

# Alteration to Existing Buildings

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In this presentation we will look at the progress of the work to address alteration to existing buildings (or AEB) in the National Model Codes.

## Outline

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- Review of policy
- Implementation plan

# What is this task about?

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Confusion in the industry  
Ambiguity with respect to the degree of work necessary  
Potential unsafe practices  
Lost opportunity

## What is this task about?

The provinces and territories identified that the absence of clear code requirements for buildings subject to alteration could lead to a number of problems.

- There could be **confusion** in the **construction industry** and with **product suppliers** who operate in different jurisdictions
- There is **uncertainty** about the degree of work necessary, which could lead to a reluctance on the part of building owners to upgrade
- Determining which upgrades are required may create **challenges for designers and regulators**
- **Potentially unsafe practices** could occur both during construction and in completed work
- There could be a **lost opportunity** for increasing the performance level of the building, whether in terms of energy efficiency, safety or accessibility

## What was done so far?

- Environmental scan
- Overarching principles for alterations
- Triggers and decision points for code requirements
- Implementation plan
- Defined scope of work



In the previous code cycle, the Joint Task Group on AEB produced a final report that was approved by the Canadian Commission on Building and Fire Codes in April 2020.

After receiving the provincial and territorial priorities for the 2020-2025 code cycle, the JTG revised the scope of the work to focus on alterations leading to improvements in energy efficiency. The framework developed for this work could be expanded to other content areas in the future.

We will now look at aspects of this report in further detail.

## Environmental scan

- Canadian jurisdictions with AEB\*—specific provisions
  - City of Vancouver
  - British Columbia
  - Alberta
  - Manitoba
  - Ontario
  - Quebec
  - Nova Scotia

First, the JTG conducted an environmental scan to determine what was currently being done in Canada and elsewhere.

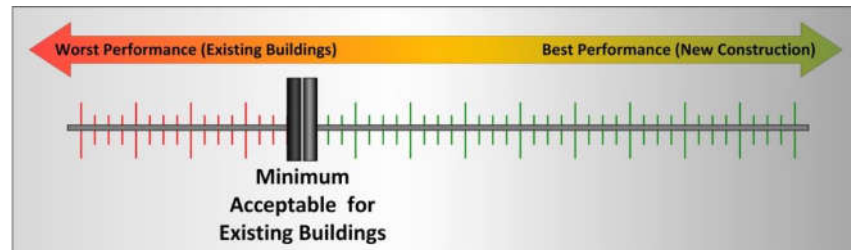
The environmental scan included Canadian and International

- **regulatory initiatives** or enabling guidelines that promote alteration to existing buildings
- **non-regulatory tools**, such as voluntary programs, tax credits or grants to encourage AEB measures

Most non-regulatory tools are related to energy efficiency or accessibility.

The jurisdictions currently having provisions specific to AEB are listed here and will be consulted when technical provisions for the National Model Codes are developed.

## Over-arching principles for alteration to existing buildings



- Improve performance of existing building stock

- Potential to create undue burden and unintended consequences

Next, the JTG developed a set of principles to guide development of the requirements that apply to an existing building under alteration.

To start off, it is important to highlight the overall goal of this initiative: to **close** the **performance gap** between existing construction and new construction, where all objectives are considered.

The goal is NOT to bring every existing building up to current code, which would be the right side of the slide.

## The 8 principles

1. Close the performance gap
2. Maintain or increase
  - life safety
  - overall building performance level
3. Avoid negative unintended consequences
4. Ensure the building cannot be left in an unsafe state
5. Apply SMART regulation principles
6. Encourage alterations to existing buildings
7. Preserve officially recognized heritage elements
8. Complement voluntary programs

These eight principles should guide the development of technical requirements.

- 1) As just mentioned, **Close the performance gap** between new and existing buildings.
- 2) In doing so, alterations cannot make the building worse in terms of **both life safety and overall building performance**.
- 3) Any negative consequence of the alteration should be avoided. An example of this is requiring the installation of low flow plumbing fixtures where the slope of the existing pipes would prevent the movement of effluent.
- 4) During construction, the building cannot be left in an unsafe state.
- 5) SMART regulatory principles should apply to the technical requirements, which include effectiveness, cost-efficiency, timeliness, transparency, accountability and performance.
- 6) Alterations to buildings should be encouraged **without undue burden**, which may stall improvements or drive the work underground.
- 7) Heritage buildings should be allowed a degree of flexibility.
- 8) Requirements should complement other policy tools.

## Triggers and decision points

- Repair or replacement of part or component for the purpose of maintenance
- Replacement with new part or component that serves the same purpose



The JTG described the triggers that would determine whether code requirements apply to an alteration or not.

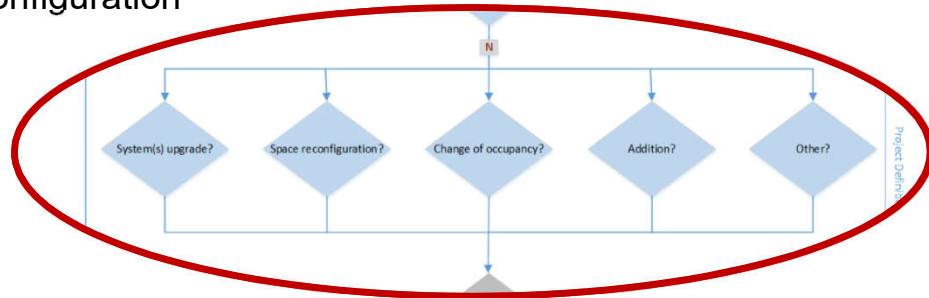
A maintenance task is one performed for the purpose of repairing a part or component and can include the replacement of that part with another. In this example, the air conditioning unit is being replaced.

Alterations that fall under this category are considered **exempt** from code requirements



## Minor or major alteration?

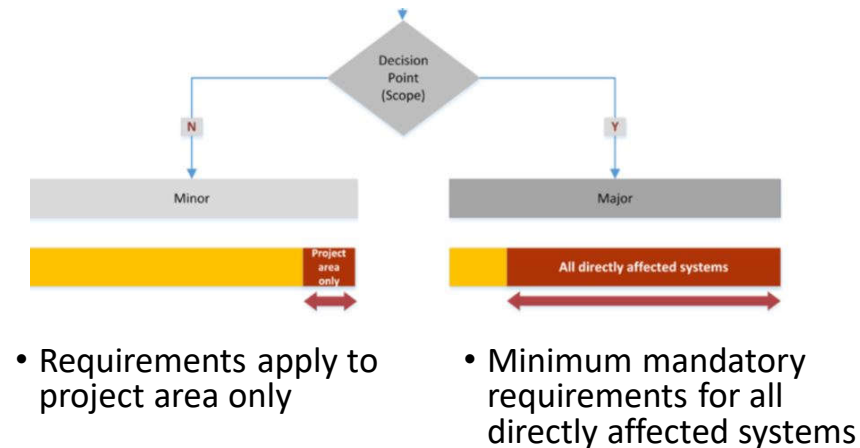
- Systems upgrade
- Space reconfiguration
- Addition



If the project is not exempt, then it would fall under one of two categories: a **minor** or **major** alteration, using a set of triggers.

For the 2025 edition of the National Model Codes, these triggers include **systems upgrade, space reconfiguration or an addition.**

## Scope of alterations



The scope of the alteration determines whether it becomes a minor or major alteration. The current code will apply to both types of alterations. The key question is the extent to which these requirements apply and whether relaxations are given.

Most of the technical work of the SCs will be answering this question in accordance with the principles that we just reviewed.

For a minor alteration, code requirements will be limited to the project area. For a major alteration, requirements will apply to all directly affected systems, and where appropriate, some indirectly affected systems.

## Recommendations for development of provisions

- Proposed a new Part
- NFC application

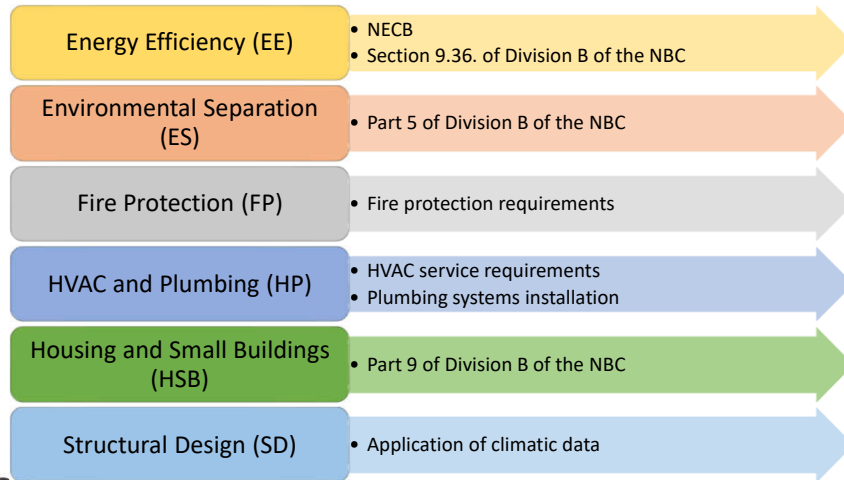


The JTG recommended that the provisions be located in the National Model Codes, not provided as a set of guidelines.

It is proposed to add a new Part to the National Building Code, National Plumbing Code and National Energy Code for Buildings.

The National Fire Code currently applies to existing buildings and addresses safety for buildings during an alteration.

## Approved AEB tasks for 2020–2025



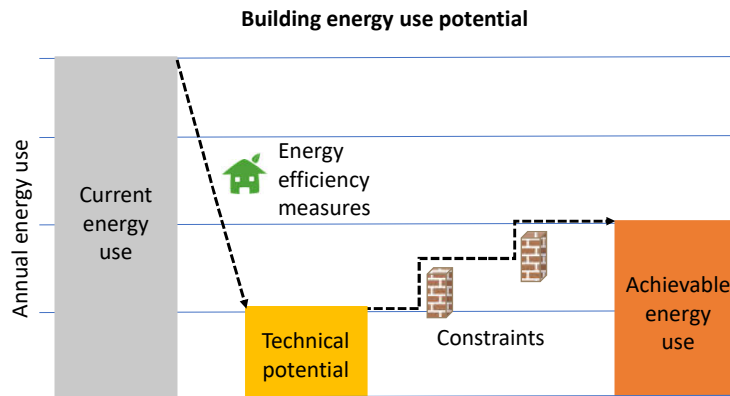
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The JTG drafted an implementation plan to facilitate cross-committee coordination during the development of AEB provisions.

For the 2020-2025 code cycle, the CCBFC approved tasks for the standing committee workplans that are related to AEB, as shown in the list on the screen.

The development of technical provisions will start in the task groups of the Standing Committee on Energy Efficiency, with the task groups for other committees determining the minimum requirements in other Parts of the code that apply to the alteration.

## Concept for AEB measures for energy efficiency



The JTG revised the scope of the work to initially focus on alterations improving the energy efficiency of buildings.

The **key concept** that will be used when considering provisions to improve energy efficiency is that where the impact analysis asserts that it is justifiable:

- **upgrade energy performance** during an alteration to **maximize energy savings**
- **avoid missing the opportunity** for improvement

To do this, **energy efficiency measures** would be implemented in the systems being **voluntarily upgraded** by the building owner.

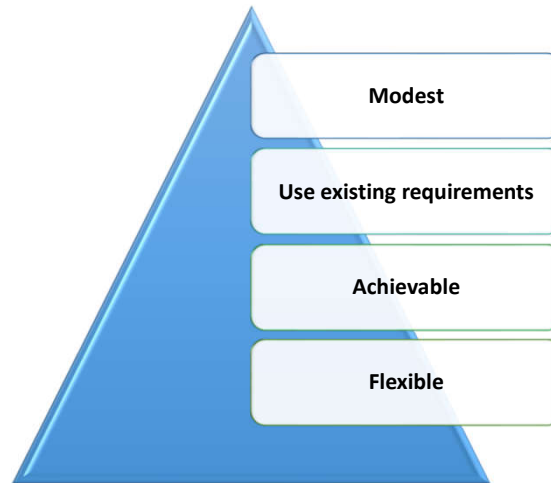
The constraints that are **limiting the total potential energy savings** will be assessed to determine if they can be relaxed without negatively affecting other code objectives in order to maximize the achievable energy savings.

The principles that code committees will follow are that:

- performance after an alteration **should not be worse** than before
- performance should be upgraded where the **impact analysis asserts that it is justifiable**

- if there is **no existing code provision** to address an issue created by an alteration, then **that provision will be developed** in the new Part

## Goals for 2025



The goals for 2025 are to

- Develop something achievable in the short time frame
- Create modest prescriptive minimum requirements with performance compliance options
- Consider that professionals may not be involved in minor alterations
- Work with existing requirements rather than developing new provisions where possible
- Determine the level of flexibility that the AEB provisions should provide in the performance spectrum of somewhere between ***not worse than before*** and ***full application of the code*** to achieve some % better performance
- Consider operational life of components and repair before replacement

## Case study: replacement of all windows

### Minor alteration (systems upgrade)

#### Code requirements

- Lower U-value windows as per current Code
- Improve air sealing around windows

#### Relaxed code requirements

- Continuity of air-barrier system throughout the building enclosure not required (not part of the voluntary upgrade)
- Improved insulation of wall not required (too onerous)



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As an example to illustrate how the committees will determine the application of code requirements to an alteration, let's look at the case of the voluntary replacement of **all** windows in a building. This would be considered a *minor alteration* as it is a *systems upgrade and is limited to only one building system*.

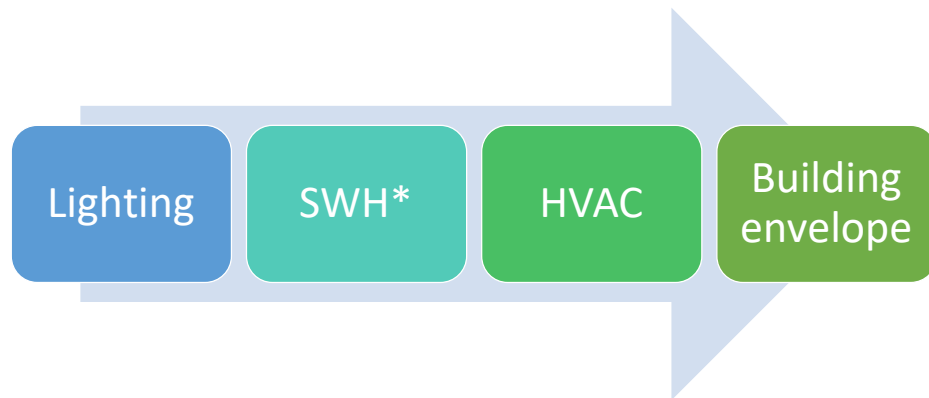
Reasonable code requirements that would apply to this alteration are to **select replacement windows** that meet code requirements for thermal transmission, as they are readily available on the market. In addition, air sealing measures around the window to the existing air barrier should be applied.

It would not be reasonable to require that the existing air-barrier system be continuous throughout the building enclosure as that could require substantial work outside of the project scope.

In addition, it would not be reasonable to meet the current code requirement for wall insulation, as update of the cladding system or interior finish was not part of the original planned work and would be cost-prohibitive.



## Order of implementation



\* Service water heating

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The technical committees decided to use a systems-based approach to the development of provisions, while keeping in mind the holistic performance of the building.

Given the short timeline for code development, the building systems were ordered from least complex to most complex and the committees will tackle them in the following order:

- 1) lighting in the NECB
- 2) SWH systems
- 3) HVAC systems
- 4) Building envelope

Work may be conducted in parallel to provide the maximum amount of code development time.

# Summary

- Policy setting the boundaries for AEB
- Implementation plan followed



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This conclude my presentation.

I have covered what was the focus of the work related to AEB for the 2020-2025 code cycle.

I have defined the boundaries under which the work needed to be done and how standing committees intended to develop technical requirements.

**Thank you**



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Thank you very much for attending this presentation.

Free code documents, including the 2020 edition of the National Model Codes, the final report of the Joint Task Group, and links to attend public meetings for TGs working on AEB are available on the NRC website.