interview fatigue. Where possible, alternate interviewees were identified and interviewed.

Survey response rate

A survey of NRC's Codes Canada staff was conducted as part of the evaluation with an overall response rate of 57%. However, an average 37% of survey respondents selected 'don't know/not applicable' as a response to survey questions. This reduced the conclusions the evaluation could draw from the survey. The evaluation was able to supplement survey results with findings from interviews.

Excluded line of evidence – Comparative review

An international comparative review was initially planned as a line of evidence for this evaluation. It was to build on a 2017 comparative review conducted for NRC's Codes Canada; however, the evaluation learned that NRC's Codes Canada had already begun work on updating the 2017 document. As such it was decided that the evaluation would review the two documents to inform its comparative assessment of NRC's Codes Canada's roles responsibilities in developing national model codes relative to similar organizations in other countries.

Data and document availability

NRC's Codes Canada did not systematically track its use of research to support proposed code changes. To mitigate this gap in data, interviews with internal staff and code development system partners were used to gather examples.

Excluded line of evidence – Expert consultation

International experts were to be consulted to gather their assessment on the efficiency and effectiveness of NRC's Codes Canada's activities in support of the National Model Codes Development System. However, at the same time, NRC's Codes Canada was due to meet with the same representatives (i.e., from Australia and Germany) at an international conference to gather insights on the governance models used by other countries. In order to avoid duplication of efforts, the evaluation team provided questions for NRC's Codes Canada to pose on its behalf. As a result of the COVID-19 pandemic, the international conference was postponed indefinitely. To mitigate these gaps, interviews with internal and external key informants were used as well as a review of documents, including previously conducted assessments of the National Model Codes Development System and an international comparison commissioned by the CCBFC. These provided information on the effectiveness of NRC's Codes Canada's activities and facilitated a comparison of NRC's Codes Canada activities to those of other countries.