

# Why build high-performance affordable housing?

This factsheet for housing providers presents reasons to incorporate energy-efficiency and climate change adaptation measures into new construction projects for affordable housing.

## What is a high-performance new building?

A high-performance building is designed and built for higher energy and environmental performance than current building code requirements. While building to code today may offer improvements over previously built housing projects, the building code only represents the minimum acceptable performance.

Building to higher energy and environmental standards will save money over the lifetime of the building because it reduces energy and maintenance costs, as well as the costs of disposal at end of life. There are often also significant non-energy benefits such as improved occupant comfort. There is no better time to strive for superior performance than when the building is being designed. Waiting for future retrofits will be more expensive and less effective.

### Key attributes of high-performance buildings



**Tighter building envelope:** High levels of insulation and airtightness greatly increase a building's energy performance. The building envelope is the most expensive component of the building to retrofit once the building is complete, but making the envelope energy-efficient in the first place has a low incremental cost. Getting it right the first time is therefore critical. Furthermore, the cost of investing more in a better building envelope can often be offset with smaller (and therefore cheaper) HVAC equipment.



**Superior HVAC systems:** Heating, ventilation and air conditioning (HVAC) can comprise up to 85 percent of energy use in a building. Each option—such as heat pumps, heat recovery ventilation, combination units, or instantaneous heaters—has advantages and trade-offs. The amount of fresh air from outside may be critical for indoor air quality and health, but at the same time needs to be balanced with associated energy costs. Exploring the various options with the building design team will allow you to select the most appropriate systems for your needs.



**Smart use of windows:** Windows are particularly important when it comes to the building envelope. On one hand, they have a weaker thermal resistance than walls and can increase the need for air conditioning in the summer. On the other hand, high-performance windows allow you to increase solar heat gain from the sun in winter months. Designers should help you select windows with higher thermal resistance, keep the window-to-wall ratio to an optimum value, orient the windows well, and shade them against the summer sun.



**Better lighting:** New construction is the best time to put in place natural light and daylight harvesting to minimize artificial lighting needs. High-performance lighting systems, such as LED, use 10 to 90 percent less energy, without the warm-up time or flickering of fluorescent and halogen lights. LEDs last five to 20 times longer, reducing maintenance costs. Lighting controls such as occupancy or daylight sensors offer additional gain in performance and comfort. Lighting is not only energy-intensive; it is also a critical consideration for comfort and design of interior and exterior spaces.



**Efficient water heating and appliances:** Domestic hot water heating is a substantial energy load in a residential building. Efficient water measures such as faucet aerators and showerheads reduce both water use and the energy required to heat the water. To help you choose efficient models of appliances such as fridges and ranges, ENERGY STAR® is a trusted rating system. ENERGY STAR® products not only save energy but also have a lower total cost of ownership and longer life.

With increasingly frequent extreme weather events predicted due to climate change in the coming decades, better HVAC systems, building envelopes and windows are of great importance to protect tenants against heat waves and cold snaps and the resulting swings in energy prices.

### Benefits of high-performance affordable housing buildings

- Reduced energy bills and maintenance costs
- Reduced carbon emissions and environmental footprint
- Access to additional funding sources
- Improved tenant comfort and lower rent
- Improved resilience to extreme weather events
- Inspiration for external stakeholders to get them on side
- Contribution to reviving neighbourhoods
- Higher property value

## Using new building certification as a guidepost

Clearly defining the parameters of your future high-performance building is challenging because there are not only energy performance considerations, but also multiple environmental and climate change adaptation considerations. New construction **certifications** are meant to provide guidance and define “high-performance.” GMF funding does not require certification, but you may benefit from using the certification criteria in your design even if you do not choose to complete certification.

Below is a list of example certifications to explore. Find the one that works best for you.



**R-2000** was developed by the Canadian government over 35 years ago and is updated regularly. Homes built to the [R-2000](#) standard are on average 50 percent more efficient than homes built to code.



**Leadership in Energy and Environmental Design (LEED®)** is the most widely used green building rating system in the world. [LEED®](#) is a multifaceted approach to designing a sustainable building and provides multiple levels of certification to match your level of ambition.



**Passive House** is the most rigorous voluntary energy-based standard in the design and construction industry. Starting in Germany, the [Passive House](#) has evolved for the Canadian climate.



**ENERGY STAR®** is also a certification for new homes and buildings. [ENERGY STAR®](#) homes are about 20 percent more energy-efficient than standard homes built to code.



**NovoClimat2.0** is both a new home incentive program and a certification available to both homes and multi-unit buildings of all sizes. [NovoClimat](#) is offered in Quebec only.

## How to get started on a new project



After you choose a certification, the best way to see it come to fruition is through **integrated design**. Integrated design entails a higher degree of collaboration between housing providers, architects, engineers and builders to make the design better.



**Energy modeling** helps the design team anticipate the impact of design decisions on the performance and test to find the best design, forecast energy and operation and maintenance costs, and minimize total cost of ownership. Energy modeling is often a basic requirement for a certification or for **incentives, grants and loans**, because it is the accepted approach to comparing your high-performance design to an identical building built to code.

### Get started!

Consult the following resources and factsheets in this series for tips on how to plan and implement your project:

[FCM's Sustainable Affordable Housing initiative](#)

[Planning high-performance affordable housing](#)