



COMMERCIAL DEEP ENERGY RETROFIT PROGRAM

PROGRAM GUIDE

DESIGN WITH ENERGY EFFICIENCY IN MIND.





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INTRODUCTION

Some existing buildings requiring more comprehensive upgrades and enhancements may be suited for deep energy retrofits. For these projects, an entire building’s energy use is analyzed using energy modelling, and energy-efficiency enhancements are designed specifically for that building to reduce its overall energy use by 20% or more upon completing a whole-building renovation.

The building enhancements during a deep energy retrofit are wide-ranging, and the projects tend to be capital intensive; however, the energy-efficiency upgrades are exhaustive and are expected to provide long-term results for building owners. Through the Commercial Deep Energy Retrofit Program we offer technical guidance and financial incentives for energy modelling and energy efficient design for existing buildings.

Benefits of Deep Energy Retrofit Projects:

- Identify opportunities for energy and greenhouse gas emission reductions
- Reduced building maintenance demands
- Save energy and money
- Correct known persistent building problems
- Indoor environment improvements for air quality, thermal comfort
- Reduce your operating costs
- Increase your property value and occupancy rates

Through the Commercial Deep Energy Retrofit Program, incentives are available for a limited number of major renovation projects in which site energy use will be reduced by 20% or more from the pre-renovation baseline energy use. Buildings with aged building elements and equipment in need of being refreshed, repaired or upgraded (e.g. windows, heating/cooling equipment, lighting, etc.), are ideal candidates for this program.

DOES MY PROJECT QUALIFY?

- Commercial Manitoba Buildings with high to moderate energy consumption (often dated) with the potential to reduce energy usage by 20% or more and the means to undertake a large renovation project.
- Prepared to undertake a major renovation to significantly reduce annual building energy consumption in all conditioned or semi-conditioned year-round occupied spaces with a headroom height of 7.5 ft. or greater. Semi-conditioned spaces are any enclosed spaces within a conditioned building that are heated by a heating system whose output is greater than or equal to 0.9W/sq. ft. of the semi-heated floor area. Crawl spaces, attics, and other unconditioned areas are not to be included for the program’s incentive calculation.
- A major commercial or Multi-Unit Residential Building (MURB) renovation project where no less than two significant energy saving measures are undertaken and no single measure will achieve 75% or more of the overall anticipated project savings.
- The renovation project has not started on-site work prior to Efficiency Manitoba approving your application.
- The building’s primary heat source is either natural gas or electricity.



OVERVIEW:

The Commercial Deep Energy Retrofit Program considers an entire building’s energy use. Rather than looking at a single component of a building renovation such as lighting, energy modelling is used to simulate all building features and systems to identify and evaluate opportunities for energy efficiency and optimal building design.

There is a synergistic relationship between the building components and systems that is sensitive to a wide range of events unique to each building, of which seasonal weather change is typically most significant. Energy Modelling can help identify and evaluate opportunities for energy efficiency by simulating how all building components and systems, inclusive of all planned energy saving measures interact. Energy models can simulate a variety of building details, such as roof and wall construction, lighting power densities, domestic hot water usage, heating and ventilation systems, occupancy schedules, and more. Changing variables, such as indoor environmental conditions, building infiltration levels, heat loss related to changes in thermal transmittance levels in walls, roofs, windows & doors, construction materials, and occupant levels to represent actual anticipated building conditions and schedules allow the energy modeller to produce a variety of scenarios and optimize the building’s design towards targeted energy efficiency objectives.

Phase 1 Energy Modelling:

Up to \$12,000 is available to qualifying projects towards building energy modelling costs provided in two separate phases. In Phase 1, the project team has an opportunity to use energy modeling to review and optimize energy efficiency enhancements for the building.

Phase 1: Up to \$6,000 for project design analysis.

THE FOLLOWING DELIVERABLES MUST BE SUBMITTED FOR PHASE 1:

- A copy of the **Baseline Building Energy Model** representing all the current existing building systems, envelope, etc., calibrated to a five-year annual weather normalized average energy use for the most recent calendar years, for Efficiency Manitoba review and agreement. In some cases, a different baseline may be used if deemed representative of previous building use. For example, if the primary use of the building is changing, or if it’s been vacant for a period of time. Verification of existing building elements must be provided.
- A copy of the **Design Building Energy Model**, incorporating the project’s planned energy efficiency measures, for review and agreement, that demonstrates anticipated post-renovation energy consumption.
- A **Design Building Energy Model Report**, demonstrating the projected site energy use reduction from the pre-renovation baseline energy use. The **Workbook**, summarizing model inputs of Phase 1 will be included with the model report. On-site energy generation technologies such as Solar Photovoltaic and Wind Generated Power technologies would not be eligible for inclusion. Exterior Lighting is also ineligible for energy savings benefits for this program, however additional financial incentives are available through Efficiency Manitoba’s Business Lighting Program. Visit efficiencymb.ca/business/business-lighting for details.
- An **Owner’s Project Requirements (OPR)** document, complete with owner acceptance, outlining the functional requirements and projects expectations. This document would be used to guide the project and should be shared with Efficiency Manitoba, the design team, renovation team, and any other relevant groups.
- An **Basis of Design (BOD)** document, complete with owner acceptance, outlining the design solutions to the specific requirements detailed in the OPR.
- A detailed copy of the **invoice** for applicable energy modelling services.



The results of the Phase 1 energy modelling exercise would be used to determine if the project qualifies to proceed to Phase 2. In the event that a comfortable minimum 20% energy reduction threshold cannot be demonstrated and the project does not qualify for our Commercial Deep Energy Retrofit Program Phase 2, any other applicable technology programs would be available as an alternative, for example the Business Lighting Program. Efficiency Manitoba approval is required prior to proceeding to Phase 2.

Phase 2 Performance:

The Phase 2 Performance offers a financial incentive ranging between \$2.25/sq. ft. - \$6.00/sq. ft. of the building’s eligible floor space, as determined by the project’s Final Building Energy Model and reviewed by Efficiency Manitoba. The eligible floor space area is measured from the interior face of the exterior walls or from the centerline of walls separating buildings.

Building energy reduction percentages will be pro-rated between each table benchmark and rounded down to the nearest whole number to determine the incentive factor used for the incentive calculation (e.g., a 27.8% energy reduction is rounded down to 27%, which yields a pro-rated incentive factor of \$2.95/sq. ft. based on the table below). Projects that successfully complete Phase 2 Performance are eligible to receive up to the additional \$6,000 towards energy modelling costs up to the maximum energy modelling incentive of \$12,000 for the project.

Reduced Annual Building Energy Consumption	Performance Incentive factor (\$/sq. ft.)*
20%	\$2.25
25%	\$2.75
30%	\$3.25
35%	\$3.75
40%	\$4.50
45%	\$5.25
50%	\$6.00

*For projects that don’t maintain a minimum 20% energy reduction upon completion of Phase 2 Performance, please refer to program details (pg. 5) for adjusted rates.

PHASE 2 DELIVERABLES:

- Provide Efficiency Manitoba with a copy of a **Final Building Energy Model** representing as-built conditions of the building that demonstrates post-renovation energy consumption for review and agreement.
- Submit the **Final Building Energy Model Report** summarizing the final building energy performance results compared to the Baseline Building Energy model. Only energy saving measures shall be considered in the Final Building Energy Model. The final version of the **Workbook**, updated to summarize the model inputs of Phase 2 will be included with the model report. On-site energy generation technologies such as solar photovoltaic and wind generated power technologies are not eligible for consideration under this program.
- Provide any relevant and requested information and/or documentation related to the deep energy retrofit project organized digitally in a finalized **Systems Manual**, inclusive of all project design documentation, operator training records, occupancy permit(s), project functional testing, start-up and commissioning reports.



Deep Energy Retrofit Project Details:

The following checklist provides an overview of the submission requirements for the Commercial Deep Energy Retrofit Program. The building owner or project design team should designate an individual to be responsible for collecting and submitting all completed program deliverables.

PHASE 1: ENERGY MODELLING

- Owner’s Project Requirements (OPR)
- Basis of Design (BOD)
- Baseline Building Energy Model
- Design Building Energy Model
- Design Building Energy Model Report, including Workbook

PHASE 2: PERFORMANCE

- Final Building Energy Model
- Final Building Energy Model Report, including final updated Workbook
- Comprehensive Final Systems Manual

The calibrated Baseline Building Energy Model shall be measured against the Final Building Energy Model that demonstrates post-renovation energy consumption. The difference between the two models will be used to determine the performance incentive value. In cases where the building use is changing significantly, or the building has been vacant for a period of time, predetermined and agreed upon reasonable adjustments to the Baseline Building Energy Model could be considered.

This program pays for overall building performance. Projects enrolled in the Commercial Deep Energy Retrofit Program will not be permitted to obtain additional prescriptive incentives through Efficiency Manitoba for upgrades completed, unless the measure is deemed out of scope for the Commercial Deep Energy Retrofit program.

In certain instances where the Final Building Energy Model demonstrates a post-renovation energy consumption below the minimum 20% energy reduction threshold, once the Final Building Energy Model has been reviewed and approved by Efficiency Manitoba, the Performance incentive factor will be adjusted based on the final energy reduction: the incentive factor will be adjusted by \$0.10/sq. ft. for each 1% reduction down to 18%, and by \$0.20/sq. ft. for each 1% reduction below 18%. For example, if a major building renovation project achieves only 18% energy reduction based on as-built conditions, the project would receive a Performance incentive factor of \$2.05/sq. ft. (i.e., 2 x \$0.10/sq. ft.); a further reduction to 17% would yield a resulting incentive of \$1.85/sq. ft. (i.e., a further \$0.20/sq. ft. adjustment).

When undertaking a Commercial Deep Energy Retrofit, it’s important to seek opportunities where better performance can be achieved and not just look at the building as a list of problems to solve. The whole building approach allows you to maximize the energy savings potential of the building.

No single measure can achieve 75% or more of the total project savings and savings must be achieved in at least two of the following categories:

Core Categories	Eligible Energy Conservation Measures
Architectural	<ul style="list-style-type: none"> • Building envelope thermal insulation upgrades: windows, skylights, doors, walls, roofs, outdoor (roof) duct and pipe insulation • Floor in contact with ground: thermal insulation upgrades • Building envelope air seal upgrades • Thermal bridging remediation
Electrical	<ul style="list-style-type: none"> • Interior lighting fixture upgrades and control upgrades • Building outdoor electrical: Intelligent Parking Lot Controllers (IPLC), smart receptacles • Building vertical transportation: energy optimized elevators and building escalators, etc. • General interior electrical equipment upgrades: high efficiency electric motors, Energy Star appliances, etc.
Mechanical	<ul style="list-style-type: none"> • HVAC control systems upgrades • Heating and/or cooling equipment upgrades • Variable speed fans and/or pumps • Ventilation equipment upgrades • Domestic hot water system upgrades • Low-flow lavatories and/or showers



Owner's Project Requirements

As part of the program, we ask for the building owner to develop and submit the Owner's Project Requirements (OPR). This is a document that details the functional requirements and expectations of the project, including project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information. It's a collection of vital information regarding the renovation project.

The OPR can be considered a working document, as it's created early on and updated throughout design, renovation, and occupancy. Energy efficiency related design objectives of the project will be established and documented here for the entire design team. The completed OPR will be provided to all design team members upon completion.

The Basis of Design (BOD)

The Basis of Design (BOD) outlines the design solutions to the specific requirements detailed in the OPR. The document is created and maintained by the design team in consultation with a program representative as it records how the building's final design achieves the objectives listed in the OPR. Throughout the project, it is typically the role of the building commissioning authority (where applicable) to review the BOD against the OPR, to verify that the owner's specific requirements are being satisfied, identify any inconsistencies with the design team, and resolve any issues by changing the design (design team agrees to the change) or by changing the OPR (owner agrees to the change).

Energy Modelling

The Commercial Deep Energy Retrofit Program relies on energy modelling to forecast energy savings. Energy modelling is a process that simulates an entire building with respect to its annual energy consumption and performance. The final Commercial Deep Energy Retrofit Incentive is derived from the simulation's comparison of the Final Building Energy Model inclusive of all final construction updates and approved submittals following the renovation with the established baseline calibrated building energy model. Program energy modelling guidelines will be made available by Efficiency Manitoba.

ENERGY MODELLING SOFTWARE REQUIREMENTS:

All building energy modelling must be completed using software compliant with NECB 2011/ MECB 2013 clause 8.4.2.2, inclusive of ANSI/ASHRAE 140 Standard Evaluation of Building Energy Analysis Computer Program.

ENERGY MODEL REPORT SUBMITTAL REQUIREMENTS:

The Energy Model Report must include, but not be limited to, the following information:

- I. Project description/building overview
- II. Energy modelling scope
- III. Inputs and assumptions:
 - Climate data
 - Basis of inputs (Baseline and Design/Final cases)
 - Key assumptions
 - System workarounds
- IV. Results and discussions:
 - Energy end-use breakdown (Baseline and Design/Final cases)
 - Energy utilization intensity (EUI) comparison between Baseline and Design/Final cases
 - Thermal energy demand intensity (TEDI comparison between Baseline and Design/Final cases)
- Forecasted Annual energy consumption comparisons (split by fuel type and expressed in kilowatt-hours of electricity and cubic meters of natural gas, and totalled)
- Forecasted annual energy cost comparisons (split by fuel type and expressed in kilowatt-hours of electricity and cubic meters of natural gas, and totalled)
- Provide any supplemental, relevant reports and results files generated by the energy modelling software program. These output documents typically include detailed information on: modelled envelope assemblies, ventilation values (e.g. ASHRAE 62.1 inputs), lighting specifications, process and plug load details, zone heating & cooling loads, and hourly schedules.
- V. Conclusions and recommendations



Systems Manual

A Systems Manual is a comprehensive documentation package that includes all information related to the building systems, assemblies, and commissioning processes. The package provides the owner and building operators with resources to understand, operate, and maintain the building's systems. The Systems Manual may be one of the most important documents created, as it ensures the building and its systems will be operated and optimized as per the intended design.

SYSTEMS MANUAL SUBMITTAL REQUIREMENTS:

A complete Systems Manual developed and delivered to the building's owner and operations personnel (where applicable). Digital copies of the final Systems Manual are preferred for program submissions.

The Systems Manual must include, but not be limited to, the following information:

I. Executive summary

A narrative overview of the building's design, construction, and operational requirements which provides the building owner/operational staff/user with a basic understanding of the intended operation, performance, and maintenance of the building.

II. Facility design and construction

1. Owner's Project Requirements (OPR): The final version of the OPR, including all updates made throughout the design and construction processes.
2. Basis of Design (BOD): The final version of the BOD, including all updates made throughout the design and construction processes to accurately reflect the final design of the building.
3. Construction/project record documentation: Provide the building's final design documents (as-built or record drawings) and equipment specifications.
4. All HVAC system Test and Balance reports for ventilation and hydronic systems that were part of the energy saving measures included in the project.


III. Facility, systems, and assemblies information

1. Final approved shop drawing submittals: Provide final copies of approved shop drawing submittals including the commissioned sequences of operations for the buildings equipment and systems (including limitations to operation).
2. Manufacture's operations and maintenance (O&M) data: Provide the verified installation and O&M manuals (as provided by the manufacturer) for the building's systems and equipment.
3. Existing building documentation (as applicable): Provide existing building documentation (e.g. O&M).
4. All HVAC system Test and Balance reports for ventilation and hydronic systems that were part of the energy saving measures included in the project.

IV. Facility operations

Develop and provide a Facility Guide. The guide is a basic building systems description and operating plan with general procedures and confirmed facility operating conditions, set points, schedules, and operating procedures for use by facility operators to optimize facility operations.

1. Operating plan: a basic guide to aid in the proper operation of the building through describing fundamental building functions and management.
2. Facility and equipment operating schedules: details the basic time-of-day operating schedule for the building and other functions of the facility.

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3. Set-points, ranges, and limitations: final installed and commissioned values used with the operational control sequences for the installed HVAC and other equipment in the building.
 4. Sequences of operations: final installed and commissioned sequences of operation for the installed HVAC and other operating equipment in the building.
 5. Emergency procedures (optional): details on specific emergency procedures recommended for the building and location of applicable controls.
 6. Maintenance schedules (optional): details of the equipment preventative maintenance schedule.

V. Commissioning process report

- Final commissioning report: Provide the final commissioning report with evaluation and records for each commissioned building system.
- Functional testing and start-up reports: Provide detailed testing sheets on the following energy related systems (at minimum)
 - o Heating, ventilating, air conditioning, refrigeration systems, and associated controls;
 - o Lighting and day lighting controls;
 - o Domestic hot water systems

Include pre-functional checklists; manufacturers', testing agencies', and contractors' reports; and include all observations and recommendations for future reference.

VI. Operator training records

The owner, operator, and other relevant personnel must receive appropriate training on the renovated building's operation. Training should follow the creation of the Systems Manual and inform the owner and operators how the building was designed to operate. It's beneficial to keep records of the training sessions and training materials for both current and future staff.

- Provide sign-off sheets and records of attendance along with descriptions of the training activities pertaining to the content referenced in the building's Systems Manual.



HOW TO PARTICIPATE:

1. Submit your application.

We may contact you to schedule a meeting to further discuss the project details. Once accepted, the building owner and all contacts listed will be notified via email outlining the next steps.

2. Utilize energy modelling to evaluate options for energy efficiency upgrades.

Consult our efficiency team to provide guidance on energy modelling and energy efficient designs.

3. Complete and submit your Phase 1 deliverables.

Submit your Owner’s Project Requirements (OPR), Basis of Design (BOD), Baseline Building Energy Model, Design Building Energy Model, Workbook, and Design Building Energy Model Report for Efficiency Manitoba review, and invoice for the relevant energy modelling services.

4. Once all deliverables are received and approved we pay your Phase 1 incentive and provide project feedback.

5. When all program Phase 1 requirements have been achieved, we’ll provide approval to advance to Phase 2 of the program.

6. Complete the renovation.

Throughout the entire deep energy retrofit renovation, our energy efficiency team will remain available to provide technical assistance and guidance on energy modelling and energy efficient design.

7. Complete and submit your Phase 2 deliverables.

Submit your Final Building Energy Model representing as-built conditions of the building, Final Building Energy Model Report, updated Workbook, and Final Systems Manual, for Efficiency Manitoba review. Your final incentive will be determined by measuring the final as-built energy model energy consumption against the pre-renovation baseline, once all deliverables have been reviewed and approved by Efficiency Manitoba.

8. We pay your Phase 2 incentive.

Upon successful completion of the program, communication will be delivered to the building owner and project team confirming that the project has met the requirements of the Commercial Deep Energy Retrofit Program. The confirmed incentive amount will also be delivered to the building owner.

APPLY ONLINE AT EFFICIENCYMB.CA

204-944-8181

1-844-944-8181

deepretrofits@efficiencyMB.ca

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