Green Municipal Fund

SUSTAINABLE AFFORDABLE HOUSING FACTSHEET

Why undertake energy-efficiency retrofits

This factsheet for housing providers presents reasons to incorporate energy-efficiency and climate change adaptation measures into projects involving major equipment upgrades or maintenance.

What are deep energy retrofits?

40+%

energy savings through deep energy retrofits

An energy-efficiency retrofit is a rehabilitation project that achieves superior energy performance in a building. Retrofits can make the building more comfortable during heat waves and cold snaps, help lower rent and increase tenant satisfaction. Deep retrofits are an extensive overhaul of the building's systems that can save 40–60 percent in energy costs.[1] This may include significantly reconfiguring the interior, replacing the roof, adding or rearranging windows for increased daylight, or replacing heating, ventilation and air conditioning (HVAC) systems with renewable technologies.

Why do energy-efficiency retrofits?

Minor energy-efficiency retrofits (single measures) can result in savings as high as 15 percent of energy use. Major energy retrofits (multiple measures across multiple building systems) can lead to savings between 15 and 40 percent. Deep energy retrofits, typically conducted alongside space changes, modernization or building renewal, can lead to savings of over 40 percent.[2] In addition to energy savings, building owners can lower maintenance costs while improving comfort and general tenant satisfaction.

Benefits of energy efficiency

- Reduced energy bills
- Reduced maintenance costs
- Improved resilience to extreme weather events
- Reduced carbon emissions and environmental footprint
- Higher property value
- Improved tenant comfort and lower rent

Timing is key

Ask for financial incentives early: Many utilities and all orders of government offer financial incentives and grants for energy-efficiency projects. All these programs can help finance building rehabilitation. Many incentive programs require pre-approval before purchasing any energy-efficient equipment.

1 "Retrofitting," Natural Resources Canada, 2019.

2 *Major Energy Retrofit Guidelines for Commercial and Institutional Buildings*, Natural Resources Canada, 2016.

A project may be just around the corner: It's smart to opt for more efficient equipment when replacing equipment that has reached the end of its useful life. The long-term benefits will make up for the (marginally) higher price.

Plan ahead! When a piece of equipment burns out, you often won't have the time to research and choose the most energy-efficient option.

What retrofits should I consider?

Each building will see savings from different measures, depending on when the building was constructed and what upgrades have already been completed. Make sure to evaluate how energy is used within the building as a whole. To achieve the greatest benefits associated with deep energy retrofits, implement multiple retrofits across multiple building systems.

Bundle to achieve deep energy retrofits

Lighting	HVAC	Building envelope	Hot water
• Energy savings of up to 60% can be expected with higher-quality LED lighting—without the warm-up time or flickering of incandescent, fluorescent and halogen lights. • LEDs last 5–20 times longer, reducing maintenance costs. • Lighting controls, such as occupancy or daylight sensors, offer additional savings.	• In Canada, heating, ventilation and air conditioning (HVAC) comprises ~70% of building energy use in residential and commercial buildings.[3] • Old boilers can operate at as low as 50–70% fuel efficiency. New high-efficiency boilers operate at 97+% efficiency.[4] • Tuning up HVAC equipment typically results in savings of 5–15%, and as high as 30%.[5]	• The building envelope includes walls, windows, roofs and doors. • Houses built between 1950 and 1980 can use 25+% more energy than houses built after 1980, due to a lack of proper insulation and airtightness.[6] • Improving airtightness and adding insulation and EnergyStar® windows and doors can result in heating savings of 10–75%.	• Upgrading to low-flow showerheads and faucet aerators can save 25–60% of the water used through these means.[7] • Installing water efficiency measures saves both water and the energy used to heat the water. • Newer technologies for showerheads and faucet aerators can improve tenant comfort by increasing water pressure while saving water.

3 "Furnaces and Boilers," U.S. Department of Energy.
4 "Furnaces and Boilers," U.S. Department of Energy.
5 "Recommissioning for Existing Buildings," Natural Resources Canada, 2018.
6 "Energy Efficiency Building Envelope Retrofits for Your House," About Your House, Canada Mortgage and Housing Corporation, 2012.
7 "Reducing Hot Water Use for Energy Savings," U.S. Department of Energy.

Implementing multiple measures (within a building) or projects (across multiple buildings) yields greater savings than a series of one-off retrofits.

Multiple measures within a building

- Larger, more comprehensive projects deliver better value for you and your renters.
- Upgrading multiple building systems at the same time allows more cost-effective measures, such as lighting measures, to justify less cost-effective yet desirable measures, such as building envelope rehabilitation.
- Completing multiple upgrades in one project reduces exposure to project performance risk though diversification, and ultimately reduces disruption to tenants.
- When implementing multiple measures in a project, some measures can create efficiencies that allow you to save money when implementing other measures. For instance, upgrading insulation will reduce the heating load in the building, allowing the purchase of a smaller, more affordable boiler. Many lighting fixtures have controls integrated into the fixture, and purchasing them together can save on installation and set-up costs.

Multiple projects across more than one building

- Larger projects create economies of scale and greater purchasing power, justifying the resources and effort needed to develop and pursue them.
- Consider partnering with nearby housing providers to combine your individual projects into one larger project.

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

How to undertake deep energy retrofits

Developing a business case for an energy-efficiency retrofit