

## FINAL REPORT

# Verification Analysis of Natural Resources Canada's Screening Tool Follow Up Study

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# Verification Analysis of NRCan's Web Screening Tool Follow Up Study

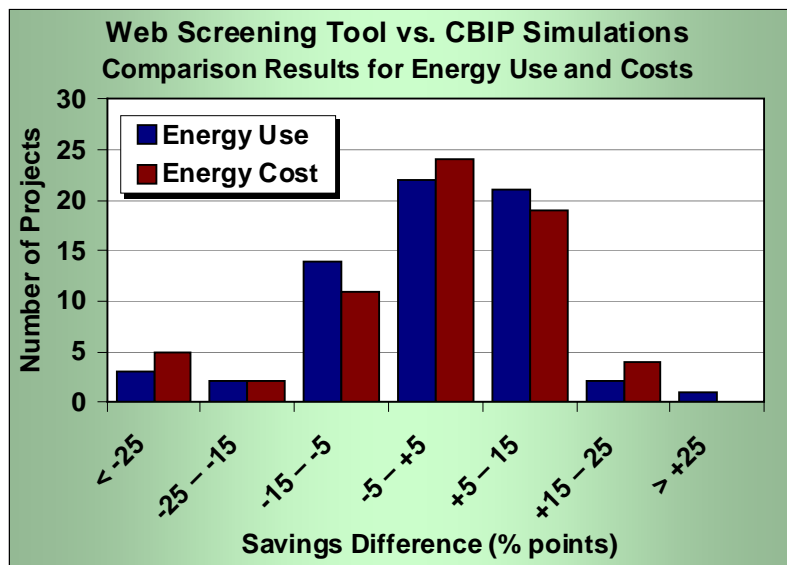
## EXECUTIVE SUMMARY

The Yukon Government is embarking on an initiative to influence designers to adopt the principles and guidelines outlined in the LEED® Canada-NC 1.0 Green Building Rating System (LEED). In support of this initiative, the Yukon Government wants to provide a simplified approach for estimating eligibility and point awards for Credit 1 of the Energy & Atmosphere (EAc1) section of the LEED Canada NC-1.0 rating system. LEED Prerequisite 2 (EAp2) and EAc1 are determined based on the modelling rules established by the now-defunct Commercial Building Incentive Program (CBIP), which Natural Resources Canada (NRCan) retains for its ecoEnergy for Buildings program. LEED Canada uses the CBIP approach of requiring 25% savings on energy use for program eligibility.

Natural Resources Canada's (NRCan's) "Screening Tool for New Building Design" (Tool) may serve as a simplified basis for estimating EAp2 and EAc1. The tool is hosted on the Office of Energy Efficiency's (OEE's) web site at <http://screen.nrcan.gc.ca/>. To help the Yukon Government determine if the tool would provide accurate results for LEED screening, EnerSys Analytics Inc. (EnerSys) performed analysis services to verify the Screening Tool's accuracy in comparison to detailed energy performance compliance modelling.

The purpose of this project was to expand upon a 2008 study to compare the results from the Screening Tool to that of actual simulations. The verification effort involved entering an additional 36 samples into the Screening Tool, and evaluating how well the energy and cost savings of the combined samples from both studies compared to the original simulations. The identified projects were weighted toward buildings located in the Canadian North or in relatively cold climates, and included 20 identifiable building types, ranging in size from 268 m<sup>2</sup> to 117,000 m<sup>2</sup>. While these were the sizes of the buildings in the sample, the tool does not have a floor area restriction.

Overall, the Web Screening Tool compared well to the detailed energy performance simulations, particularly for the building types and HVAC system configurations for which it is designed. The adjacent figure illustrates that the Screening Tool was within ±15% points for (1) 88% for projects based on energy use savings and (2) nearly 83% of the projects based on energy cost savings. The overall



## Verification Analysis of NRCAN's Screening Tool

discrepancy on savings averaged +0.7% for energy use and -0.9% for energy costs. As energy costs are used to calculate LEED EAc1 points, it follows that the comparative EAc1 point awards would compare reasonably well, too—with 83% of the projects that met the LEED prerequisite savings within  $\pm 2$  LEED points.

While a large majority of projects compared favourably in terms of predicted savings and EAc1 points, the Web Screening Tool has noticeable limitations, which manifested in more significant discrepancies with detailed simulations. The conditions that surfaced for causing the biggest discrepancies included:

- Designs with relatively low auxiliary energy use, since the Web Screening Tool did not provide the ability to change aspects directly related to fan power (besides VSDs for VAV systems).
- Building functions that significantly diverge from the types the Web Screening Tool provided.
- Centralized combination ground-source heat pump systems modelled in EE4 since EE4 inconsistently configured the heating system and energy source for the Reference case.
- Projects with exceptionally high electricity rates in comparison to fossil fuel rates when and both fuel sources were used for heating. While using two building blocks to represent the fossil and electric heat source might help mitigate the discrepancy, it is not a straightforward approach for most users.
- Significant schedule differences between those used by the detailed simulation versus the MNECB defaults fixed by the Web Screening Tool.
- Failure to exclude the floor area of parkades, crawlspaces and attics in the Web Screening Tool.
- Projects with heat recovery applied to mixed air systems without adjustment for the amount of returned (heated) air. The prevalence of heat recovery applied to air systems with significant levels of mixed air while in heating mode appeared to be relatively rare in the sample set, however.

# Verification Analysis of NRCan's Web Screening Tool

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## Verification Analysis of NRCan's Screening Tool Follow Up Study

### INTRODUCTION

The Yukon Government is embarking on an initiative to influence designers to adopt the principles and guidelines outlined in the LEED® Canada-NC 1.0 Green Building Rating System (LEED). In support of this initiative, the Yukon Government wants to provide a simplified approach for estimating eligibility and point awards for Credit 1 of the Energy & Atmosphere (EAc1) section of the LEED Canada rating system. LEED Prerequisite 2 (EAp2) and EAc1 are determined based on the modelling rules established by the now-defunct Commercial Building Incentive Program (CBIP)<sup>1</sup>. In fact, qualification for CBIP (i.e., 25% savings on energy use) is the main basis for establishing qualification for LEED with EAp2.

Typically, two approaches are followed for demonstrating building energy performance: a “prescriptive path” and a “performance path.” Oftentimes, building evaluation programs, such as Natural Resources Canada’s (former) Commercial Building Incentive Program (CBIP) and the U.S. Green Building Council's LEED 2.2, adopt both methods.

The prescriptive path method allows for building designs to adhere to a set of prescribed requirements, which in combination would meet the energy targets for that particular building type. Natural Resources Canada (NRCan), for instance, developed prescriptive bundles for CBIP, which included measure sets for northern climates. As described by Cane and Morrison (2001), the main benefit of the prescriptive approach is ease of implementation and compliance. The drawbacks, however, include lack of innovation by design teams resulting in missed opportunities. Because the prescriptive bundles were so restrictive, CBIP found that few design teams followed to this method of compliance.

The second method of demonstrating energy performance is to evaluate the building’s entire energy usage by using a thermodynamic-based energy simulation tool. Advantages of this performance method are that it allows more flexibility in the design and it can apply to any building type. The disadvantages are that software programs available for showing building performance are complicated, time consuming, and require expertise.

In an effort to simplify the performance method, Natural Resources Canada's (NRCan's) "Screening Tool for New Building Design" (Screening Tool) may serve as a basis for estimating EAp2 and EAc1. The tool is hosted on the Office of Energy Efficiency's (OEE's) website at <http://screen.nrcan.gc.ca/>. To help the Yukon Government determine if the tool would provide accurate results for LEED screening, EnerSys Analytics Inc. (EnerSys) performed analysis services to verify the Screening Tool in a 2008 study. In order to improve the accuracy of that study, the Yukon Government commissioned this effort to expand upon the sample set.

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<sup>1</sup> Note that for this effort, "CBIP" refers to the modelling protocols and not the program itself, as the program has effectively been repackaged under the ecoEnergy for Buildings (but without incentives).

## **Verification Analysis of NRCan's Screening Tool Follow Up Study**

As the developers of the Screening Tool, we understand the details of how it works, its limitations and how it should be most beneficially used for such an effort. While we know how to make best use of the Screening Tool, our verification is arguably biased because of our in-depth knowledge of the tool's background assumptions, of which other users would not be aware. In particular, a certain level of interpretation is required to distill the hundreds of characteristics that apply to an actual new building design for entry into the couple dozen inputs of the Screening Tool. Depending on the variances from the archetype building models for the tool, users can inappropriately represent their building in the tool. For this reason, we employed an independent subconsultant to review and input nearly 40% of the building projects used in this verification effort.

This report summarizes our general approach along with results as to how actual detailed CBIP simulations compared to results from the Screening Tool. We also comment on where some of the largest discrepancies lie, as well as some of the common misapplications of the Screening Tool (which may be candidates for improvement to the tool).

## Verification Analysis of NRCan's Screening Tool Follow Up Study

### METHODOLOGY

In summary, the verification effort involved taking a sampling of CBIP projects, entering them into the Screening Tool<sup>2</sup>, and evaluating how well the energy and cost savings compared to the original simulations. This section expands on our approach to evaluate how well savings results from the Screening Tool agreed with detailed CBIP energy performance compliance simulations.

#### PROJECT SELECTION

Our verification of the Screening Tool involved first obtaining a sample set of building energy performance simulation projects that were prepared based on CBIP protocols. Most simulations were completed using NRCan's EE4 energy performance compliance software, but several employed mainly the DOE2.1e software, which is the EE4 engine. For the follow-up phase, two projects were completed using eQuest. As is often the case with EE4, several of the projects were finalized outside of the EE4 front-end software and completed using DOE2.1e.

The purpose of this follow up study was to expand upon the project sample set from the original 2008 study (Hepting, 2008) in order to get an improved indication as to the Screening Tool's relative accuracy. From our direct access to dozens of projects, we added 36 projects to the verification study. To make this study more relevant to the conditions in the Yukon, we focused on including projects from the Northern Territories or at least in relatively cold climates (23 of the projects were in the Territories or Nunavut, with 10 of these in the Yukon). We used projects that were readily available to us from our own modelling efforts, or from model verifications we performed on behalf of CBIP or as independent third-party assessors. In addition, Jim Clark of Natural Resources Canada provided three CBIP projects from the Yukon.

Most of the projects from the original study were submitted to NRCan for evaluation under their CBIP program, although several were not submitted to NRCan due to timing with discontinuation of the program incentives. Only three of the projects for this follow up study were submitted to NRCan for review, with the remaining representing detailed hourly simulations for designs at various stages of design. Approximately 26 projects were simulated for LEED Canada NC-1.0 purposes, with 22 of these submitted directly to the CaGBC and not reviewed by NRCan (CBIP or ecoEnergy) for various reasons. Table 1 lists the projects included in this study, with their respective building types and locations. The table contains two columns of building types to show the actual facility purpose, represented in the detailed modelling, in comparison to the closest building type offered by the Screening Tool. Note that some facilities effectively had two key building type categories, which can be approximated with the Screening Tool's dual building block capability. Projects 001-225 through 029-129 were part of the original study.

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<sup>2</sup>This study used version 2007-08-01, v.2.05 of the Screening Tool.

## Verification Analysis of NRCan's Screening Tool Follow Up Study

**Table 1. List of Building Projects Analyzed for Screening Tool Verification**

Project ID	Floor Area (m <sup>2</sup> )	Building Type(s)		Location
		Simulation	Screening Tool	City
001-225	60,000	Hospital	Hospital	Lower Mainland, BC
002-259	3,394	Rec Centre	Office, Sm. / Retail, Big Box	Nanaimo, BC
003-204	2,848	School	School	Iqaluit, NU
004-234	2,831	Rec Centre	School	Mayo, YT
005-227	2,630	School	School	Tulita, NT
006-245	2,980	School	School	Gameti, NT
007-258	11,700	School	School	Inuvik, NT
008-251	1,182	School	School	Yellowknife, NT
009-270	7,566	School / Office, Sm.	School	Brampton, ON
010-302	12,488	Dormitory	MURB	Gagetown, NB
011-193	4,460	School	School	Quenel, BC
012-246	637	Shelter	Hotel / Office, Sm.	Hay River, NT
013-119	11,673	Ext. Care	Ext. Care	Whitehorse, YT
014-205	3,294	Police Station	Hotel / Office, Sm.	Iqaluit, NU
015-244	3,242	Office, Sm.	Office, Sm.	Kamloops, BC
016-214	14,077	MURB	MURB	Vancouver, BC
017-199	1,300	School	School	Tofino, BC
018-230	10,937	Office, Lg.	Office, Lg.	Vancouver, BC
019-129	2,505	Rec Centre	School	Vancouver, BC
020-129	5,554	School	School	Toronto, ON
021-129	2,170	Office, Lg.	Office, Lg.	Edmonton, AB
022-129	9,248	Ext. Care	Ext. Care	North York, ON
023-129	268	Office, Sm.	Office, Sm.	Crossfield, AB
024-129	8,432	Shelter	Hotel	Toronto, ON
025-129	4,536	Office, Lg.	Office, Lg.	Edmonton, AB
026-129	2,447	Ext. Care	Ext. Care	Ingersoll, ON
027-129	6,331	Office, Lg.	Office, Lg.	Fort MacMurray, AB
028-129	6,253	School	School	Sundrie, AB
029-129	32,632	Dormitory	MURB	Edmonton, AB
101-279	451	Community Centre	Office, Sm.	Dawson, YT
102-318	2,608	Office, Sm.	Office, Sm.	Whitehorse, YT
103-365	6,496	Rec Centre	School	Yellowknife, NT
104-295	1,753	Shelter	MURB	Terrace, BC
105-273	28,224	MURB / Retail, Strip Mall	MURB	Surrey, BC
106-327	1,916	Office, Sm.	Office, Sm.	Kugluktuk, NT
107-345	1,760	Community Centre	School	Haines Junction, YT
108-366	5,768	School	School	Hay River, NT
109-344	1,986	Hospital	Hospital	Ft. MacMurray, AB
110-312	2,790	Office, Sm. / Fire Station	Office, Sm. / Warehouse	Whitehorse, YT
111-313	1,784	Community Centre / Hotel	Hotel	Clyde River, NU
112-349	1,400	Office, Sm. / Data Centre	Office, Sm.	Yellowknife, NT
113-299	5,122	Office, Sm.	Office, Lg.	Athabasca, AB
114-292	4,654	Rec Centre	School	Ft. MacMurray, AB
115-328	1,478	Ext. Care	Ext. Care	Duncan, BC
116-317	6,802	School	School	Yellowknife, NT

## Verification Analysis of NRCan's Screening Tool Follow Up Study

**Table 1. List of Building Projects Analyzed for Screening Tool Verification (cont.)**

Project ID	Floor Area (m <sup>2</sup> )	Building Type(s)		Location City
		Simulation	Screening Tool	
117-CRJ	1,379	Community Centre	School	London, ON
118-CRJ	434	Office, Sm.	Office, Sm.	Toronto, ON
119-CRJ	5,811	Office, Sm.	Office, Sm.	Toronto, ON
120-CRJ	22,861	Office, Lg.	Office, Lg.	Toronto, ON
121-CRJ	116,975	Office, Lg.	Office, Lg.	Toronto, ON
122-CRJ	72,526	Office, Lg.	Office, Lg.	Calgary, AB
123-CRJ	12,127	School	School	Toronto, ON
124-CRJ	7,451	Office, Lg.	Office, Lg.	Toronto, ON
125-CRJ	9,457	MURB	Hotel	Toronto, ON
126-CRJ	11,878	School	School	Toronto, ON
127-CRJ	115,987	Office, Lg.	Office, Lg.	Toronto, ON
128-CRJ	72,526	Office, Lg.	Office, Lg. / Retail, Strip Mall	Toronto, ON
129-CRJ	5,102	Office, Sm.	Office, Sm.	Mt. Forest, ON
130-312	1,410	Office, Sm. / Fire Station	Office, Sm. / Warehouse	Whitehorse, YT
131-NRCar	463	Hospital	Ext. Care	Whitehorse, YT
132-NRCar	1,273	Retail, Big Box	Retail, Big Box	Whitehorse, YT
133-NRCar	5,021	School	School	Carmacks, YT
134-368	10,300	School	School	North Vancouver, BC
135-356	3,850	Police Station	Office, Sm. / Warehouse	Ottawa, ON
136-350	72,400	Office, Lg.	Office, Lg.	Surrey, BC

Of the selected projects, 16 different building type functions were represented, ranging in size from 268 m<sup>2</sup> to 117,000 m<sup>2</sup>. These building types are listed below, along with the occurrence of each<sup>3</sup>.

- Data Centre (1)
- Dormitory (2)
- Extended care (4)
- Fire Station (2)
- Hospital (3)
- Hotel / Motel (1)
- Multiunit Residential (3)
- Office, Large (11)
- Office, Small (12)
- Police Station (2)
- Retail (2)
- Recreation / Community Centre (9)
- School (16)
- Shelter (3)

Note that the Screening Tool allowed for direct evaluation of only a select list of building types: extended care, hospital, multiunit residential, large and small offices, schools, retail, and warehouses. It did not include dormitory, police station, recreation centre, shelter, community centre, fire station, or data centre building types. We represented these building types using what we assessed to be the closest building type(s) available (note that the Screening Tool allowed for a building to be broken into up to two major building type blocks).

<sup>3</sup> Several buildings had more than one major building function.

# Verification Analysis of NRCan's Screening Tool Follow Up Study

## DATA PREPARATION AND INPUT

As the Screening Tool is a simplified modelling application, it required significantly fewer inputs than the detailed energy performance models. Thus, our first step involved distilling the hundreds of building inputs from the detailed models to align with those required by the Screening Tool. This involved combing through the key modelling inputs and output reports to condense the data into a representative format for entry into the 30–60 inputs available through the Screening Tool. Appendix A contains summaries of the Screening Tool project inputs and results.

The next step involved setting up the Screening Tool projects and transferring the condensed information to the respective projects. The project names were kept anonymous, with generalized IDs, to maintain the confidentiality of the specific CBIP/LEED project. The project results from both the detailed and Screening Tool simulations were then captured and saved to a workbook for comparative analysis.

### Sample School for Whitehorse

As an example application of the Web Screening Tool, we created a fictitious, yet typical LEED-qualified school located in Whitehorse, generally based on typical characteristics for similar schools used in this study. Screen captures for this example, shown in the following figures, depict the Screening Tool inputs. (Note that inputs and results from the 65 actual buildings in the study can be found in Appendix A.)

**Figure 1. Sample Configuration and Rate Input Screen**

**Screening Tool For New Building Design**

**Facility Profile for Sample Northern School**  
Location: Whitehorse (A), Yukon Territory

**Configuration**

Select the choices that best describe your building:

Building Type:  Floor Area:  m<sup>2</sup>

Primary Heating System:

**Utility Rates**

Enter your marginal utility rates (including any taxes and fees):

\$ <input type="text" value="0.150"/> per kWh	\$ <input type="text" value="0.0"/> per <input type="text" value="GJ"/> natural gas
\$ <input type="text" value="0.000"/> per kW	\$ <input type="text" value="0.850"/> per litre oil/propane

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**Figure 2. Sample Building Characteristics Input Screen**

### Building Shell (School)

	Reference Building	Your Design	
Average window-to-wall-area ratio:	17.3%	<input type="text" value="15.00"/>	%
Overall window USI-value:	2.1	<input type="text" value="1.70"/>	W/m <sup>2</sup> C
Window shading coefficient:	0.736	<input type="text" value="0.39"/>	
Overall wall RSI-value:	2.703	<input type="text" value="4.90"/>	m <sup>2</sup> C/W
Gross exterior wall area:	1479.0	<input type="text" value="1479.0"/>	m <sup>2</sup>
Roof type:		<input type="text" value="Trusses &amp; joists"/>	
Overall roof RSI-value:	3.448	<input type="text" value="7.04"/>	m <sup>2</sup> C/W
Gross exterior roof area:	2838.0	<input type="text" value="2838.0"/>	m <sup>2</sup>

### Mechanical System (School)

	Reference Building	Your Design	
Heating efficiency:	80%	<input type="text" value="84.00"/>	%
Minimum outside air:	1	<input type="text" value="1.80"/>	l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	<input type="text" value="CO2 sensor"/>	
Percent of outside air controlled by DCV:	0%	<input type="text" value="10.00"/>	%
Percent of floor area cooled:	100%	<input type="text" value="5.00"/>	%
Cooling efficiency:	5.2	<input type="text" value="3.50"/>	COP
Outdoor air economizer?	Yes	<input checked="" type="checkbox"/> Yes	
Efficiency of exhaust air heat recovery:	0%	<input type="text" value="50.00"/>	%
Service water heating fuel type:	Fossil	<input type="text" value="Fossil"/>	
Service water heating efficiency:	80%	<input type="text" value="80"/>	%
Service water savings:	0%	<input type="text" value="0"/>	%
Mechanical Efficiency Options (only applies to Your Design):			
Heating plant option:		<input type="text" value="Modulating"/>	

## Verification Analysis of NRCan's Screening Tool Follow Up Study

**Figure 2. Sample Building Characteristics Input Screen (cont.)**

Lighting (School)		Reference Building	Your Design
Average lighting density:		19.1	<input type="text" value="12.00"/> W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):			
	<input type="text" value="None"/>		<input type="text" value="0"/> %
	<input type="text" value="None"/>		<input type="text" value="0"/> %

Figure 3 presents the results from the Web Screening Tool for the typical school. As shown, the design satisfied the LEED Canada EAp2 requirement since it resulted in well over 25% energy use savings. This qualified the sample school for four EAc1 points.

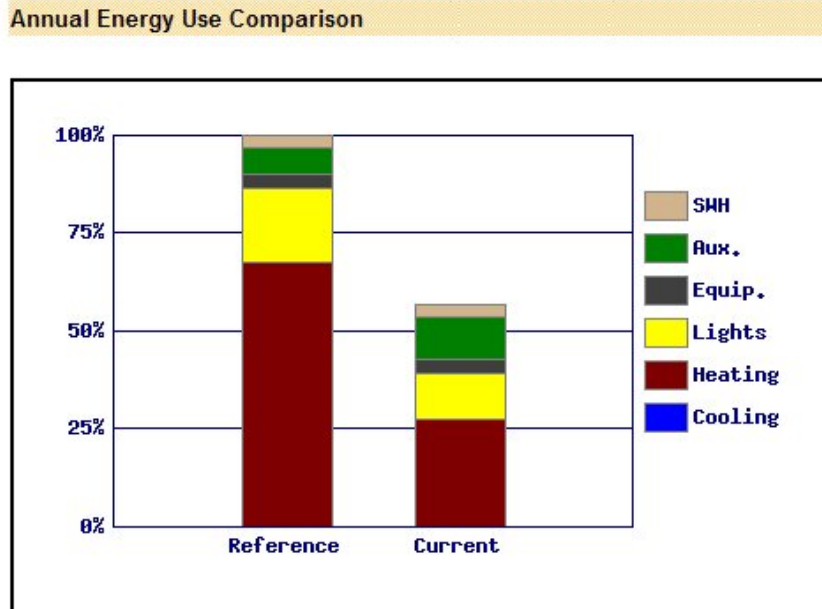
It is interesting to note that the key contributor to the savings was the exhaust heat recovery. Without heat recovery, the energy savings would drop below 25% and the design would not qualify for LEED. As discussed in the next section, this is a key reason all qualifying CBIP projects for the North have some level of exhaust heat recovery.

**Figure 3. Sample Building Results Screen**

Current Design Performance		
<b>Annual Energy Use (GJ)</b>		
Reference Building	7,822	
Your Design	4,444	
Energy Savings	3,379	<b>43.2%</b>
<b>Annual Energy Cost Savings</b>		<b>\$79,955.66</b>
<b>LEED® Canada Energy &amp; Atmosphere (EA)</b>		
Reference Building	\$207,153.26	
Your Design	\$127,197.60	
Regulated Energy Cost Savings**	\$79,955.66	( 38.6% )
**Regulated energy costs exclude plug loads (equipment) for LEED.		
<b>LEED Canada EA Credit 1</b>		<b>4 points</b>
<b>Emissions Savings</b>		
Carbon Dioxide (CO <sub>2</sub> )	278,822	kg

# Verification Analysis of NRCan's Screening Tool Follow Up Study

## Figure 3. Sample Building Results Screen (cont.)



### Your Design

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	600	0	2	\$90
Heating	20,140	59,430	2,158	\$48,428
Lights	256,298	0	923	\$38,445
Equip.	75,137	0	270	\$11,271
Aux.	230,240	0	829	\$34,536
SWH	0	7,459	262	\$5,699
Totals	582,415	66,889	4,444	\$138,468

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	1,146	0	4	\$172
Heating	42,643	146,565	5,296	\$118,379
Lights	407,942	0	1,469	\$61,191
Equip.	75,137	0	270	\$11,271
Aux.	144,750	0	521	\$21,712
SWH	0	7,459	262	\$5,699
Totals	671,619	154,024	7,822	\$218,424

## Verification Analysis of NRCan's Screening Tool Follow Up Study

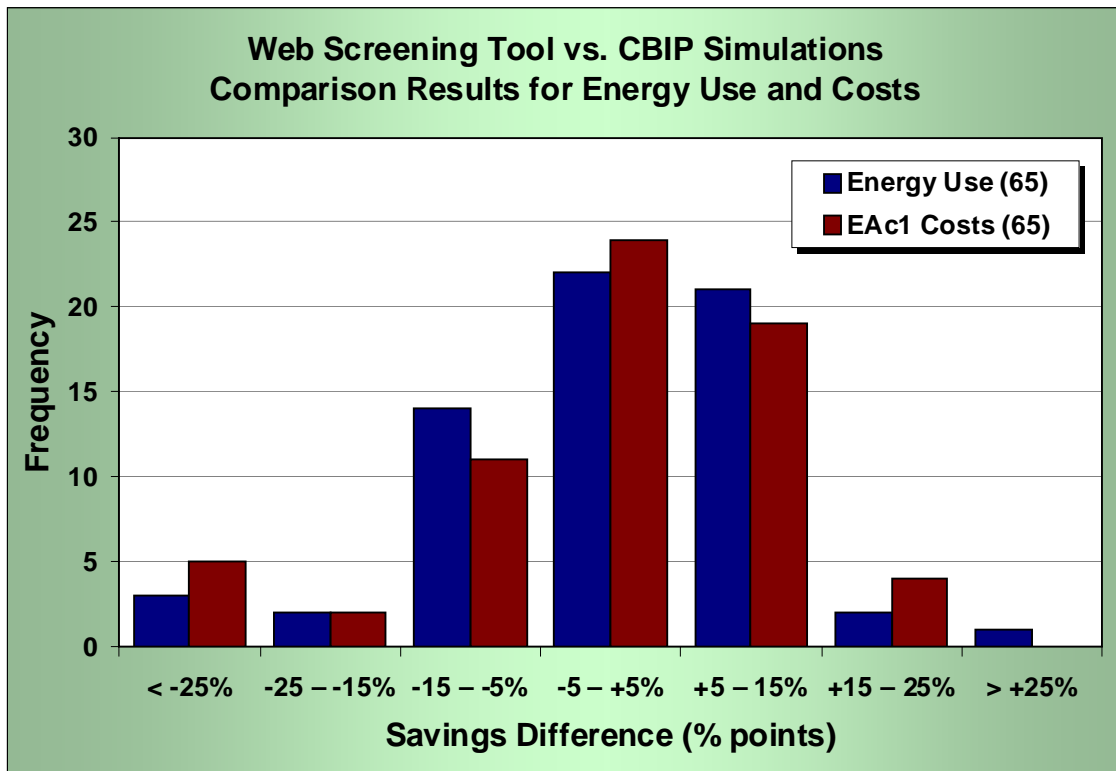
### RESULTS

Overall, the Screening Tool compared favourably to the detailed energy performance simulations. This applied for both energy use savings as well as energy cost savings. Note that this is an important distinction because LEED requires savings on energy use of at least 25% to meet EAp2, but bases its point assignments for EAc1 on energy cost savings.

Figure 4 shows the distribution of the relative differences between energy use and energy cost savings between the detailed and simplified approaches for estimating relative energy performance. As indicated in the figure, the Screening Tool predicted energy use saving to within  $\pm 15\%$  points for 88% of the projects included in the verification assessment, and 34% of the projects were within  $\pm 5\%$  points. On average, the Screening Tool predicted energy savings to within +0.7% points (higher) in comparison to the detailed simulations, with a standard deviation of 11.5% points.

Regulated end-use energy cost savings, as calculated for LEED (which excluded plug loads) compared a bit less favourably. When comparing the Screening Tool EAc1 cost savings to those from the detailed simulation, 83% of the projects were within  $\pm 15\%$  points, but 37% of the projects were within  $\pm 5\%$  points. Note that several of the projects

**Figure 4. Energy Use and Cost Savings Differences, Frequency Distribution**

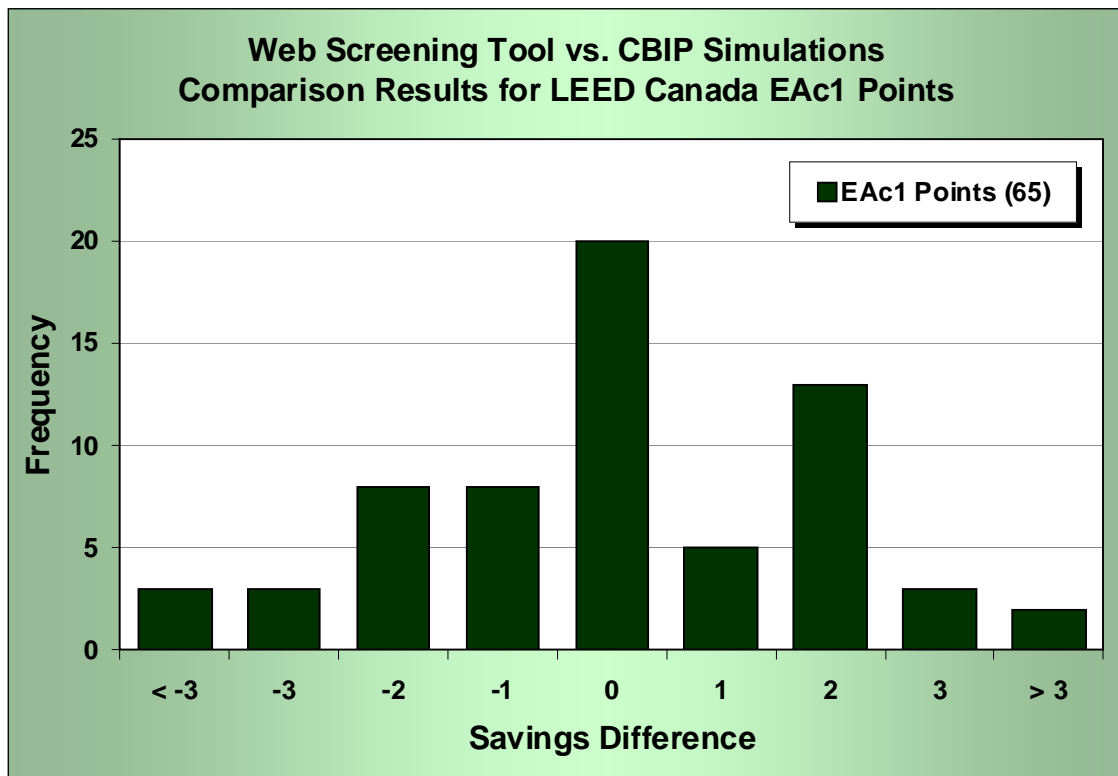


## Verification Analysis of NRCan's Screening Tool Follow Up Study

did not meet the 25% savings requirement to qualify for LEED EAp2 and hence, the Screening Tool did not report EAc1 cost savings. However, we manually calculated the equivalent regulated end-use energy cost savings from the end-use results provided by the Tool. On average, the Screening Tool predicted regulated energy cost savings to within -0.9% points (slightly lower) in comparison to the detailed simulations, with a standard deviation of 14% points.

The EAc1 energy cost savings are used to calculate LEED EAc1 points. Figure 5 shows the results from comparing the points predicted by the Screening Tool versus the points that would have been (or were) awarded by LEED from the detailed simulations. As indicated in the figure, the Screening Tool predicted EAc1 point awards to within  $\pm 2$  points for 83% of the projects included in the verification assessment, and 51% of the projects were within  $\pm 1$  point. Over 30% of the projects predicted the same number of EAc1 points. On average, the Screening Tool predicted EAc1 points to within 0.02 point (slightly higher) in comparison to the detailed simulations, with a standard deviation of 2.1 points.

**Figure 5. LEED EAc1 Point Differences, Frequency Distribution**



## Verification Analysis of NRCan's Screening Tool Follow Up Study

Table 2 provides the background comparisons that are represented in Figures 4 and 5. The green entries indicate differences that were within  $\pm 10\%$ , for energy use and EAc1 cost savings, or within  $\pm 1$  EAc1 point. The red entries indicate differences that were outside of  $\pm 20\%$ , for energy use and EAc1 cost savings, or beyond  $\pm 2$  EAc1 points.

### REVIEW OF DISCREPANCIES

While a large majority of projects compared favourably in terms of predicted savings and EAc1 points, several projects did not fare so well. In investigating the projects that demonstrated more significant differences between the Screening Tool and detailed models, we found the following issues:

1. **Projects with relatively low auxiliary energy use and low minimum air flow levels** cannot *presently* be represented with the Screening Tool (version 2.05). Hence, projects with mixed mode ventilation and/or displacement ventilation, for instance, may have their electricity use overstated in the Screening Tool. For variable flow systems that provided for minimum flow reductions below the Reference case's 0.4 cfm/ft<sup>2</sup> level, discrepancies in reheat was relatively significant, especially if the building had a high degree of load variability among zones (e.g., highly glazed offices). The two projects with the highest disagreement for

**Table 2. Savings Differences by Project**

Project ID	Savings Difference		EAc1 Point Difference
	Energy Use	EAc1 Costs	
001-225	-1.2%	-1.2%	0
002-259	-0.4%	-2.9%	0
003-204	10.7%	-5.9%	-1
004-234	7.1%	8.7%	2
005-227	-0.9%	-15.7%	-3
006-245	-3.6%	11.8%	-1
007-258	-8.8%	1.1%	0
008-251	8.5%	0.3%	0
009-270	-6.8%	-3.2%	0
010-302	3.5%	2.9%	0
011-193	-7.0%	-5.4%	-2
012-246	-0.8%	-2.4%	0
013-119	-1.8%	-4.2%	-1
014-205	8.7%	9.1%	2
015-244	7.0%	6.9%	1
016-214	-23.5%	-8.6%	-3
017-199	13.0%	-28.7%	-5
018-230	6.1%	-9.0%	-2
019-129	26.2%	14.3%	2
020-129	4.6%	7.2%	2
021-129	23.0%	16.0%	3
022-129	4.9%	-3.2%	0
023-129	-6.3%	-24.4%	-1
024-129	2.9%	4.7%	1
025-129	13.2%	7.8%	2
026-129	-1.8%	-0.5%	0
027-129	-4.3%	5.8%	2
028-129	5.5%	10.2%	2
029-129	3.0%	-3.4%	-1
101-279	-15.6%	-6.3%	0
102-318	-5.5%	3.4%	0
103-365	6.7%	-0.3%	0
104-295	-5.4%	-4.3%	0
105-273	1.9%	0.0%	-2
106-327	6.2%	23.4%	0
107-345	4.1%	6.5%	1
108-366	2.7%	-2.0%	0
109-344	-7.1%	-33.6%	0
110-312	-31.1%	-26.7%	-2
111-313	2.2%	-12.6%	-3
112-349	10.0%	19.3%	5
113-299	6.2%	1.8%	0
114-292	5.5%	6.1%	1
115-328	4.9%	0.8%	0
116-317	12.1%	9.7%	2
117-CRJ	14.4%	13.4%	3
118-CRJ	-1.7%	-8.3%	-2

## Verification Analysis of NRCan's Screening Tool Follow Up Study

energy use and cost savings, as well as EAc1 points, exhibited this problem<sup>4</sup>. Note that this was exacerbated when combined with the issue of having relatively high electricity rates in comparison to the natural gas rates.

- Building types that do not align with those provided by the Screening Tool** provided for potential discrepancies and required careful thought as to which building type(s) would provide for the most representative approximation. This involved having an appreciation as to what the MNECB dictates for various building type functions, especially for lighting and distinguishing between residential and non-residential space uses. In some cases, the building type was too disparate to be appropriately represented. For instance, the third most disparate comparison for regulated cost savings was for a clinic, which had significantly different loads than for hospital building type used to represent it with the Screening Tool. Representation of a firehall also proved problematic, as did the one data centre in the sample. The latter demonstrated one of the worst comparisons for EAc1 points, partly because the Web Screening Tool could not represent the high amount of waste heat recovered from the computer equipment.

**Table 2. Savings Differences by Project (cont.)**

Project ID	Savings Difference		EAc1 Point Difference
	Energy Use	EAc1 Costs	
119-CRJ	-3.0%	11.6%	2
120-CRJ	-5.2%	-9.3%	-2
121-CRJ	-5.1%	-3.1%	-1
122-CRJ	-8.0%	-4.8%	-1
123-CRJ	9.3%	8.9%	2
124-CRJ	-5.7%	-8.4%	-2
125-CRJ	6.0%	13.2%	2
126-CRJ	19.7%	24.8%	5
127-CRJ	-31.4%	-46.5%	-5
128-CRJ	-36.9%	-47.1%	-6
129-CRJ	-7.4%	-0.5%	0
130-312	13.5%	13.3%	3
131-NRCan	-8.3%	-9.9%	-2
132-NRCan	0.7%	13.0%	2
133-NRCan	4.4%	8.1%	2
134-368	6.8%	3.4%	1
135-356	-9.9%	-7.7%	-1
136-350	13.4%	1.4%	0
<b>Average</b>	<b>0.7%</b>	<b>-0.9%</b>	<b>0.0</b>
<b>Min</b>	<b>-23.5%</b>	<b>-28.7%</b>	<b>-5</b>
<b>Max</b>	<b>26.2%</b>	<b>16.0%</b>	<b>3</b>

- Projects with ground-source heat pumps (GSHPs)** were particularly susceptible to having relatively high discrepancies. This was due to very significant differences in how the Screening Tool configured the Reference case versus how EE4 addressed this configuration. The MNECB modelling rules dictate that GSHPs with supplementary fossil heating are to be effectively compared to a Reference case with a fossil-fired boiler. The Screening Tool does this, as does EE4 for GSHPs serving distributed heat pumps. However, with the introduction of EE4 version 1.6, NRCan inconsistently programmed EE4 to provide for an electric resistance boiler in the Reference case if the GSHP provides more than half of the proposed heating

<sup>4</sup> It is interesting to note that the two most projects with the highest overall comparison discrepancies barely qualified for LEED EAp2 based on energy use savings, partly because of a bug with EE4 that generously provided too much credit on pumping energy use. As the energy cost savings were relatively high due to the disparity in electricity versus fossil fuel prices, the projects were able to qualify for 5 – 6 EAc1 points versus none indicated by the Web Screening Tool.

## Verification Analysis of NRCan's Screening Tool Follow Up Study

energy requirements (which is nearly always the case). Moreover, EE4 introduced an error from DOE2 that allowed the electric heating efficiency to vary from about 80–95% instead of the 100% efficiency indicated by MNECB for electric heating<sup>5</sup>. The net effect was that the effective fuel switch for the comparable Reference cases provided for a potentially significant discrepancy that can be magnified in the energy costs depending on the relative differences in electricity versus fossil fuel costs. A few projects with relatively poor comparisons on energy use savings, EAc1 cost savings, and points (e.g., -5), exhibit this problem.

4. **Projects with high electricity rates in comparison to fossil fuel rates** were also susceptible to having relatively high discrepancies, particularly if both fuel sources provided heating. In many cases, the Screening Tool estimated absolute energy use for both the Proposed and Reference cases significantly higher or lower than in the detailed simulation. But in most of these cases, the relative differences cancelled each other out, providing for net savings that were relatively close. But if the local electricity costs were unusually high in comparison to fossil fuel costs, as often happens in remote Northern communities for instance, the relative EAc1 cost savings could become skewed. This is due to the relatively heavy "weighting" that the rates impose on the electricity savings versus fossil fuel savings. Several projects exhibited this problem, particularly ones with significant fan and pump savings and a few remote Northern projects having local utility rates of over \$1.00/kWh versus \$0.87/liter of fuel oil.
5. **Schedule differences** introduced discrepancies in several cases. The Screening Tool uses default MNECB schedules. If the detailed simulation applied different schedules, this could shift the relative end-use allocation in the comparative models. This issue was most prevalent in several school projects, where some simulators provided for more realistic reduced summer and holiday schedules (versus the weekly default MNECB schedules that apply for all times of the year). It was even more apparent in a visitor operations centre that only operated in the summer. In these cases, electricity use was most affected because the Screening Tool included summer operations (i.e., little space heating), which amplified EAc1 cost savings differences with the relative cost of electricity nearly always being higher than for fossil fuel.
6. **Parkades, crawlspaces and attics** provided for discrepancies even if they were not included as part of the occupied floor area in the Screening Tool (as is the proper approach). In particular, if such a space was marginally conditioned and modelled with the fans always running (typically, not recommended), this skewed the energy use of the detailed simulation in comparison to the Screening Tool archetypes since they do not directly account for such spaces. In other words, the relative energy use likely would be understated with the Screening Tool if the area were excluded. However, if the area for semi-conditioned areas was included in the Screening Tool,

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<sup>5</sup> The error with having an inappropriate electric boiler heating efficiency reportedly has been resolved with EE4 version 1.7, but none of the projects were modelled with this version of EE4 due to its relatively recent release.

## Verification Analysis of NRCAN's Screening Tool Follow Up Study

the relative energy use tended to be overstated. This problem was minimized if the simulation was configured to provide for the cycling of fans (as is typical for how such spaces are actually controlled) to prevent having too much fan energy and possible heating of outside air. In one case, this was not done in the simulation; we consequently included the area in the Screening Tool project, which resulted in the project having an energy savings comparison that was the 6<sup>th</sup> worse.

7. **Heat recovery applied to mixed air systems** was not precisely represented in the Screening Tool because it simply reduced the amount of outside air to emulate exhaust heat recovery. For systems with high percentages of outside air flow while in heating mode (where exhaust heat recovery is most typically applied), this is a reasonable representation. But for systems with higher levels of return air (e.g., 30% or more) when in a heating mode, a large portion of the outside air conditioning load is effectively transferred to the zone (e.g., met with baseboards). This means that in reality the opportunity for heat recovery is diminished at the air handler, particularly as the supply air temperature is driven lower. The heat recovery effectiveness may be lowered based on percent of outside at the primary air handler (versus the minimum supply air) as a conservative adjustment but few users would know to do that. This condition of overstated heat recovery for a mixed air system applied to the project that demonstrated the largest overestimation of regulated end-use energy costs. Because of the diminished overall effectiveness of heat recovery applied to systems with significant levels of return air, its application appeared to have been very limited (possibly only one project).
8. **LEED Industrial Energy Credit (IEC)** was not represented in the Web Screening Tool, but would be apparent in the EAc1 point calculations for some projects. Several of the MURB projects were provided up to the maximum two EAc1 points for IEC associated with EnergyStar appliances and/or reduced parking lighting. We consistently adjusted the reported regulated energy cost savings to account for this discrepancy, but reported on the full EAc1 points with the IEC.
9. **Demand charges for electricity** caused problems for the initial study as the Screening Tool sometimes provided incorrect predictions of peak demand. Hence, if high demand charges were entered (in comparison to the energy charges), this could exaggerate the relative cost savings, particularly for projects that had a high degree of variation from the default values. However, since the original study, the Screening Tool was updated to minimize this error. Hence, the projects entered for this update appeared not to have this problem.

### **EE4 Inaccuracies**

Some of the discrepancies between EE4 and the Screening Tool results were due to the inaccurate manner in which EE4 represented model components. As mentioned previously, EE4's incorrect Reference case for ground-source heat pump systems resulted in large discrepancies. A smaller yet notable difference between EE4 and Screening Tool was with the representation of pumping energy. Typically, pumping

## Verification Analysis of NRCan's Screening Tool Follow Up Study

accounts for a quite small contribution to the overall building energy use. In two cases, however, the exceptionally high pumping energy that EE4 assigned to the Reference case allowed the projects to barely qualify for the EAp2 requirement. As the electricity costs were relatively high compared to the fossil fuel costs, this allowed the EE4-simulated project to qualify for relatively high EAc1 points. In contrast, the equivalent Web Screening Tool representations did not qualify and hence, indicated zero EAc1 points.

### ENERGY EFFICIENCY MEASURE REVIEW

In reviewing the detailed simulations to distil the inputs and output reports for entry into the Screening Tool, we noted the characteristics that we felt contributed the most to the relative energy savings in comparison to the MNECB Reference case. This was done as a secondary effort, which did not impact the Screening Tool verification effort.

For each project, we recorded up to five different energy saving measures that applied to each project from a list of standardized selections. The incidence of each applicable measure is listed in Table 3. The measures listed in Table 3 are not exhaustive and only include our estimate of the top five measures (if there were that many) that contributed the most to the savings in comparison to the CBIP Reference case. In most cases, if not all cases, for instance, roof insulation exceeded the minimum prescriptive requirement of the MNECB. But it was only registered for about 42% of the projects because other measures provided for greater savings.

In general, mechanical measures provided for the largest energy savings. In particular, heat wheel heat recovery was the most prevalent measure—present in over half of the projects. More generally, exhaust heat recovery in all its forms were prevalent in 75% of the projects. Except for most of the 12 projects with ground-, air- or exhaust-source heat pump systems, heat recovery typically provided for the largest individual energy savings—for the Northern projects, this definitely was the case.

Further details about each of the buildings' characteristics appear in Appendix A, but more detailed review beyond generalized qualitative patterns likely would be of limited value. The relationships among specific building characteristics and their relative energy performance likely would not be statistically significant and any indicators inconclusive. This is because there are nearly limitless approaches for achieving various levels of energy performance, with various cross-effects on different end-uses. Hence, quantifying their relative importance is problematic, if not impossible, beyond a generalized level.

## Verification Analysis of NRCAN's Screening Tool Follow Up Study

**Table 3. Frequency of Energy Saving Measures**

Energy Saving Measure	Count
Cooling - high efficiency (>50% higher than Ref)	1
DHW - condenser/chiller heat recovery	2
DHW - high efficiency boiler (>87% seasonal efficiency)	2
Fans - low fan power (low flow and/or high efficiency)	4
Fans - VSDs	1
Heating - heat recovery, air-to-air	2
<b>Heating - heat recovery, heat wheel</b>	<b>16</b>
Heating - heat recovery, heat pipe	1
Heating - heat recovery, run-around loop	4
Heating - high efficiency boiler (>87% seasonal efficiency)	6
Heating - mid efficiency boiler (75-87% seasonal efficiency)	4
Heating - high efficiency furnace (>83% seasonal efficiency)	1
Heating - mid efficiency furnace (75-83% seasonal efficiency)	1
HVAC System - ground-source heat pump	4
HVAC System - central air-source heat pump	1
HVAC System - exhaust-source heat pump	1
HVAC System - reduce O/A levels	2
HVAC Controls - demand controlled ventilaton	4
HVAC Controls - reheat reduced significantly	1
Lighting - >50% lower than Ref (incl. controls)	4
Lighting - 30-50% lower than Ref (incl. controls)	6
Lighting - 10-30% lower than Ref (incl controls)	6
Lighting - daylighting controls	1
Lighting - lighting occupancy sensors	3
Pumps - VSDs	3
Roof - R-value >100% higher than Ref	6
Roof - R-value 50-100% higher than Ref	2
Roof - R-value 25-50% higher than Ref	5
Walls - R-value >100% higher than Ref	3
Walls - R-value 50-100% higher than Ref	2
Walls - R-value 25-50% higher than Ref	3
Windows - Losses >40% lower than Ref	1
<b>Windows - Losses 25-40% lower than Ref</b>	<b>7</b>
<b>Windows - Losses 10-25% lower than Ref</b>	<b>7</b>

### CONCLUSION

For the vast majority of cases, NRCAN's Screening Tool provided for a relatively good representation of the estimated energy savings one can expect from performing a much more detailed compliance simulation for LEED Canada purposes. However, the simplified tool easily could be used incorrectly (as with any simulation tool), providing for inappropriate comparative compliance results. For instance, a common mistake users might make, which could have a very significant impact on the energy performance results, is in the assignment of exhaust heat recovery. If the overall heat recovery does not account for fresh air from *all* systems and/or direct exhaust not returned for heat recovery purposes, the relative savings could be significantly overstated. Another common mistake would be to include the floor area for indirectly conditioned large spaces, such as crawlspaces and parking garages.

As highlighted in this report, the Screening Tool also has certain limitations and conflicts with NRCAN's EE4 energy performance compliance software. Arguably the biggest discrepancy with how EE4 configures the Reference case existed in the application of ground-source heat pumps (GSHPs) with supplementary fossil fuel heating—likely the most common application of GSHP systems. As previously explained, NRCAN's EE4 energy performance compliance software effectively introduced this problem with version 1.6, which assigns an electric boiler to the Reference case for most cases. We have recommended that NRCAN change EE4, or at least apply a work-around that provides for an appropriate fossil fuel boiler in the Reference case. We make this recommendation not only because it contradicts the MNECB Compliance Supplement modelling rules and EE4's own treatment of distributed heat pumps served by a GSHP system, but because it is inconsistent with the secondary ASHRAE 90.1-1999 approach for LEED EAc1. Because fewer of the samples in this updated study used EE4, however, this discrepancy had less of an affect on the overall report results.

The Screening Tool may be further improved through enhancements and upgrades, but it is important to maintain its relative simplicity and ease-of-use. Otherwise, the impetus for its continued use for rapidly evaluating energy performance issues, including for LEED Canada purposes, would diminish. Adding a few simple features, such as allowing users to define fan power and opportunities that reduce fan energy, would make the Screening Tool more robust.

## Verification Analysis of NRCan's Screening Tool Follow Up Study

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- Commercial Building Incentive Program for Energy Efficient New Construction. 1999. Technical Guide. Natural Resources Canada.
- LEED-NC for New Construction. October 2005. Reference Guide, Version 2.2. U.S. Green Building Council. Pages 174–195.
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**APPENDIX A**

**Web Screening Tool Summaries**

Web Screening Tool Summaries



Natural Resources Canada / Ressources naturelles Canada

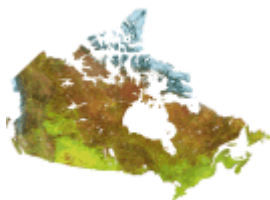


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Hospital, 60000 m<sup>2</sup>  
 Location: Abbotsford (A), British Columbia  
 Heating System: Fossil

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.050 per kWh                      \$ 9.500 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	25.4	25.4 %
Overall window USI-value:	3.2	1.84 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	2.71 m <sup>2</sup> C/W
Gross exterior wall area:	15856	15856 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	5.68
Gross exterior roof area:	17549	17549 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	86.5 %
Minimum outside air:	2.56	2.56 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	Occupancy sensor
Percent of outside air controlled by DCV:	0	5 %
Percent of floor area cooled:	98	98 %
Cooling efficiency:	5.2	6.6 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	20 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	86.9 %
Service water savings:	0	61 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		Yes

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18.8	8.9 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	100	100 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Web Screening Tool Summaries**

**Annual Energy Use (GJ)**

Reference Building	119,318
Your Design	80,362

Energy Savings	<b>38,956</b>	<b>32.6%</b>
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**Annual Energy Cost Savings** **\$446,986.54**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$1,305,016.44
Your Design	\$858,026.00

**Regulated Energy Cost Savings\*\*** **\$446,990.44 ( 34.3% )**

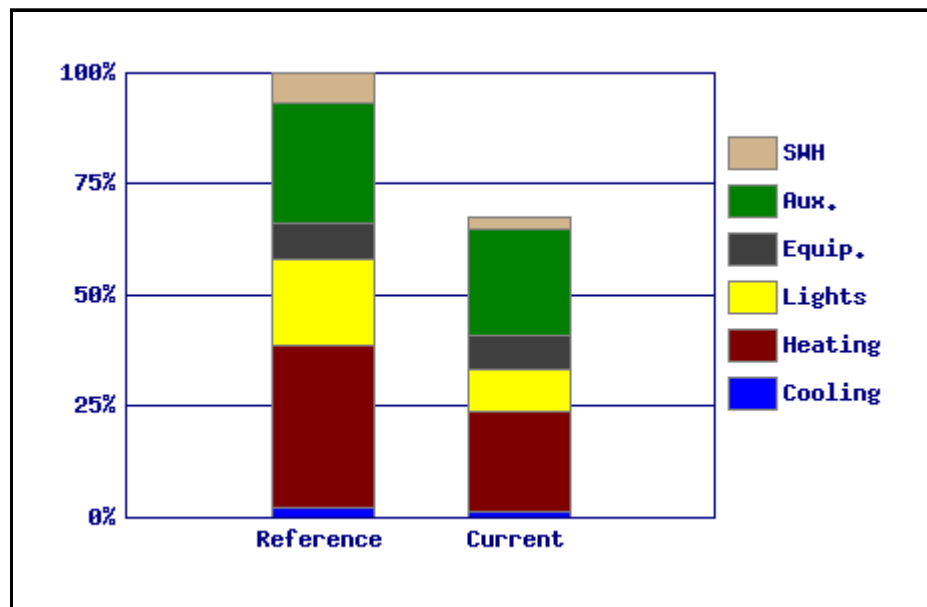
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 3,720,415 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs

### Web Screening Tool Summaries

Cooling	385,099	0	1,386	\$19,255
Heating	0	26,987	26,987	\$256,326
Lights	3,096,758	0	11,148	\$154,838
Equip.	2,546,528	0	9,167	\$127,326
Aux.	8,020,249	0	28,873	\$401,012
SWH	0	2,800	2,800	\$26,595
Totals	14,048,635	29,787	80,362	\$985,352

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	732,380	0	2,637	\$36,619
Heating	0	43,413	43,413	\$412,343
Lights	6,541,821	0	23,551	\$327,091
Equip.	2,546,450	0	9,167	\$127,322
Aux.	9,097,812	0	32,752	\$454,890
SWH	0	7,799	7,799	\$74,074
Totals	18,918,463	51,211	119,318	\$1,432,339

### Disclaimer

The information presented on this web page gives approximate values to help you make an informed decision about whether or not to proceed with an application for the validation of the design under the [ecoEnergy Initiative](#). Because the input data are not as detailed as required under the ecoENERGY - New Buildings Design Validation Application, actual results will vary. Therefore, NRCan does not guarantee that the Screening Tool results meet the ecoENERGY criteria for validation of the design.

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Web Screening Tool Summaries



Natural Resources Canada / Ressources naturelles Canada

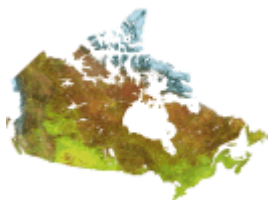


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Facility Description for 002-259

Your Facility Description:

Configuration

- 1. Office, Small, Ground-Source Heat Pumps - 50.0%
- 2. Retail, Big Box, Ground-Source Heat Pumps - 50.0%

Total Floor Area: 3,394 m<sup>2</sup>

Location: Victoria (C), British Columbia

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.053 per kWh	\$ 1.554 per Therms
\$ 0.000 per kW	\$ 0 per litre oil/propane

First Building Block

First Building Block: Office, Small, 1697 m<sup>2</sup>

Heating System: Ground-Source Heat Pumps

Building Shell (Office, Small)

	Reference Building	Your Design
Average window-to-wall-area ratio:	24.1	24.1 %
Overall window USI-value:	3.2	3.41 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.52 m <sup>2</sup> C/W
Gross exterior wall area:	855	855 m <sup>2</sup>
Roof type:	All other	All other

**Web Screening Tool Summaries**

Overall roof RSI-value:	2.128	3.61
Gross exterior roof area:	1091	1091 m <sup>2</sup>

**Mechanical System (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	1.4	1.4 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	Occupancy sensor
Percent of outside air controlled by DCV:	0	100 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	2.33 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	72 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	350 %
Service water savings:	0	13 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		Yes

**Lighting (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	5.79 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block:	Retail, Big Box, 1697 m <sup>2</sup>
Heating System:	Ground-Source Heat Pumps

### Web Screening Tool Summaries

#### Building Shell (Retail, Big Box)

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	9.9	9.9 %
Overall window USI-value:	3.2	3.5 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.9 m <sup>2</sup> C/W
Gross exterior wall area:	960	960 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.61
Gross exterior roof area:	950	950 m <sup>2</sup>

#### Mechanical System (Retail, Big Box)

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	2.2	2.2 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	100 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	2.33 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	350 %
Service water savings:	0	13 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		Yes

#### Lighting (Retail, Big Box)

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	30	25.3 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

#### Process Loads (Retail, Big Box)

**Web Screening Tool Summaries**

	Reference Building	Your Design
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	3,663	
Your Design	1,781	
	1,881	<b>51.4%</b>

**Annual Energy Cost Savings** **\$27,707.29**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$50,541.53	
Your Design	\$22,834.24	
	<b>\$27,707.29</b>	<b>( 54.8% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

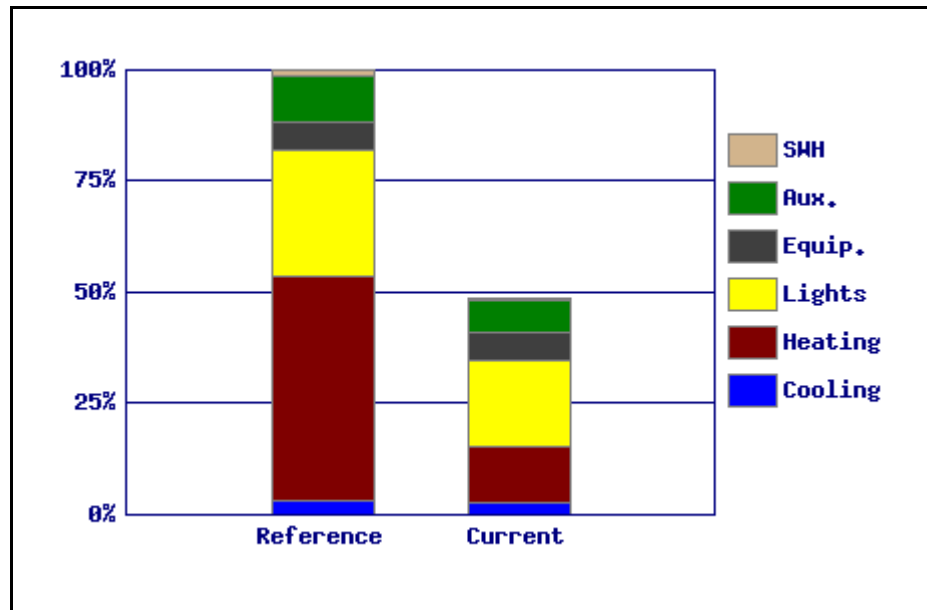
**LEED Canada EA Credit 1** **7 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 105,053 kg

**Annual Energy Use Comparison**

Web Screening Tool Summaries



Your Design

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Therms	Total Energy GJ	Costs
Cooling	27,617	0	99	\$1,464
Heating	128,931	0	464	\$6,833
Lights	196,828	0	709	\$10,432
Equip.	64,005	0	230	\$3,392
Aux.	74,148	0	267	\$3,930
SWH	3,310	0	12	\$175
<b>Totals</b>	<b>494,839</b>	<b>0</b>	<b>1,781</b>	<b>\$26,226</b>

Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Therms	Total Energy GJ	Costs
Cooling	34,023	0	122	\$1,803
Heating	14,734	1,781	1,834	\$27,010
Lights	289,014	0	1,040	\$15,318
Equip.	64,005	0	230	\$3,392
Aux.	107,833	0	388	\$5,715
SWH	13,123	0	47	\$696
<b>Totals</b>	<b>522,732</b>	<b>1,781</b>	<b>3,663</b>	<b>\$53,934</b>

## Web Screening Tool Summaries

### Disclaimer

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Web Screening Tool Summaries



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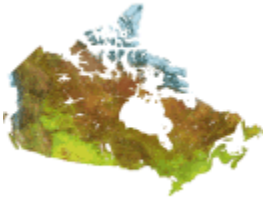


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

003-204 (Corrected)

Building Profile Summary

Proposed Building: School, 2848 m<sup>2</sup>  
 Location: Iqaluit (F), Nunavut  
 Heating System: Fossil (Constant Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.263 per kWh                                      \$ 0 per Liters  
 \$ 8.000 per kW                                        \$ 0.597 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	7.59	7.59 %
Overall window USI-value:	2.1	2.45 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.36
Overall wall RSI-value:	3.333	3.15 m <sup>2</sup> C/W
Gross exterior wall area:	1757	1757 m <sup>2</sup>
Roof type:	Trusses & joists	Trusses & joists
Overall roof RSI-value:	4.348	3.94
Gross exterior roof area:	2645	2645 m <sup>2</sup>

### Web Screening Tool Summaries

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	82.3 %
Minimum outside air:	2.55	2.55 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	51 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

#### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	15.29 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

#### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

#### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

#### Current Design Performance

**Web Screening Tool Summaries**

**Annual Energy Use (GJ)**

Reference Building	12,848
Your Design	7,660

Energy Savings **5,188** **40.4%**

**Annual Energy Cost Savings \$86,283.46**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$283,923.89
Your Design	\$197,640.43

**Regulated Energy Cost Savings\*\* \$86,283.46 (30.4%)**

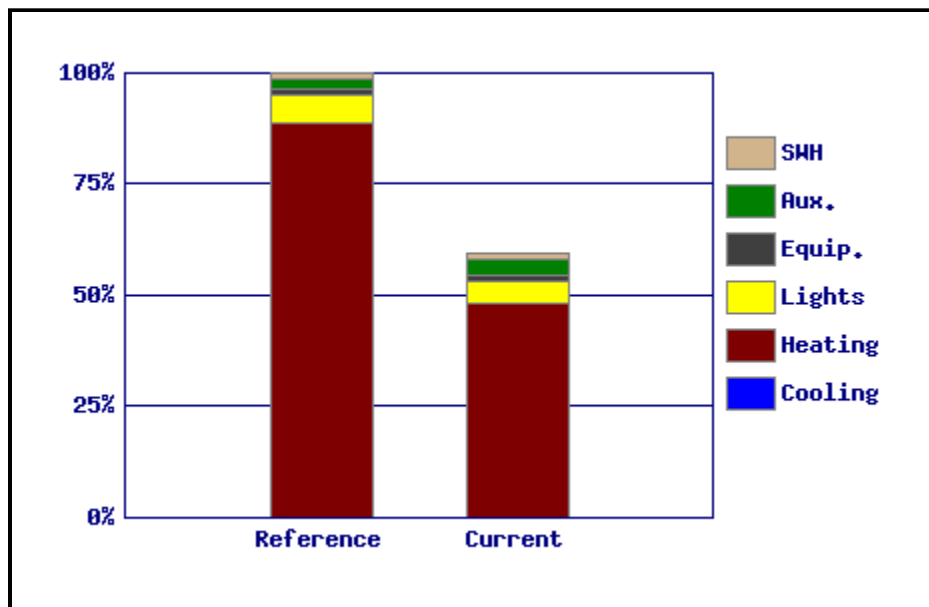
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **2 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 397,598 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs

### Web Screening Tool Summaries

Cooling	0	0	0	\$0
Heating	49,863	171,072	6,182	\$105,627
Lights	186,019	0	670	\$52,776
Equip.	42,798	0	154	\$12,474
Aux.	129,910	0	468	\$36,386
SWH	0	5,313	186	\$2,851
Totals	408,590	176,385	7,660	\$210,115

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	79,960	316,495	11,393	\$193,807
Lights	232,364	0	837	\$65,924
Equip.	42,798	0	154	\$12,474
Aux.	77,316	0	278	\$21,342
SWH	0	5,313	186	\$2,851
Totals	432,438	321,808	12,848	\$296,398

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**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	1.73	1.73 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	36	36 %
Cooling efficiency:	5.2	3.37 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	53 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	6.69 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	2,981	
Your Design	1,698	
<hr/>		
Energy Savings	1,283	<b>43.0%</b>
<b>Annual Energy Cost Savings</b>		<b>\$38,494.56</b>

**LEED® Canada Energy & Atmosphere (EA)**

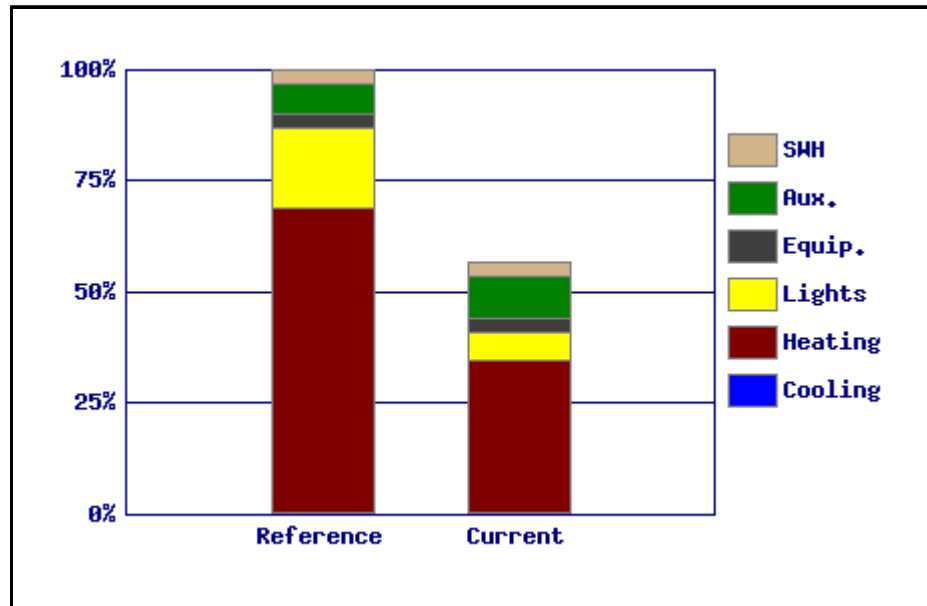
Reference Building	\$89,169.01
Your Design	\$50,674.45
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$38,494.56 (43.2%)</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **5 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 118,180 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	5,293	0	19	\$1,114

## Web Screening Tool Summaries

Heating	9,032	28,004	1,015	\$26,112
Lights	52,382	0	189	\$8,622
Equip.	27,545	0	99	\$4,849
Aux.	77,957	0	281	\$12,409
SWH	0	2,734	96	\$2,416
Totals	172,209	30,738	1,698	\$55,523

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	3,079	0	11	\$624
Heating	16,409	56,426	2,039	\$52,632
Lights	149,551	0	538	\$24,612
Equip.	27,545	0	99	\$4,849
Aux.	54,985	0	198	\$8,885
SWH	0	2,734	96	\$2,416
Totals	251,569	59,160	2,981	\$94,018

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**Web Screening Tool Summaries**



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Office of Energy Efficiency

**Screening Tool For New Building Design**

**Screening Tool Summary**



**Project Description**

Your Project Description:

**Building Profile Summary**

Proposed Building: School, 2630 m<sup>2</sup>  
 Location: Norman Wells (D), Northwest Territories  
 Heating System: Fossil (Constant Volume)

**Utility Rates**

Your marginal utility rates (including any taxes and fees):

\$ 0.770 per kWh                      \$ 0 per Liters  
 \$ 8.900 per kW                      \$ 0.870 per litre oil/propane

**Building Shell**

	Reference Building	Your Design
Average window-to-wall-area ratio:	21	21 %
Overall window USI-value:	2.1	1.19 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.5
Overall wall RSI-value:	3.704	3.4 m <sup>2</sup> C/W
Gross exterior wall area:	1705	1705 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.704	5.1
Gross exterior roof area:	2031	2031 m <sup>2</sup>

**Mechanical System**

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	88 %
Minimum outside air:	1.39	1.39 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	11 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	54 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	90 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	13.7 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
Occupancy sensor		62 %
Occupancy and daylighting (multiple step dimming)		14 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	5,832	
Your Design	2,807	
<hr/>		
Energy Savings	<b>3,025</b>	<b>51.9%</b>
<b>Annual Energy Cost Savings</b>		<b>\$108,281.31</b>

**LEED® Canada Energy & Atmosphere (EA)**

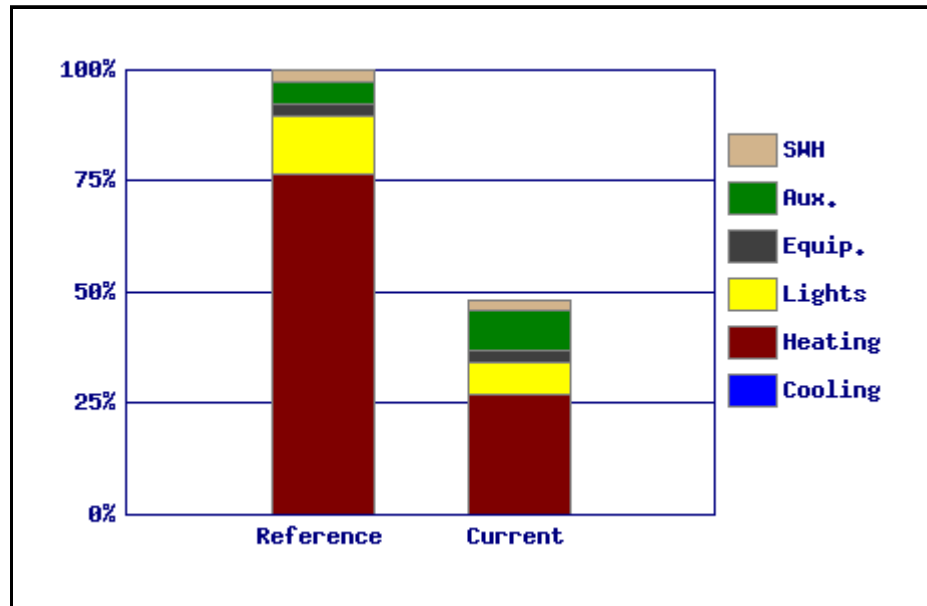
Reference Building	\$363,772.81
Your Design	\$255,491.50
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$108,281.31 ( 29.8% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **2 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 243,424 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0

### Web Screening Tool Summaries

Heating	14,847	43,657	1,585	\$45,816
Lights	117,749	0	424	\$93,381
Equip.	39,522	0	142	\$31,684
Aux.	143,386	0	516	\$113,200
SWH	0	3,957	139	\$3,095
Totals	315,504	47,615	2,807	\$287,175

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	34,148	123,551	4,458	\$123,571
Lights	214,577	0	772	\$170,168
Equip.	39,522	0	142	\$31,684
Aux.	84,068	0	303	\$66,552
SWH	0	4,452	156	\$3,481
Totals	372,315	128,003	5,832	\$395,456

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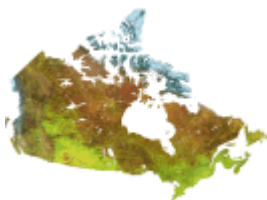
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## Office of Energy Efficiency

## Screening Tool For New Building Design

## Screening Tool Summary



## Project Description

Your Project Description:

## Building Profile Summary

Proposed Building: School, 2980 m<sup>2</sup>  
 Location: Yellowknife (B), Northwest Territories  
 Heating System: Fossil (Constant Volume)

## Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 1.016 per kWh                      \$ 0 per Liters  
 \$ 8.000 per kW                      \$ 1.130 per litre oil/propane

## Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	12	12 %
Overall window USI-value:	2.1	1.49 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.48
Overall wall RSI-value:	3.03	5.11 m <sup>2</sup> C/W
Gross exterior wall area:	964	964 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	6.18
Gross exterior roof area:	1489	1489 m <sup>2</sup>

## Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	84.5 %
Minimum outside air:	1	1 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	13 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	62 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	85 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	12.2 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
Occupancy and daylighting (multiple step dimming)		45 %
Occupancy sensor		25 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	4,156	
Your Design	2,224	
<hr/>		
Energy Savings	1,932	<b>46.5%</b>
<b>Annual Energy Cost Savings</b>		<b>\$132,849.25</b>

**LEED® Canada Energy & Atmosphere (EA)**

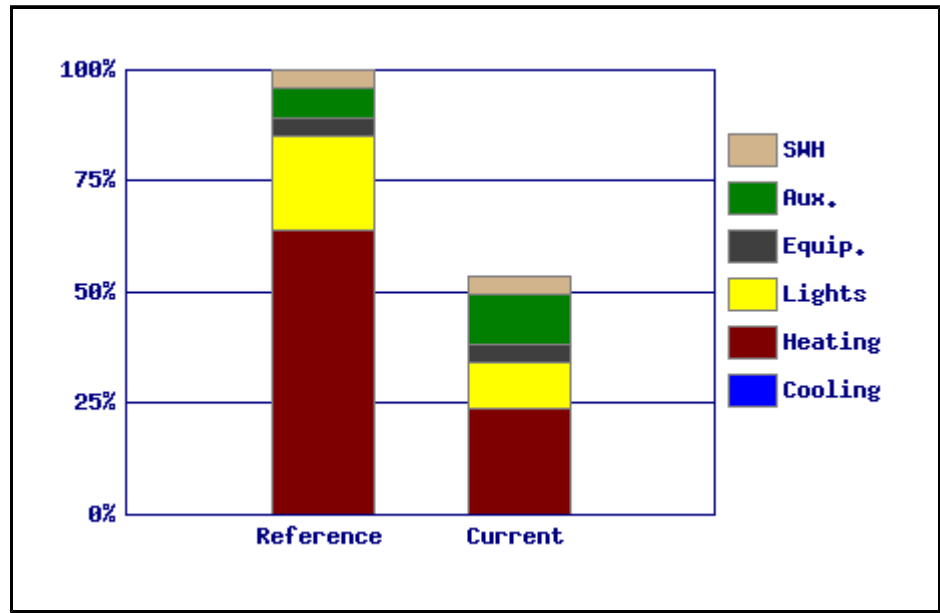
Reference Building	\$436,166.17
Your Design	\$303,316.92
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$132,849.25 ( 30.5% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **2 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 167,861 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0

**Web Screening Tool Summaries**

Heating	9,403	27,491	998	\$37,610
Lights	119,195	0	429	\$123,572
Equip.	44,782	0	161	\$46,773
Aux.	133,150	0	479	\$137,633
SWH	0	4,432	156	\$4,502
Totals	306,530	31,923	2,224	\$350,090

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	20,764	73,843	2,666	\$96,471
Lights	243,133	0	875	\$252,058
Equip.	44,782	0	161	\$46,773
Aux.	80,012	0	288	\$82,853
SWH	0	4,709	165	\$4,784
Totals	388,691	78,553	4,156	\$482,939

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Web Screening Tool Summaries



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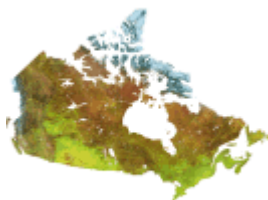


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: School, 1182 m<sup>2</sup>  
 Location: Yellowknife (B), Northwest Territories  
 Heating System: Fossil (Constant Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.140 per kWh                                      \$ 0 per Liters  
 \$ 8.143 per kW                                      \$ 0.780 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	23	23 %
Overall window USI-value:	2.1	2.52 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.03	3.39 m <sup>2</sup> C/W
Gross exterior wall area:	884	884 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	5.87
Gross exterior roof area:	1185	1185 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	1.8	1.8 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	50 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	85 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	14.6 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	2,944	
Your Design	1,733	
<hr/>		
Energy Savings	1,210	<b>41.1%</b>
<b>Annual Energy Cost Savings</b>		<b>\$22,345.22</b>

**LEED® Canada Energy & Atmosphere (EA)**

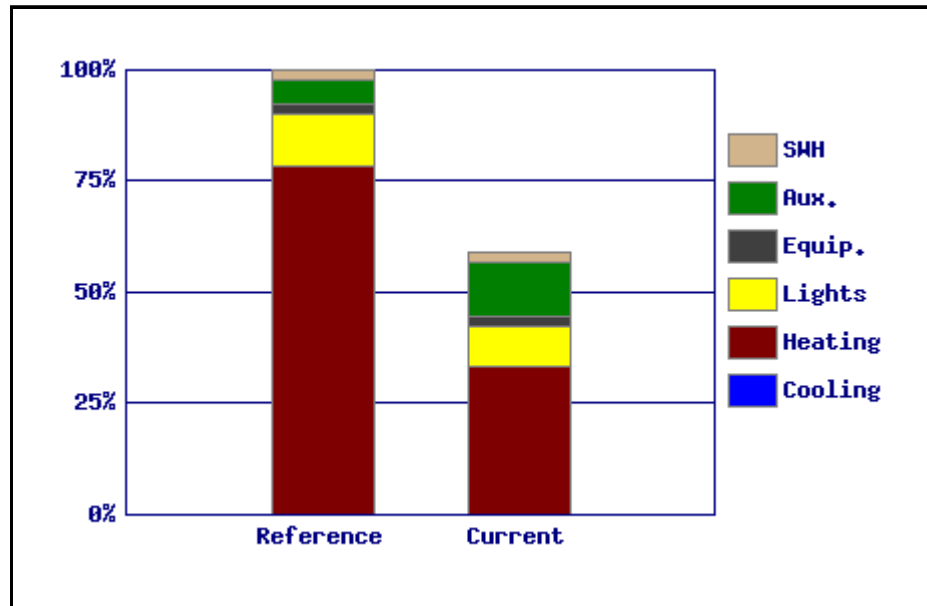
Reference Building	\$71,621.59
Your Design	\$49,276.37
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$22,345.22 ( 31.2% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **2 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 84,725 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0

**Web Screening Tool Summaries**

Heating	9,013	27,064	982	\$20,396
Lights	73,720	0	265	\$11,875
Equip.	17,762	0	64	\$3,001
Aux.	100,085	0	360	\$15,772
SWH	0	1,758	62	\$1,233
Totals	200,580	28,823	1,733	\$52,278

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	17,676	63,913	2,306	\$47,652
Lights	96,437	0	347	\$15,534
Equip.	17,762	0	64	\$3,001
Aux.	44,638	0	161	\$7,126
SWH	0	1,868	66	\$1,310
Totals	176,513	65,781	2,944	\$74,623

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Web Screening Tool Summaries



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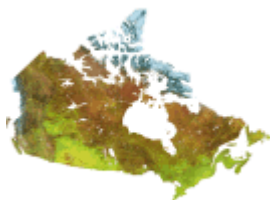


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: School, 7566 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil (Variable Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.053 per kWh                      \$ 10.314 per GJ  
 \$ 6.300 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	28.2	28.2 %
Overall window USI-value:	3.2	2.68 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.52
Overall wall RSI-value:	1.818	2.63 m <sup>2</sup> C/W
Gross exterior wall area:	3353	3353 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	5.25
Gross exterior roof area:	3954	3954 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	1.88	1.88 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	36 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	6.17 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	10,440	
Your Design	6,663	
<hr/>		
Energy Savings	<b>3,776</b>	<b>36.2%</b>
<b>Annual Energy Cost Savings</b>		<b>\$58,798.03</b>

**LEED® Canada Energy & Atmosphere (EA)**

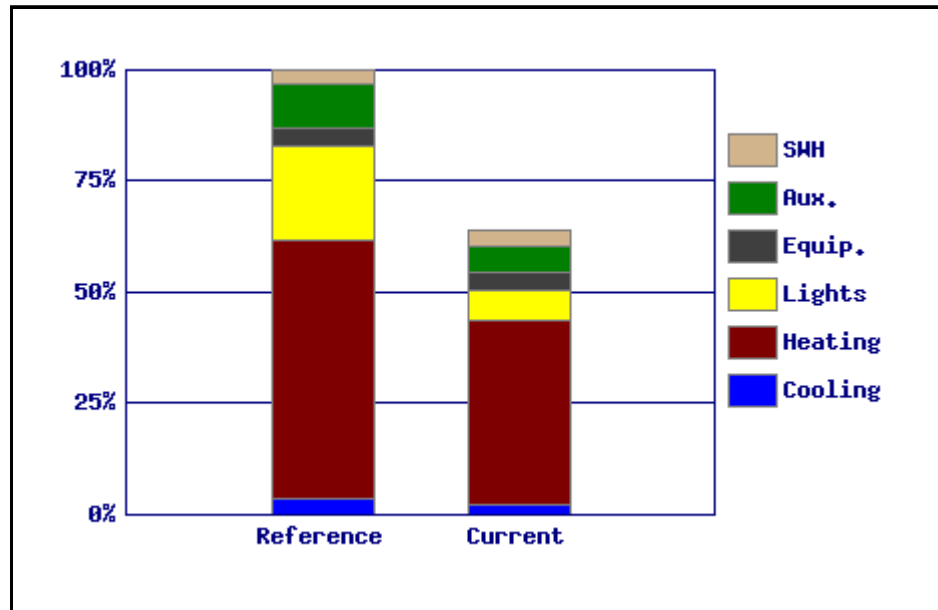
Reference Building	\$140,397.33
Your Design	\$81,599.29
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$58,798.04 (41.9%)</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **4 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 399,290 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	62,722	0	226	\$6,285

### Web Screening Tool Summaries

Heating	36,891	4,200	4,333	\$45,612
Lights	199,414	0	718	\$13,825
Equip.	113,697	0	409	\$8,575
Aux.	176,885	0	637	\$12,362
SWH	0	341	341	\$3,514
Totals	589,609	4,541	6,663	\$90,174

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	107,267	0	386	\$10,426
Heating	48,838	5,890	6,066	\$63,868
Lights	617,297	0	2,222	\$42,784
Equip.	113,697	0	409	\$8,575
Aux.	281,907	0	1,015	\$19,805
SWH	0	341	341	\$3,514
Totals	1,169,007	6,231	10,440	\$148,972

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Web Screening Tool Summaries



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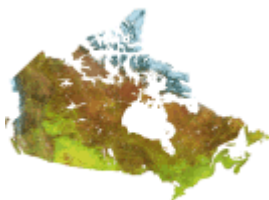


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Multi-Unit Residential, 12488 m<sup>2</sup>  
 Location: Fredericton (A), New Brunswick  
 Heating System: Fossil Fed Fan Coils

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.080 per kWh                      \$ 15.935 per GJ  
 \$ 8.730 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	19.2	19.2 %
Overall window USI-value:	3.2	2.3 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.43
Overall wall RSI-value:	2.083	1.99 m <sup>2</sup> C/W
Gross exterior wall area:	4701	4701 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	7.22
Gross exterior roof area:	3093	3093 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	0.51	0.51 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	15	15 %
Cooling efficiency:	3.8	3.2 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	65 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	10	8.45 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Parkade lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Parkade floor area:	0	0 m <sup>2</sup>
Average lighting density:	3.2	3.2 W/m <sup>2</sup>
Percent of lighting load with occupancy sensor control:	0	0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Web Screening Tool Summaries**

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	10,522	
Your Design	6,574	
	<hr/>	
Energy Savings	<b>3,948</b>	<b>37.5%</b>

**Annual Energy Cost Savings \$66,470.83**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$182,951.00	
Your Design	\$116,480.17	
	<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$66,470.83</b>	<b>( 36.3% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

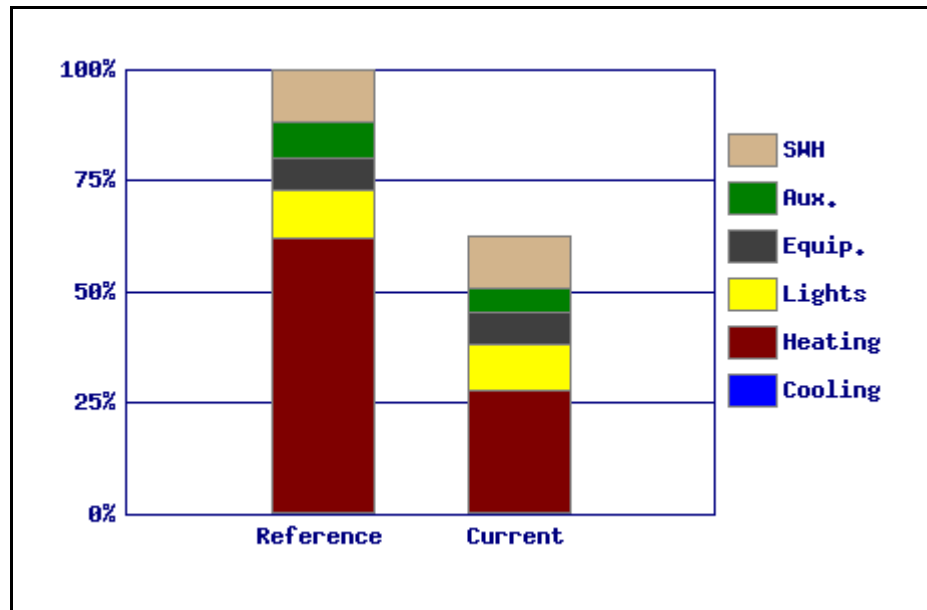
**LEED Canada EA Credit 1 3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 324,154 kg

**Annual Energy Use Comparison**

Web Screening Tool Summaries



Your Design

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	8,347	0	30	\$1,101
Heating	0	2,898	2,898	\$46,168
Lights	300,774	0	1,083	\$34,606
Equip.	210,068	0	756	\$21,875
Aux.	161,691	0	582	\$15,082
SWH	0	1,225	1,225	\$19,522
Totals	680,881	4,123	6,574	\$138,355

Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	9,677	0	35	\$1,319
Heating	0	6,492	6,492	\$103,434
Lights	320,548	0	1,154	\$36,493
Equip.	210,068	0	756	\$21,875
Aux.	238,730	0	859	\$22,183
SWH	0	1,225	1,225	\$19,522
Totals	779,024	7,718	10,522	\$204,826

## Web Screening Tool Summaries

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Web Screening Tool Summaries



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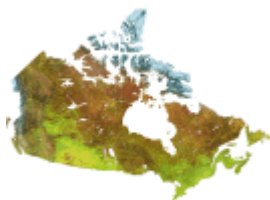


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Facility Description for 011-193

Your Facility Description:

Configuration

- 1. School, Ground-Source Heat Pumps - 89.2%
- 2. School, Fossil (Variable Volume) - 10.8%

Total Floor Area: 4,460 m<sup>2</sup>

Location: Prince George (B, PNG), British Columbia

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.033 per kWh	\$ 11.000 per GJ
\$ 6.680 per kW	\$ 0 per litre oil/propane

First Building Block

First Building Block: School, 3978 m<sup>2</sup>  
 Heating System: Ground-Source Heat Pumps

Building Shell (School)

	Reference Building	Your Design
Average window-to-wall-area ratio:	31.5	31.5 %
Overall window USI-value:	3.2	2.45 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.222	2.2 m <sup>2</sup> C/W
Gross exterior wall area:	1998	1998 m <sup>2</sup>
Roof type:	All other	All other

**Web Screening Tool Summaries**

Overall roof RSI-value:	2.439	3.91
Gross exterior roof area:	2298	2298 m <sup>2</sup>

**Mechanical System (School)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	2.17	2.17 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	96	96 %
Cooling efficiency:	5.2	4 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	34 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting (School)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	12.16 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (School)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block:	School, 482 m <sup>2</sup>
Heating System:	Fossil (Variable Volume)

### Web Screening Tool Summaries

#### Building Shell (School)

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	31.5	31.5 %
Overall window USI-value:	3.2	2.45 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.222	2.2 m <sup>2</sup> C/W
Gross exterior wall area:	242	242 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	3.91
Gross exterior roof area:	278	278 m <sup>2</sup>

#### Mechanical System (School)

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	2.17	2.17 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	96	96 %
Cooling efficiency:	5.2	25.8 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	34 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

#### Lighting (School)

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	12.16 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Web Screening Tool Summaries**

**Process Loads (School)**

	Reference Building	Your Design
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	7,180	
Your Design	3,055	
	4,125	<b>57.5%</b>
<b>Energy Savings</b>		
<b>Annual Energy Cost Savings</b>		<b>\$45,758.91</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$83,516.24	
Your Design	\$37,757.33	
	\$45,758.91	<b>( 54.8% )</b>
<b>Regulated Energy Cost Savings**</b>		

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

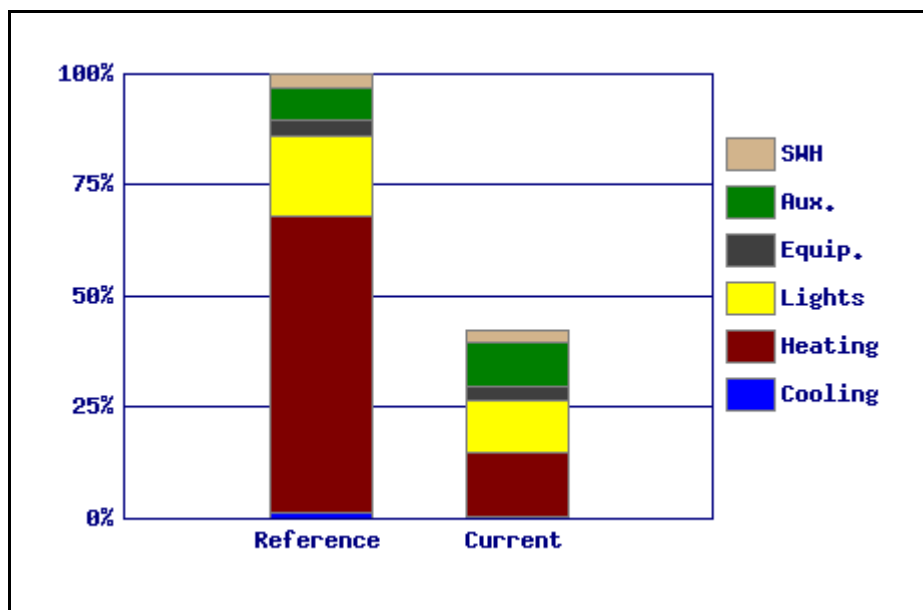
**LEED Canada EA Credit 1** **7 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 189,382 kg

**Annual Energy Use Comparison**

Web Screening Tool Summaries



Your Design

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	11,641	0	42	\$537
Heating	199,334	313	1,031	\$14,403
Lights	231,673	0	834	\$11,653
Equip.	67,022	0	241	\$3,805
Aux.	193,359	0	696	\$8,850
SWH	0	210	210	\$2,314
Totals	703,030	524	3,055	\$41,562

Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	29,063	0	105	\$2,430
Heating	39,386	4,628	4,770	\$52,852
Lights	363,884	0	1,310	\$18,300
Equip.	67,022	0	241	\$3,805
Aux.	151,052	0	544	\$7,620
SWH	0	210	210	\$2,314
Totals	650,408	4,838	7,180	\$87,321

## Web Screening Tool Summaries

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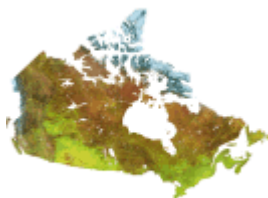


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Facility Description for 012-246

Your Facility Description:

Configuration

- 1. Hotel, Fossil Fed Fan Coils - 59.0%
- 2. Office, Small, Fossil Fed Fan Coils - 41.0%

Total Floor Area: 637 m<sup>2</sup>

Location: Yellowknife (B), Northwest Territories

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.196 per kWh	\$ 0 per Liters
\$ 0.000 per kW	\$ 0.625 per litre oil/propane

First Building Block

First Building Block: Hotel, 376 m<sup>2</sup>  
 Heating System: Fossil Fed Fan Coils

Building Shell (Hotel)

	Reference Building	Your Design
Average window-to-wall-area ratio:	13	13 %
Overall window USI-value:	2.1	2.16 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.03	5.01 m <sup>2</sup> C/W
Gross exterior wall area:	286	286 m <sup>2</sup>
Roof type:	All other	All other

**Web Screening Tool Summaries**

Overall roof RSI-value:	3.448	6.69
Gross exterior roof area:	435	435 m <sup>2</sup>

**Mechanical System (Hotel)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	2.25	2.25 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	2.8 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	49.5 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	85 %
Service water savings:	0	10 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting (Hotel)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	17.1	16.47 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Hotel)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block:	Office, Small, 261 m <sup>2</sup>
Heating System:	Fossil Fed Fan Coils

### Web Screening Tool Summaries

#### Building Shell (Office, Small)

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	13	13 %
Overall window USI-value:	2.1	2.16 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.03	5.01 m <sup>2</sup> C/W
Gross exterior wall area:	198	198 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	6.69
Gross exterior roof area:	302	302 m <sup>2</sup>

#### Mechanical System (Office, Small)

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	2.25	2.25 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	2.8 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	49.5 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	85 %
Service water savings:	0	10 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

#### Lighting (Office, Small)

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	13.78 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Web Screening Tool Summaries**

**Process Loads (Office, Small)**

	Reference Building	Your Design
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	1,743	
Your Design	974	
	769	<b>44.1%</b>
Energy Savings		

**Annual Energy Cost Savings** **\$14,169.02**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$41,817.24	
Your Design	\$27,648.22	
	\$14,169.02	<b>( 33.9% )</b>
<b>Regulated Energy Cost Savings**</b>		

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

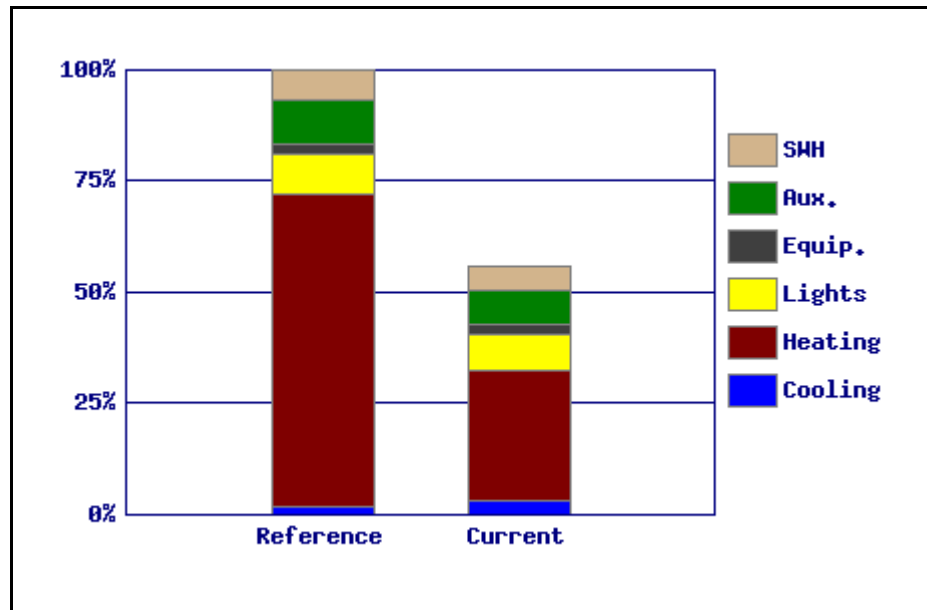
**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 61,588 kg

**Annual Energy Use Comparison**

**Web Screening Tool Summaries**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	14,264	0	51	\$2,796
Heating	1,056	14,456	511	\$8,329
Lights	39,027	0	140	\$7,649
Equip.	11,060	0	40	\$2,168
Aux.	37,393	0	135	\$7,329
SWH	0	2,751	97	\$1,545
<b>Totals</b>	<b>102,800</b>	<b>17,207</b>	<b>974</b>	<b>\$29,816</b>

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	8,204	0	30	\$1,608
Heating	4,637	34,488	1,227	\$20,284
Lights	43,357	0	156	\$8,498
Equip.	11,060	0	40	\$2,168
Aux.	49,000	0	176	\$9,604
SWH	0	3,245	114	\$1,823
<b>Totals</b>	<b>116,258</b>	<b>37,733</b>	<b>1,743</b>	<b>\$43,985</b>

## Web Screening Tool Summaries

### Disclaimer

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### Web Screening Tool Summaries

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	84.1 %
Minimum outside air:	0.61	0.61 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	4.1	4.1 %
Cooling efficiency:	2.5	3.96 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	41 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	84.5 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		Yes

#### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	16.6	12.9 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

#### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

#### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

#### Current Design Performance

**Web Screening Tool Summaries**

**Annual Energy Use (GJ)**

Reference Building	20,277
Your Design	14,919

Energy Savings **5,358** **26.4%**

**Annual Energy Cost Savings \$82,933.35**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$404,580.67
Your Design	\$321,403.01

**Regulated Energy Cost Savings\*\* \$83,177.66 ( 20.6% )**

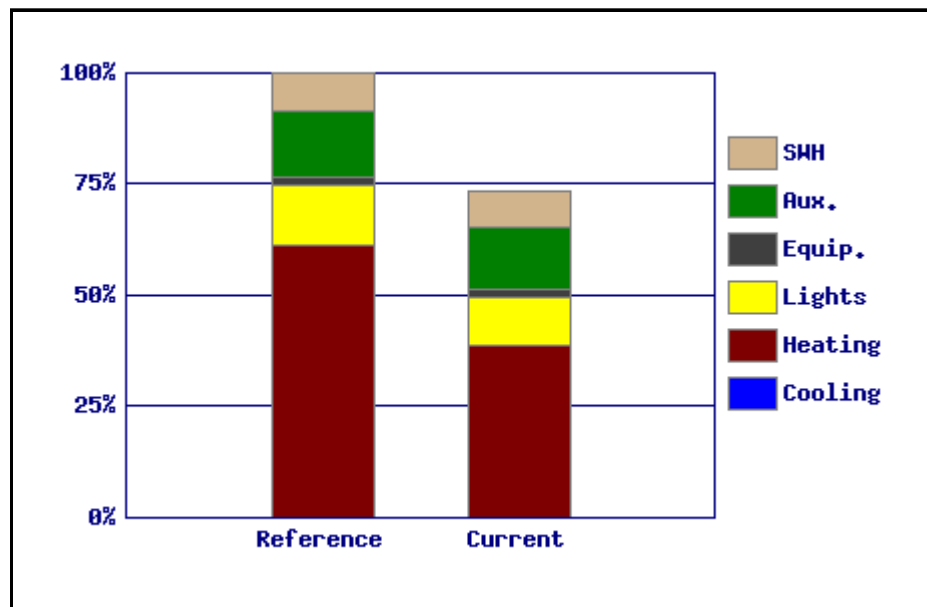
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1 0 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 457,435 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs

**Web Screening Tool Summaries**

Cooling	1,573	0	6	\$420
Heating	0	222,808	7,818	\$86,119
Lights	605,102	0	2,178	\$96,673
Equip.	106,635	0	384	\$17,144
Aux.	793,501	0	2,857	\$119,726
SWH	0	47,771	1,676	\$18,464
Totals	1,506,811	270,579	14,919	\$338,547

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	2,830	0	10	\$732
Heating	0	352,538	12,370	\$136,262
Lights	778,698	0	2,803	\$124,403
Equip.	106,635	0	384	\$16,900
Aux.	816,436	0	2,939	\$123,681
SWH	0	50,459	1,770	\$19,503
Totals	1,704,598	402,996	20,277	\$421,480

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Web Screening Tool Summaries



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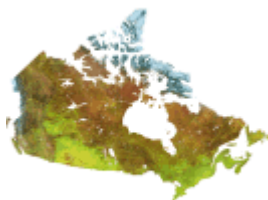


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Facility Description for 014-205

Your Facility Description:

Configuration

- 1. Hotel, Fossil (Constant Volume) - 42.0%
- 2. Office, Small, Fossil (Variable Volume) - 58.0%

Total Floor Area: 3,294 m<sup>2</sup>

Location: Iqaluit (F), Nunavut

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.263 per kWh	\$ 0 per Liters
\$ 8.000 per kW	\$ 0.460 per litre oil/propane

First Building Block

First Building Block: Hotel, 1384 m<sup>2</sup>  
 Heating System: Fossil (Constant Volume)

Building Shell (Hotel)

	Reference Building	Your Design
Average window-to-wall-area ratio:	24	24 %
Overall window USI-value:	2.1	1.58 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.333	3.83 m <sup>2</sup> C/W
Gross exterior wall area:	1190	1190 m <sup>2</sup>
Roof type:	All other	All other

**Web Screening Tool Summaries**

Overall roof RSI-value:	3.448	5.03
Gross exterior roof area:	824	824 m <sup>2</sup>

**Mechanical System (Hotel)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	88 %
Minimum outside air:	4.1	4.1 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	45 %
Percent of floor area cooled:	90	90 %
Cooling efficiency:	2.5	2.9 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	58 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	88 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting (Hotel)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	17.1	14.5 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Hotel)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block:	Office, Small, 1910 m <sup>2</sup>
Heating System:	Fossil (Variable Volume)

### Web Screening Tool Summaries

#### Building Shell (Office, Small)

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	24	24 %
Overall window USI-value:	2.1	1.58 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.333	3.83 m <sup>2</sup> C/W
Gross exterior wall area:	1643	1643 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	5.03
Gross exterior roof area:	1138	1138 m <sup>2</sup>

#### Mechanical System (Office, Small)

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	88 %
Minimum outside air:	0.96	0.96 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	45 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	3.8 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	58 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	88 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

#### Lighting (Office, Small)

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	14.5 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Web Screening Tool Summaries**

**Process Loads (Office, Small)**

	Reference Building	Your Design
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	13,812	
Your Design	5,937	
Energy Savings	7,875	<b>57.0%</b>

**Annual Energy Cost Savings** **\$119,324.17**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$280,967.10	
Your Design	\$161,652.69	
<b>Regulated Energy Cost Savings**</b>	<b>\$119,314.41</b>	<b>( 42.5% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

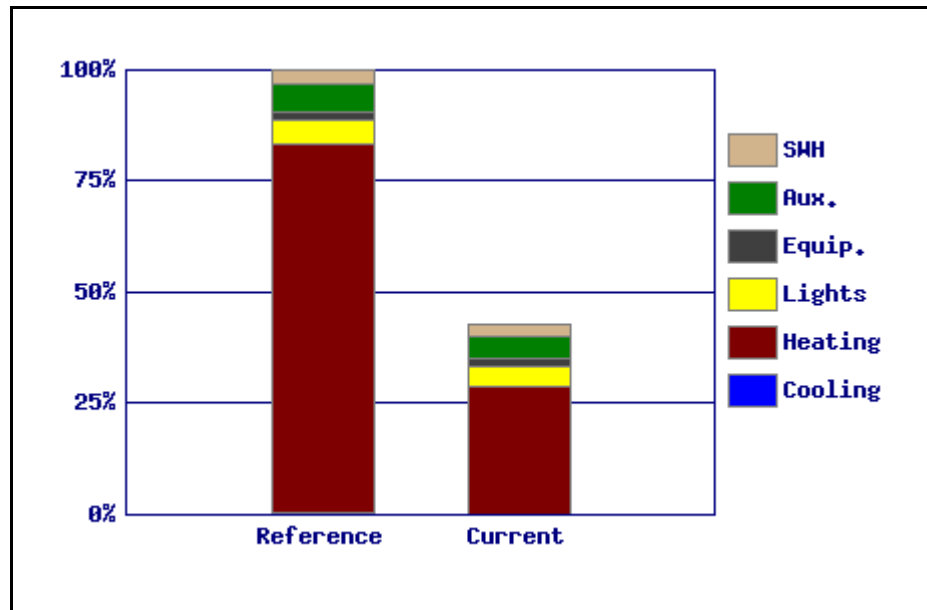
**LEED Canada EA Credit 1** **5 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 624,482 kg

**Annual Energy Use Comparison**

Web Screening Tool Summaries



Your Design

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	5,229	0	19	\$2,023
Heating	18,526	111,053	3,963	\$51,008
Lights	173,690	0	625	\$49,637
Equip.	67,242	0	242	\$19,186
Aux.	192,192	0	692	\$54,326
SWH	0	11,267	395	\$4,659
<b>Totals</b>	<b>456,879</b>	<b>122,320</b>	<b>5,937</b>	<b>\$180,839</b>

Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	8,745	0	31	\$2,652
Heating	36,041	322,692	11,452	\$143,301
Lights	209,887	0	756	\$60,018
Equip.	67,242	0	242	\$19,196
Aux.	248,786	0	896	\$69,871
SWH	0	12,394	435	\$5,125
<b>Totals</b>	<b>570,701</b>	<b>335,085</b>	<b>13,812</b>	<b>\$300,163</b>

## Web Screening Tool Summaries

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Web Screening Tool Summaries



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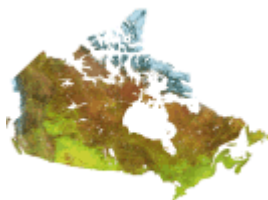


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Office, Small, 3242 m<sup>2</sup>  
 Location: Kamloops (D), British Columbia  
 Heating System: Fossil Fed Distributed Heat Pumps

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.054 per kWh                      \$ 10.476 per GJ  
 \$ 2.329 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	36.5	36.5 %
Overall window USI-value:	3.2	2.08 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.32 m <sup>2</sup> C/W
Gross exterior wall area:	1475	1475 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	4.3
Gross exterior roof area:	1127	1127 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	83.5 %
Minimum outside air:	1.09	1.09 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	90	90 %
Cooling efficiency:	3.8	3.8 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	46 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	95 %
Service water savings:	0	61 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	9.16 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
Occupancy sensor		1.7 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	3,768	
Your Design	1,809	
<hr/>		
Energy Savings	1,959	<b>52.0%</b>
<b>Annual Energy Cost Savings</b>		<b>\$24,728.33</b>

**LEED® Canada Energy & Atmosphere (EA)**

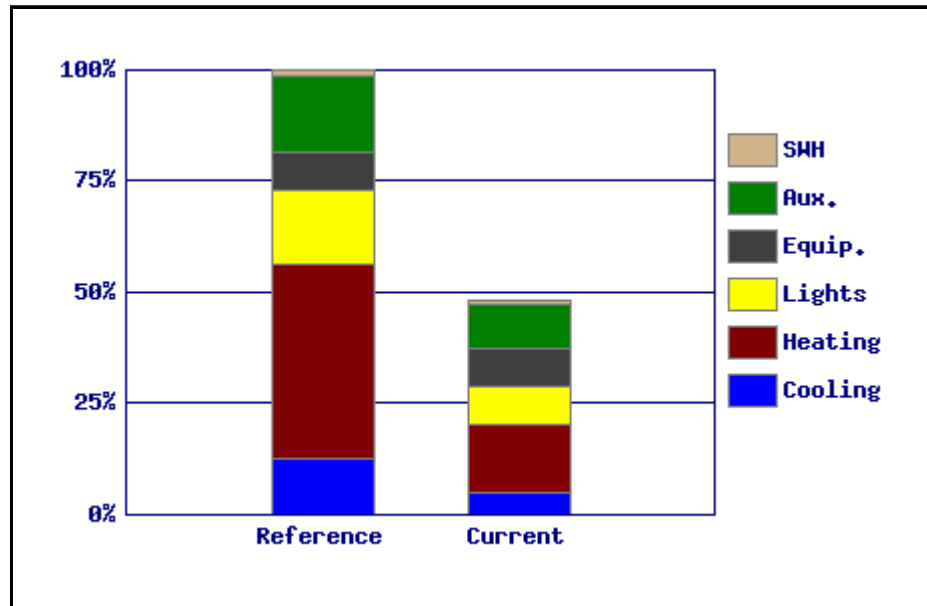
Reference Building	\$48,695.34
Your Design	\$23,983.94
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$24,711.40 ( 50.7% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **6 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 165,001 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	49,540	0	178	\$3,710

**Web Screening Tool Summaries**

Heating	70,991	332	588	\$8,327
Lights	86,973	0	313	\$5,406
Equip.	90,615	0	326	\$5,491
Aux.	105,860	0	381	\$6,311
SWH	0	22	22	\$230
Totals	403,979	354	1,809	\$29,475

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	132,762	0	478	\$8,658
Heating	13,680	1,599	1,648	\$17,540
Lights	171,773	0	618	\$10,744
Equip.	90,615	0	326	\$5,508
Aux.	178,696	0	643	\$11,191
SWH	0	54	54	\$563
Totals	587,526	1,652	3,768	\$54,203

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**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	0.42	0.42 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	89	89 %
Cooling efficiency:	3.8	3 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	14 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	10	8.82 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Parkade lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Parkade floor area:	6381.1	6381.1 m <sup>2</sup>
Average lighting density:	3.2	2.15 W/m <sup>2</sup>
Percent of lighting load with occupancy sensor control:	0	0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

### Web Screening Tool Summaries

Based on the information you provided, your building design is not 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

#### Current Design Performance

##### Annual Energy Use (GJ)

Reference Building	10,941
Your Design	10,288

Energy Savings	653	<b>6.0%</b>
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**Annual Energy Cost Savings** **\$-42,356.78**

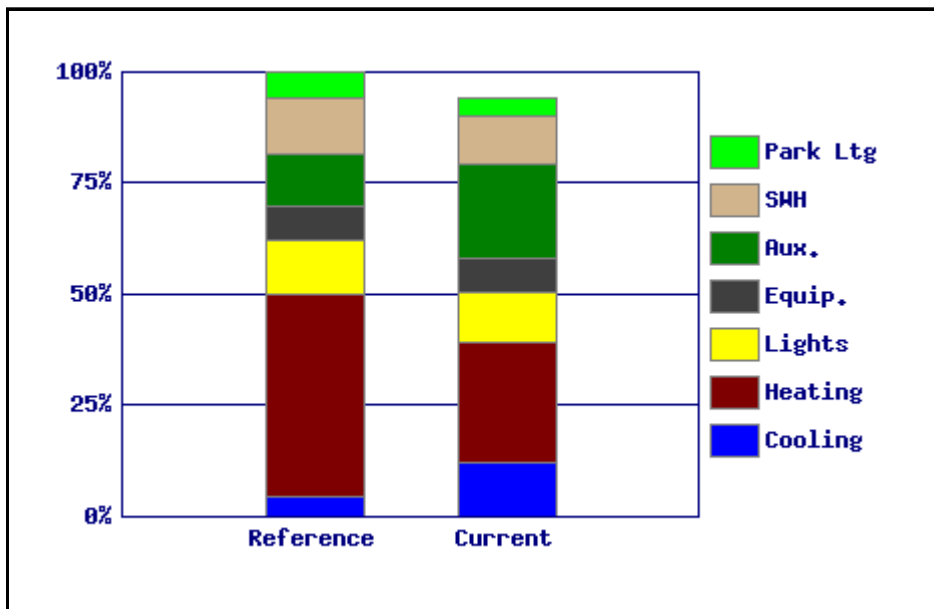
#### LEED® Canada Energy & Atmosphere (EA)

*Does not qualify (EA Prerequisite 2 is not satisfied)*

#### Emissions Savings

Carbon Dioxide (CO<sub>2</sub>) -420,568 kg

#### Annual Energy Use Comparison



#### Your Design

Annual Energy and Costs				
End Use	Electricity	Fossil Fuel	Total Energy	Costs

## Web Screening Tool Summaries

	kWh	GJ	GJ	
Cooling	364,582	0	1,312	\$25,885
Heating	823,420	0	2,964	\$58,463
Lights	344,370	0	1,240	\$24,450
Equip.	236,798	0	852	\$16,813
Aux.	638,470	0	2,298	\$45,331
SWH	0	1,188	1,188	\$10,782
Park Ltg	120,182	0	433	\$8,533
Totals	2,527,822	1,188	10,288	\$190,257

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	136,232	0	490	\$9,672
Heating	0	4,995	4,995	\$45,338
Lights	361,334	0	1,301	\$25,655
Equip.	236,794	0	852	\$16,812
Aux.	354,723	0	1,277	\$25,185
SWH	0	1,381	1,381	\$12,537
Park Ltg	178,875	0	644	\$12,700
Totals	1,267,959	6,377	10,941	\$147,900

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Web Screening Tool Summaries



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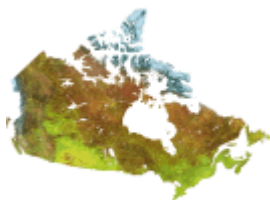


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: School, 1300 m<sup>2</sup>  
 Location: Tofino (C), British Columbia  
 Heating System: Ground-Source Heat Pumps

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.376 per kWh                      \$ 22.144 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	16.9	16.9 %
Overall window USI-value:	3.2	2.35 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.04 m <sup>2</sup> C/W
Gross exterior wall area:	1109	1109 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.45
Gross exterior roof area:	1333	1333 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	1.11	1.11 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	4.25 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	16 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	18.38 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

Reference Building	1,550
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**Web Screening Tool Summaries**

Your Design	747	
Energy Savings	<b>803</b>	<b>51.8%</b>
<b>Annual Energy Cost Savings</b>	<b>\$13,648.65</b>	

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$79,828.43
Your Design	\$66,818.45

**Regulated Energy Cost Savings\*\*** **\$13,009.98 ( 16.3% )**

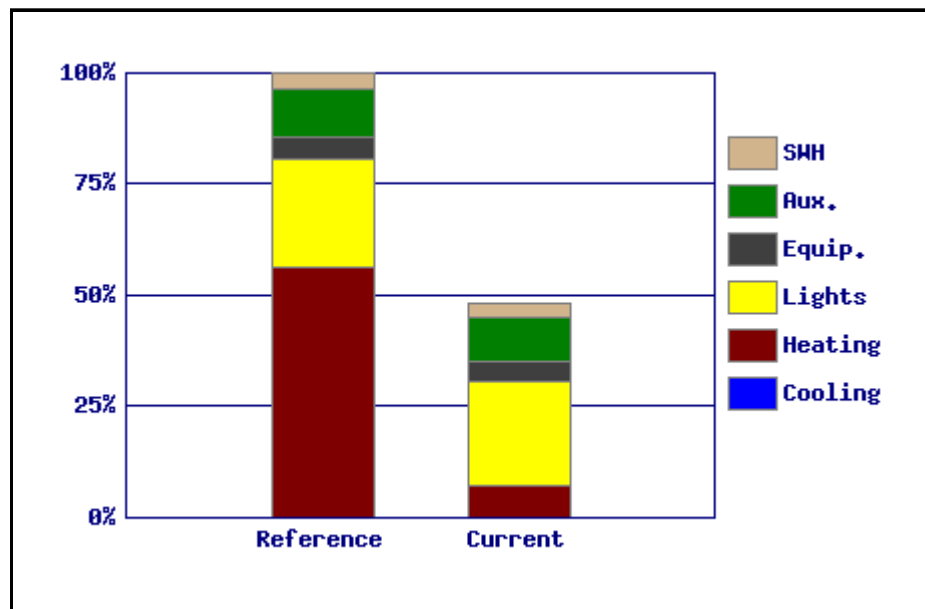
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **0 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 35,537 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	0	0	0	\$0

## Web Screening Tool Summaries

Heating	30,446	0	110	\$11,448
Lights	102,066	0	367	\$38,377
Equip.	19,536	0	70	\$7,345
Aux.	42,433	0	153	\$15,955
SWH	0	47	47	\$1,039
Totals	194,481	47	747	\$74,164

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	7,253	844	871	\$21,423
Lights	106,065	0	382	\$39,880
Equip.	21,234	0	76	\$7,984
Aux.	45,979	0	166	\$17,288
SWH	0	56	56	\$1,237
Totals	180,531	900	1,550	\$87,812

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Web Screening Tool Summaries



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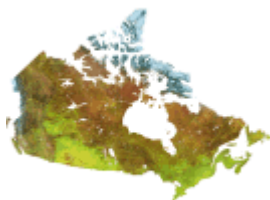


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Office, Large, 10937 m<sup>2</sup>  
 Location: Vancouver (A), British Columbia  
 Heating System: Ground-Source Heat Pumps

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.059 per kWh                      \$ 10.331 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	50.4 %
Overall window USI-value:	3.2	2.17 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	1.27 m <sup>2</sup> C/W
Gross exterior wall area:	4219	4219 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	2.89
Gross exterior roof area:	2631	2631 m <sup>2</sup>

Mechanical System

### Web Screening Tool Summaries

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	0.59	0.59 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	93	93 %
Cooling efficiency:	5.2	4.03 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	11.56 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	8,079
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**Web Screening Tool Summaries**

Your Design	4,918	
Energy Savings	3,161	<b>39.1%</b>
<b>Annual Energy Cost Savings</b>		<b>\$29,825.29</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$92,204.44
Your Design	\$62,379.15

**Regulated Energy Cost Savings\*\*** **\$29,825.29 ( 32.3% )**

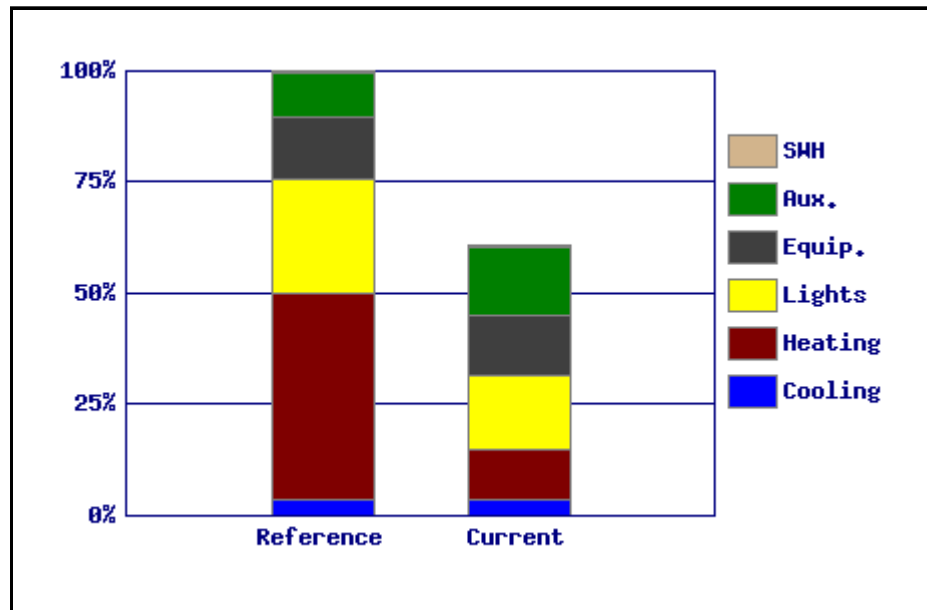
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **2 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 112,971 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	77,851	0	280	\$4,593

## Web Screening Tool Summaries

Heating	253,009	0	911	\$14,928
Lights	372,183	0	1,340	\$21,959
Equip.	305,691	0	1,100	\$18,036
Aux.	348,941	0	1,256	\$20,588
SWH	0	30	30	\$312
Totals	1,357,676	30	4,918	\$80,415

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	84,724	0	305	\$4,999
Heating	30,464	3,628	3,738	\$39,273
Lights	579,482	0	2,086	\$34,189
Equip.	305,691	0	1,100	\$18,036
Aux.	227,652	0	820	\$13,431
SWH	0	30	30	\$312
Totals	1,228,014	3,658	8,079	\$110,240

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Web Screening Tool Summaries



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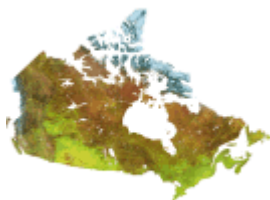


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: School, 2505 m<sup>2</sup>  
 Location: Vancouver (A), British Columbia  
 Heating System: Ground-Source Heat Pumps

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.061 per kWh                      \$ 10.887 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	49.5 %
Overall window USI-value:	3.2	2.36 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	0.79 m <sup>2</sup> C/W
Gross exterior wall area:	2114	2114 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.83
Gross exterior roof area:	2072	2072 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	5	5 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	54 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	3.96 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	68 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	9.68 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

Reference Building	5,779
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**Web Screening Tool Summaries**

Your Design	1,276	
Energy Savings	<b>4,504</b>	<b>77.9%</b>
<b>Annual Energy Cost Savings</b>		<b>\$50,923.39</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$69,392.94
Your Design	\$18,669.20

**Regulated Energy Cost Savings\*\*** **\$50,723.74 (73.1%)**

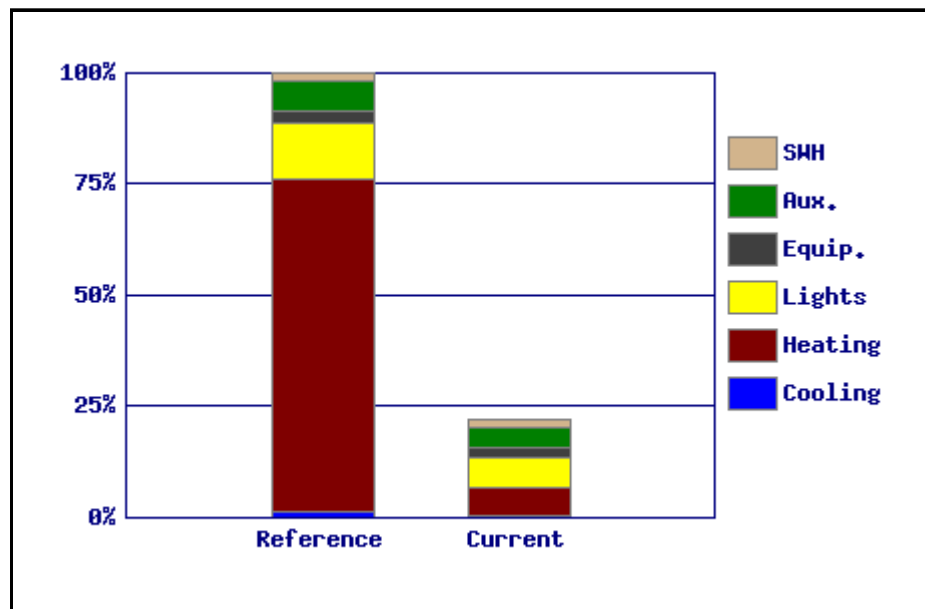
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **10 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 258,824 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	7,497	0	27	\$457

**Web Screening Tool Summaries**

Heating	102,881	0	370	\$6,276
Lights	103,584	0	373	\$6,319
Equip.	37,644	0	136	\$2,296
Aux.	72,919	0	263	\$4,448
SWH	0	107	107	\$1,170
Totals	324,525	107	1,276	\$20,965

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	22,620	0	81	\$1,380
Heating	35,713	4,190	4,318	\$47,782
Lights	204,379	0	736	\$12,467
Equip.	40,917	0	147	\$2,496
Aux.	108,100	0	389	\$6,594
SWH	0	107	107	\$1,170
Totals	411,729	4,297	5,779	\$71,889

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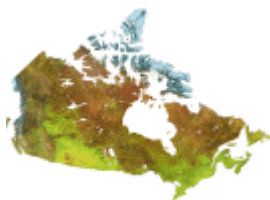


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: School, 5554 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil (Variable Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.101 per kWh                      \$ 10.054 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	28.9	28.9 %
Overall window USI-value:	3.2	2.42 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	2.29 m <sup>2</sup> C/W
Gross exterior wall area:	3410	3410 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	8.81
Gross exterior roof area:	3118	3118 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	90 %
Minimum outside air:	1.08	1.08 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	95	95 %
Cooling efficiency:	5.2	3 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	41 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	95 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		Yes

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	13.94 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	6,647	
Your Design	4,480	
<hr/>		
Energy Savings	2,168	<b>32.6%</b>
<b>Annual Energy Cost Savings</b>		<b>\$32,821.13</b>

**LEED® Canada Energy & Atmosphere (EA)**

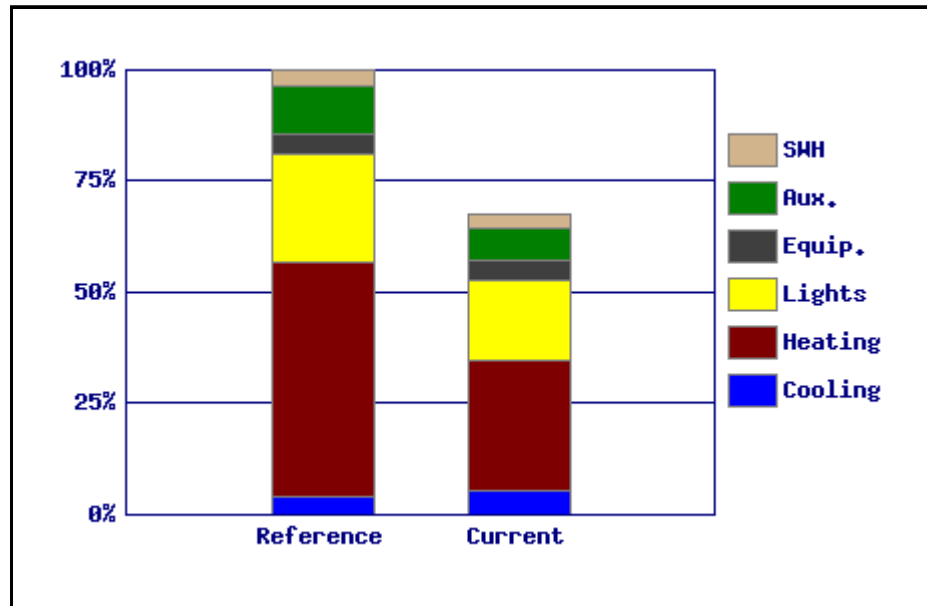
Reference Building	\$112,434.40
Your Design	\$79,613.27
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$32,821.13 ( 29.2% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **2 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 170,742 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	98,473	0	355	\$9,946

## Web Screening Tool Summaries

Heating	17,878	1,880	1,944	\$20,704
Lights	330,740	0	1,191	\$33,405
Equip.	83,462	0	300	\$8,430
Aux.	133,082	0	479	\$13,441
SWH	0	211	211	\$2,118
Totals	663,636	2,091	4,480	\$88,043

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	72,602	0	261	\$7,333
Heating	28,521	3,395	3,498	\$37,011
Lights	453,142	0	1,631	\$45,767
Equip.	83,462	0	300	\$8,430
Aux.	196,124	0	706	\$19,809
SWH	0	250	250	\$2,515
Totals	833,852	3,646	6,647	\$120,864

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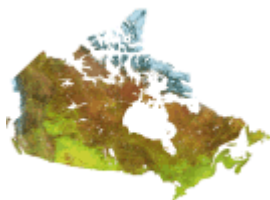


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Office, Large, 2170 m<sup>2</sup>  
 Location: Edmonton (B), Alberta  
 Heating System: Fossil Fed Fan Coils

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.091 per kWh                      \$ 5.527 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	32.5	32.5 %
Overall window USI-value:	3.2	2.68 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.083	2.48 m <sup>2</sup> C/W
Gross exterior wall area:	1256	1256 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	5.68
Gross exterior roof area:	1853	1853 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	94 %
Minimum outside air:	1.73	1.73 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	77	77 %
Cooling efficiency:	5.2	2.8 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	22 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	94 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	6.23 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	9,454	
Your Design	2,934	
<hr/>		
Energy Savings	<b>6,520</b>	<b>69.0%</b>
<b>Annual Energy Cost Savings</b>		<b>\$48,487.99</b>

**LEED® Canada Energy & Atmosphere (EA)**

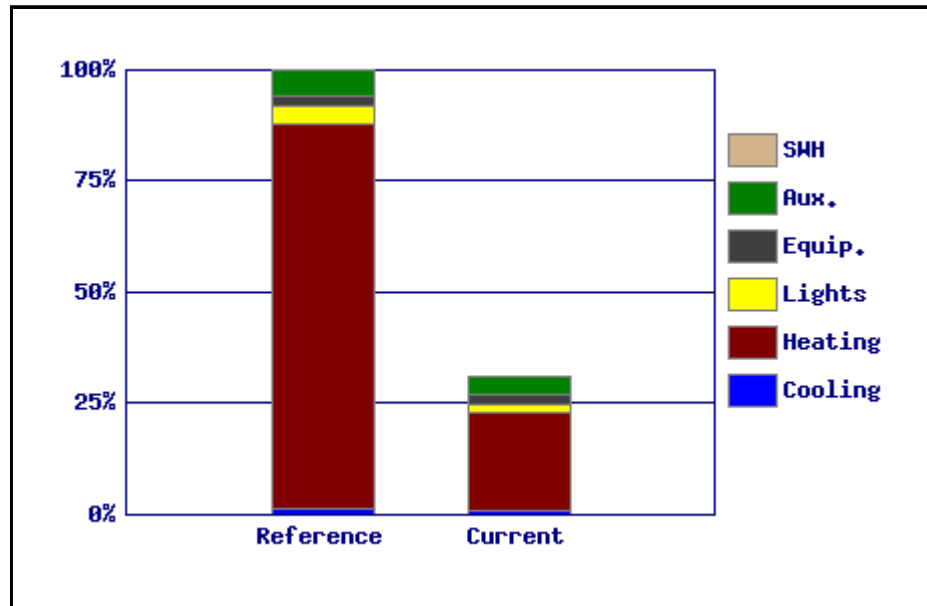
Reference Building	\$76,759.40
Your Design	\$28,271.41
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$48,487.99 (63.2%)</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **9 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 392,344 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	24,594	0	89	\$2,238

## Web Screening Tool Summaries

Heating	16,517	2,039	2,098	\$12,769
Lights	39,796	0	143	\$3,621
Equip.	60,652	0	218	\$5,519
Aux.	105,657	0	380	\$9,615
SWH	0	5	5	\$28
Totals	247,216	2,044	2,934	\$33,791

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	33,579	0	121	\$3,056
Heating	65,831	7,927	8,164	\$49,798
Lights	114,974	0	414	\$10,463
Equip.	60,652	0	218	\$5,519
Aux.	147,366	0	531	\$13,410
SWH	0	6	6	\$33
Totals	422,402	7,933	9,454	\$82,279

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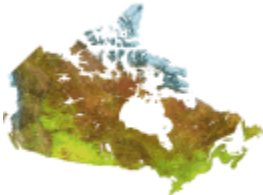


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Office of Energy Efficiency

**Screening Tool For New Building Design**

**Screening Tool Summary**



**Project Description**

Your Project Description:

022-129 (Corrected)

**Building Profile Summary**

Proposed Building: Office, Large, 2170 m<sup>2</sup>  
 Location: Edmonton (B), Alberta  
 Heating System: Fossil Fed Fan Coils

**Utility Rates**

Your marginal utility rates (including any taxes and fees):

\$ 0.091 per kWh                      \$ 5.527 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

**Building Shell**

	Reference Building	Your Design
Average window-to-wall-area ratio:	32.5	32.5 %
Overall window USI-value:	3.2	2.68 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.083	2.48 m <sup>2</sup> C/W
Gross exterior wall area:	1256	1256 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	5.68
Gross exterior roof area:	1853	1853 m <sup>2</sup>

**Mechanical System**

### Web Screening Tool Summaries

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	94 %
Minimum outside air:	2.27	2.27 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	77	77 %
Cooling efficiency:	5.2	2.8 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	17 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	94 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	6.23 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

### Annual Energy Use (GJ)

**Web Screening Tool Summaries**

Reference Building	10,883	
Your Design	3,456	
<hr/>		
Energy Savings	7,427	<b>68.2%</b>
<b>Annual Energy Cost Savings</b>		<b>\$53,975.10</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$85,596.24
Your Design	\$31,621.14
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$53,975.10 (63.1%)</b>

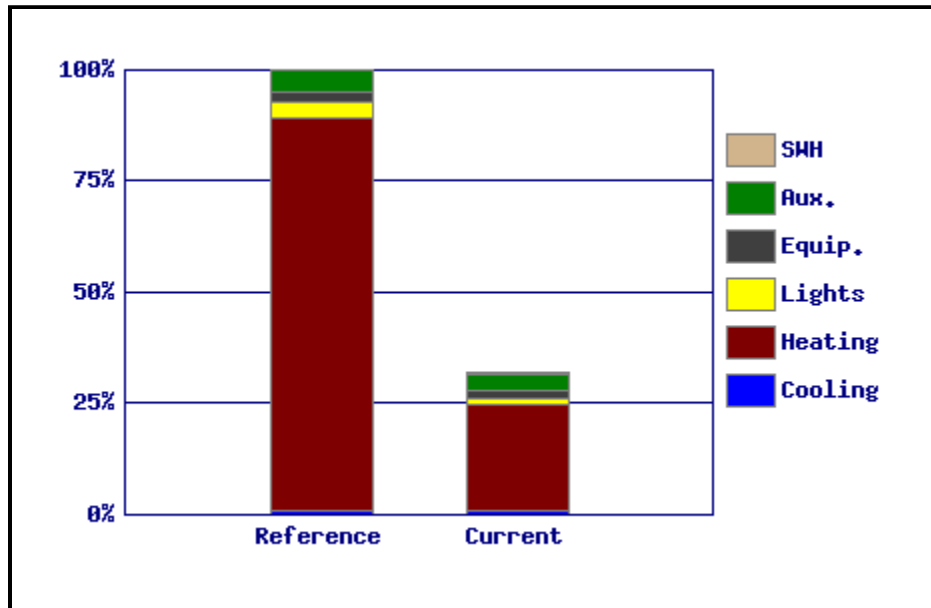
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **9 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 440,535 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	22,201	0	80	\$2,020

### Web Screening Tool Summaries

Heating	19,058	2,538	2,607	\$15,759
Lights	39,796	0	143	\$3,621
Equip.	60,652	0	218	\$5,519
Aux.	112,005	0	403	\$10,192
SWH	0	5	5	\$28
Totals	253,712	2,543	3,456	\$37,140

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	33,104	0	119	\$3,012
Heating	76,992	9,309	9,586	\$58,445
Lights	114,974	0	414	\$10,463
Equip.	60,652	0	218	\$5,519
Aux.	149,919	0	540	\$13,643
SWH	0	6	6	\$33
Totals	435,641	9,315	10,883	\$91,116

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Web Screening Tool Summaries



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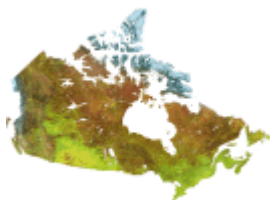


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Office, Small, 268 m<sup>2</sup>  
 Location: Calgary (A), Alberta  
 Heating System: Fossil (Variable Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.102 per kWh                      \$ 5.572 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	9.1	9.1 %
Overall window USI-value:	3.2	1.95 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	4 m <sup>2</sup> C/W
Gross exterior wall area:	366	366 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	6.52
Gross exterior roof area:	307	307 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	92 %
Minimum outside air:	0.42	0.42 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	2.61 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	15.3 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	531	
Your Design	394	
<hr/>		
Energy Savings	138	<b>25.9%</b>
<b>Annual Energy Cost Savings</b>		<b>\$113.21</b>

**LEED® Canada Energy & Atmosphere (EA)**

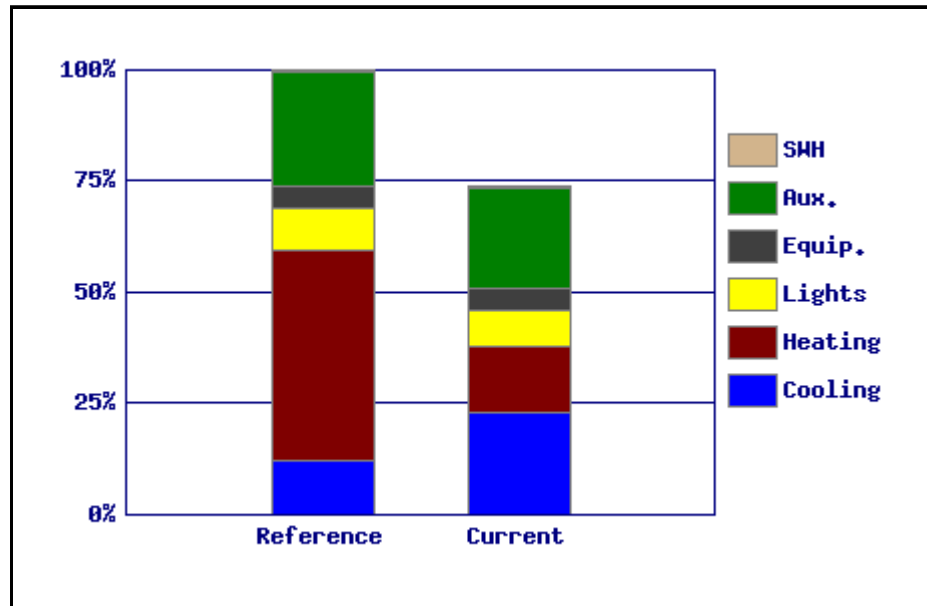
Reference Building	\$8,778.93	
Your Design	\$8,665.72	
<hr/>		
<b>Regulated Energy Cost Savings**</b>	<b>\$113.21</b>	<b>( 1.3% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **0 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 4,083 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	33,826	0	122	\$3,450

## Web Screening Tool Summaries

Heating	770	76	79	\$501
Lights	12,070	0	43	\$1,231
Equip.	7,491	0	27	\$764
Aux.	33,166	0	119	\$3,383
SWH	987	0	4	\$101
Totals	88,310	76	394	\$9,430

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	18,216	0	66	\$1,858
Heating	2,154	242	250	\$1,569
Lights	14,200	0	51	\$1,448
Equip.	7,491	0	27	\$764
Aux.	37,279	0	134	\$3,802
SWH	987	0	4	\$101
Totals	80,327	242	531	\$9,543

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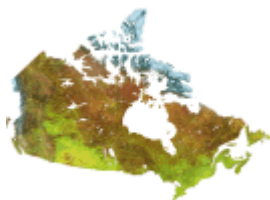


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Hotel, 8432 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil Fed Fan Coils

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.079 per kWh                      \$ 11.028 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	25	25 %
Overall window USI-value:	3.2	1.91 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	3.67 m <sup>2</sup> C/W
Gross exterior wall area:	3695	3695 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	4.52
Gross exterior roof area:	2236	2236 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	94.5 %
Minimum outside air:	0.62	0.62 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	22 %
Percent of floor area cooled:	5	5 %
Cooling efficiency:	3.8	3.08 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	13 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	95 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	17.1	8.2 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	8,627	
Your Design	5,795	
<hr/>		
Energy Savings	2,833	<b>32.8%</b>
<b>Annual Energy Cost Savings</b>		<b>\$45,317.97</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$131,509.90
Your Design	\$86,191.93
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$45,317.97 (34.5%)</b>

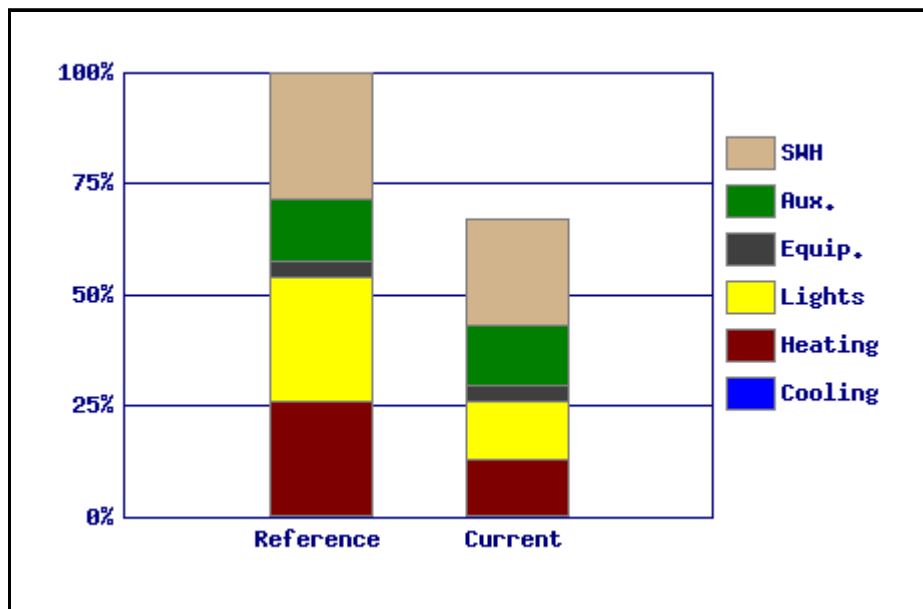
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 272,046 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	11,408	0	41	\$901

### Web Screening Tool Summaries

Heating	0	1,073	1,073	\$11,829
Lights	317,543	0	1,143	\$25,086
Equip.	84,421	0	304	\$6,669
Aux.	323,638	0	1,165	\$25,567
SWH	0	2,069	2,069	\$22,808
Totals	737,011	3,141	5,795	\$92,861

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	11,263	0	41	\$890
Heating	0	2,228	2,228	\$24,564
Lights	662,178	0	2,384	\$52,312
Equip.	84,421	0	304	\$6,669
Aux.	337,454	0	1,215	\$26,659
SWH	0	2,457	2,457	\$27,085
Totals	1,095,316	4,684	8,627	\$138,179

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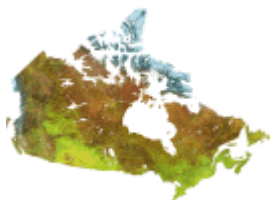


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Office, Large, 4536 m<sup>2</sup>  
 Location: Edmonton (B), Alberta  
 Heating System: Fossil (Variable Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.124 per kWh                      \$ 7.601 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	44.4 %
Overall window USI-value:	3.2	2.1 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.083	2.05 m <sup>2</sup> C/W
Gross exterior wall area:	1781	1781 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	4.63
Gross exterior roof area:	2151	2151 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	91 %
Minimum outside air:	0.77	0.77 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	3.28 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		Yes

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	12.09 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	8,471	
Your Design	4,701	
<hr/>		
Energy Savings	3,770	<b>44.5%</b>
<b>Annual Energy Cost Savings</b>		<b>\$42,780.13</b>

**LEED® Canada Energy & Atmosphere (EA)**

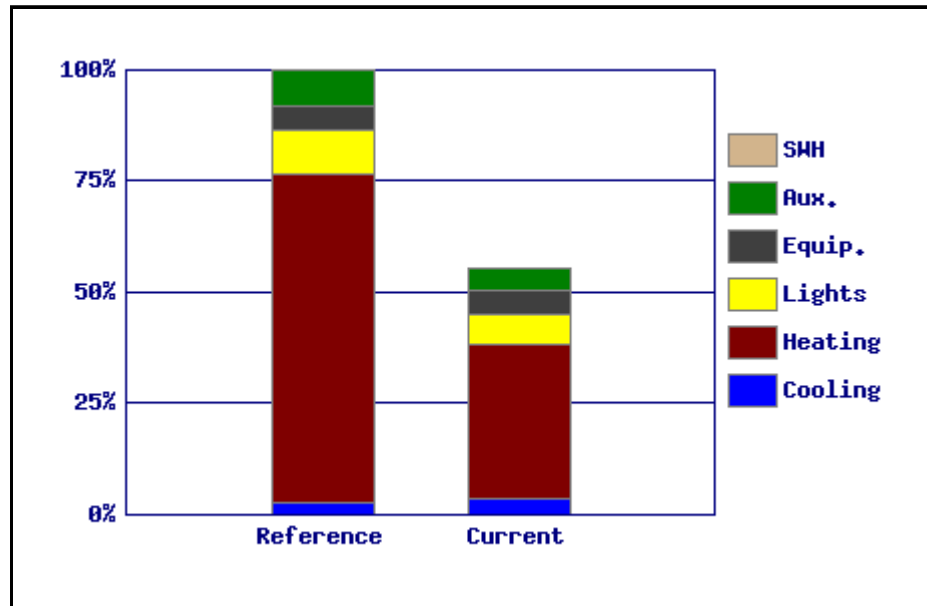
Reference Building	\$112,637.09
Your Design	\$69,856.96
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$42,780.13 (38.0%)</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **4 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 243,012 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	82,807	0	298	\$10,268

## Web Screening Tool Summaries

Heating	31,652	2,831	2,945	\$25,441
Lights	161,430	0	581	\$20,017
Equip.	126,782	0	456	\$15,721
Aux.	113,187	0	407	\$14,035
SWH	0	13	13	\$95
Totals	515,858	2,844	4,701	\$85,578

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	61,376	0	221	\$7,611
Heating	51,159	6,074	6,259	\$52,507
Lights	240,334	0	865	\$29,801
Equip.	126,782	0	456	\$15,721
Aux.	182,442	0	657	\$22,623
SWH	0	13	13	\$95
Totals	662,094	6,087	8,471	\$128,358

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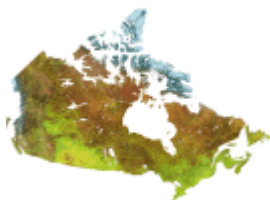


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Extended Care, 2447 m<sup>2</sup>  
 Location: London (A), Ontario  
 Heating System: Fossil (Variable Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.110 per kWh                      \$ 8.719 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	74.6 %
Overall window USI-value:	3.2	2.54 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	3.2 m <sup>2</sup> C/W
Gross exterior wall area:	925	925 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.75
Gross exterior roof area:	2425	2425 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	79 %
Minimum outside air:	1.62	1.62 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	2.5	3.08 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	43 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	16.6	9.33 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is not 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

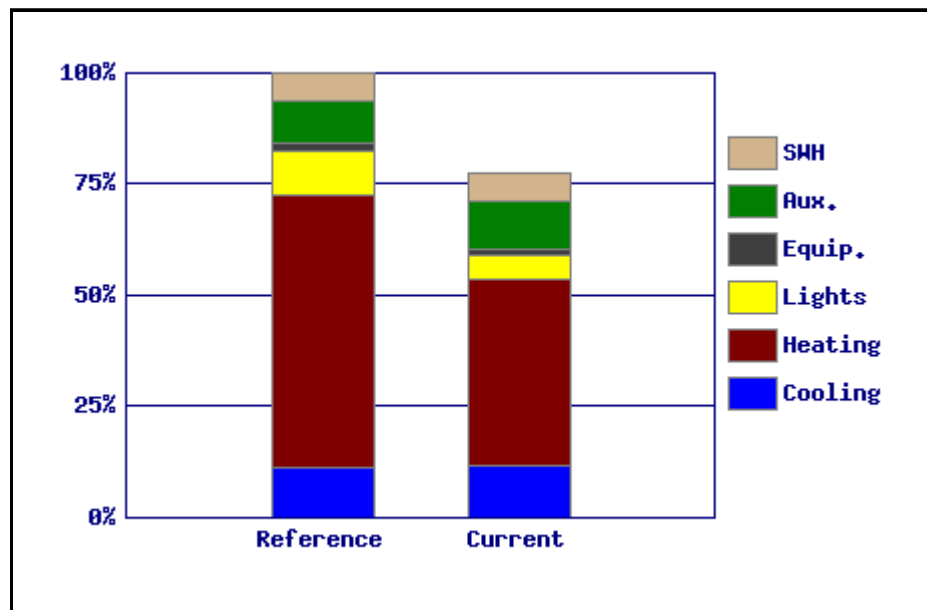
Reference Building	5,797	
Your Design	4,487	
Energy Savings	1,310	<b>22.6%</b>
<b>Annual Energy Cost Savings</b>		<b>\$15,521.00</b>

**LEED® Canada Energy & Atmosphere (EA)**  
*Does not qualify (EA Prerequisite 2 is not satisfied)*

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 84,940 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	185,332	0	667	\$20,387
Heating	0	2,433	2,433	\$21,213
Lights	91,748	0	330	\$10,092
Equip.	22,354	0	80	\$2,459
Aux.	167,763	0	604	\$18,454

## Web Screening Tool Summaries

SWH	0	371	371	\$3,235
Totals	467,197	2,805	4,487	\$75,840

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	179,905	0	648	\$19,790
Heating	0	3,556	3,556	\$31,002
Lights	163,237	0	588	\$17,956
Equip.	22,354	0	80	\$2,459
Aux.	153,815	0	554	\$16,920
SWH	0	371	371	\$3,235
Totals	519,311	3,927	5,797	\$91,361

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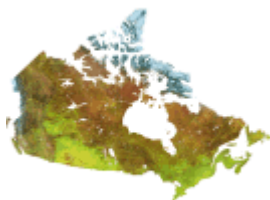


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Office, Small, 6331 m<sup>2</sup>  
 Location: Fort McMurray (C), Alberta  
 Heating System: Fossil Fed Fan Coils

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.087 per kWh                      \$ 14.413 per GJ  
 \$ 12.300 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	21.9	21.9 %
Overall window USI-value:	3.2	2.06 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.35
Overall wall RSI-value:	2.083	3.33 m <sup>2</sup> C/W
Gross exterior wall area:	3003	3003 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	3.77
Gross exterior roof area:	4412	4412 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	0.81	0.81 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	3.66 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	48 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	94 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	9.1 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	8,550	
Your Design	4,497	
<hr/>		
Energy Savings	4,053	<b>47.4%</b>
<b>Annual Energy Cost Savings</b>		<b>\$102,921.15</b>

**LEED® Canada Energy & Atmosphere (EA)**

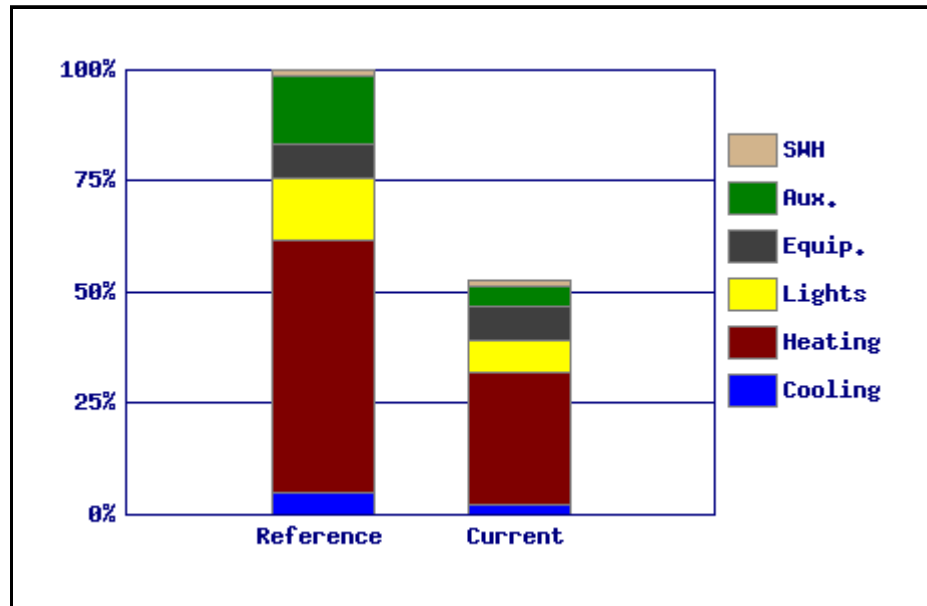
Reference Building	\$189,618.38
Your Design	\$86,697.23
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$102,921.15 ( 54.3% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **7 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 442,417 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	58,380	0	210	\$11,525

**Web Screening Tool Summaries**

Heating	14,453	2,489	2,541	\$37,376
Lights	169,589	0	611	\$22,203
Equip.	176,953	0	637	\$21,732
Aux.	113,794	0	410	\$14,307
SWH	0	89	89	\$1,287
Totals	533,169	2,578	4,497	\$108,429

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	114,893	0	414	\$24,803
Heating	40,612	4,704	4,850	\$72,011
Lights	335,440	0	1,208	\$44,321
Equip.	176,953	0	637	\$21,732
Aux.	371,473	0	1,337	\$46,970
SWH	0	105	105	\$1,512
Totals	1,039,372	4,808	8,550	\$211,350

**Disclaimer**

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Web Screening Tool Summaries



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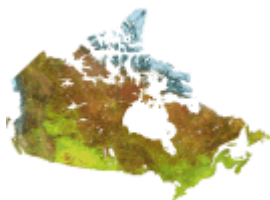


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: School, 6253 m<sup>2</sup>  
 Location: Red Deer (B), Alberta  
 Heating System: Fossil Fed Fan Coils

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.103 per kWh                      \$ 0.710 per Therms  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	17.5	17.5 %
Overall window USI-value:	3.2	2.39 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.36
Overall wall RSI-value:	2.083	1.95 m <sup>2</sup> C/W
Gross exterior wall area:	2716	2716 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	3.47
Gross exterior roof area:	4757	4757 m <sup>2</sup>

Mechanical System

**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	81 %
Minimum outside air:	1.23	1.23 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	4.1 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	77 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	67 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	10.23 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance****Annual Energy Use (GJ)**

**Web Screening Tool Summaries**

Reference Building	8,354	
Your Design	3,630	
<hr/>		
Energy Savings	4,724	<b>56.5%</b>
<b>Annual Energy Cost Savings</b>		<b>\$59,822.32</b>

**LEED® Canada Energy & Atmosphere (EA)**

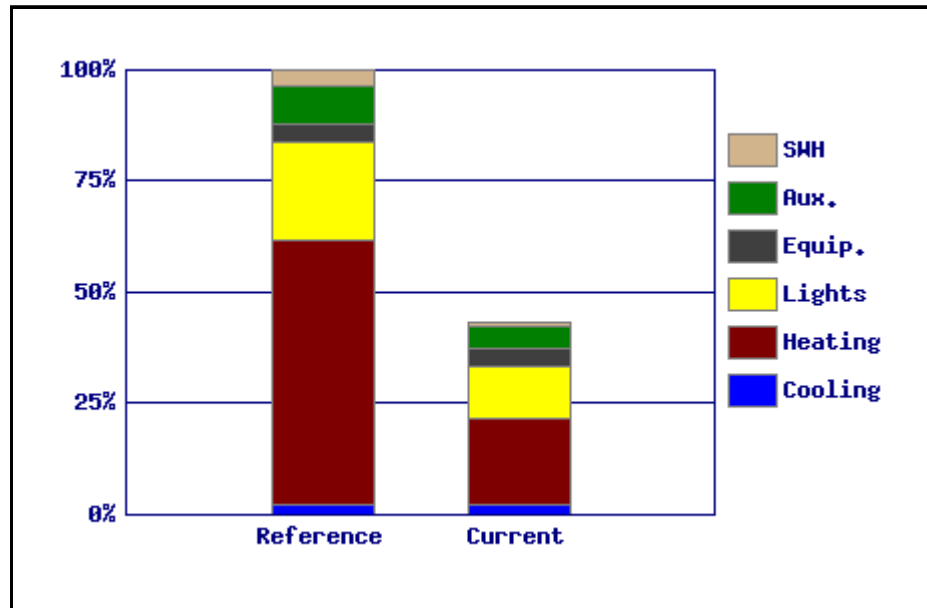
Reference Building	\$117,516.72
Your Design	\$57,694.40
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$59,822.32 ( 50.9% )</b>

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **6 points**

**Emissions Savings**  
Carbon Dioxide (CO<sub>2</sub>) 366,681 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Therms	Total Energy GJ	Costs
Cooling	50,527	0	182	\$5,204

## Web Screening Tool Summaries

Heating	11,514	1,570	1,611	\$11,747
Lights	273,258	0	984	\$28,146
Equip.	93,966	0	338	\$9,679
Aux.	115,942	0	417	\$11,942
SWH	0	97	97	\$655
Totals	545,207	1,667	3,630	\$67,373

## Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Therms	Total Energy GJ	Costs
Cooling	53,354	0	192	\$5,495
Heating	40,552	4,815	4,960	\$36,572
Lights	510,172	0	1,837	\$52,548
Equip.	93,966	0	338	\$9,679
Aux.	203,076	0	731	\$20,917
SWH	0	295	295	\$1,985
Totals	901,121	5,110	8,354	\$127,195

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**Web Screening Tool Summaries**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	84 %
Minimum outside air:	0.49	0.49 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	20	20 %
Cooling efficiency:	3.8	2.64 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	57 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	10	5.68 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Parkade lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Parkade floor area:	0	0 m <sup>2</sup>
Average lighting density:	3.2	3.2 W/m <sup>2</sup>
Percent of lighting load with occupancy sensor control:	0	0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Web Screening Tool Summaries**

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	34,132	
Your Design	20,721	
	<hr/>	
Energy Savings	<b>13,411</b>	<b>39.3%</b>

**Annual Energy Cost Savings \$230,717.89**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$574,593.21
Your Design	\$343,895.67
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**Regulated Energy Cost Savings\*\* \$230,697.54 ( 40.1% )**

\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

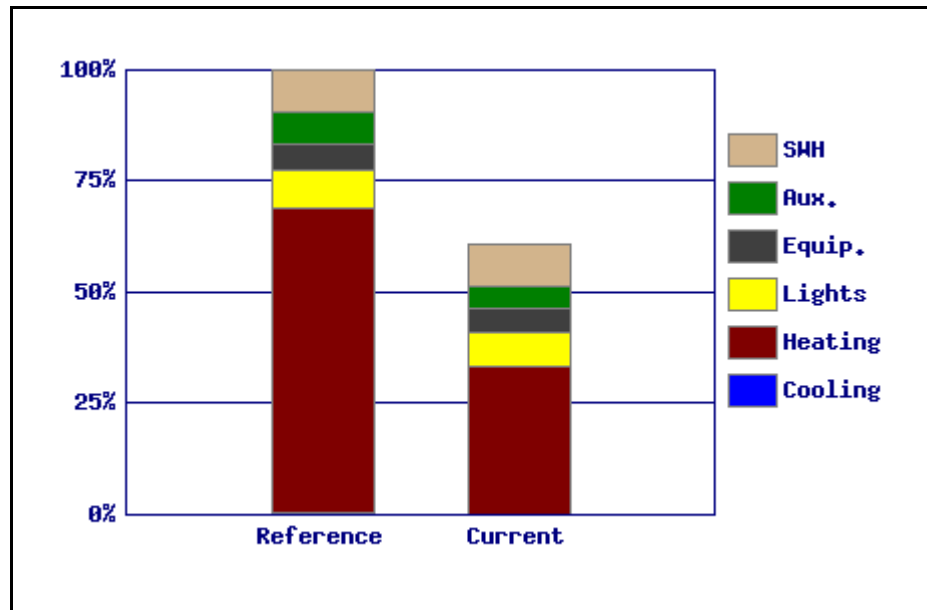
**LEED Canada EA Credit 1 4 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 817,202 kg

**Annual Energy Use Comparison**

**Web Screening Tool Summaries**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	20,682	0	74	\$2,138
Heating	0	11,354	11,354	\$186,674
Lights	693,616	0	2,497	\$64,469
Equip.	548,923	0	1,976	\$48,307
Aux.	449,352	0	1,618	\$37,969
SWH	0	3,202	3,202	\$52,646
Totals	1,712,573	14,555	20,721	\$392,203

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	25,193	0	91	\$2,577
Heating	0	23,365	23,365	\$384,161
Lights	837,615	0	3,015	\$76,751
Equip.	548,923	0	1,976	\$48,328
Aux.	689,613	0	2,483	\$58,459
SWH	0	3,202	3,202	\$52,646
Totals	2,101,344	26,567	34,132	\$622,921

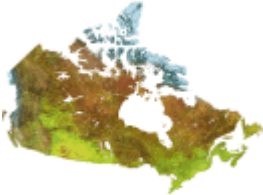
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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Office, Small, 451 m<sup>2</sup>  
 Location: Dawson City (B), Yukon Territory  
 Heating System: Fossil Fed Fan Coils

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.790 per kWh                      \$ 0 per Liters  
 \$ 0.000 per kW                      \$ 0.220 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	16	16 %
Overall window USI-value:	2.1	2.07 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	3.03	4.1 m <sup>2</sup> C/W
Gross exterior wall area:	526	526 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	6.77
Gross exterior roof area:	331	331 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	1.89	1.89 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	3.8 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	90 %
Service water savings:	0	66 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	4.09 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	1,330	
Your Design	745	
	-----	
Energy Savings	<b>585</b>	<b>44.0%</b>
<b>Annual Energy Cost Savings</b>		<b>\$46,622.53</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$75,731.42
Your Design	\$29,108.89
	-----
<b>Regulated Energy Cost Savings**</b>	<b>\$46,622.53 ( 61.6% )</b>

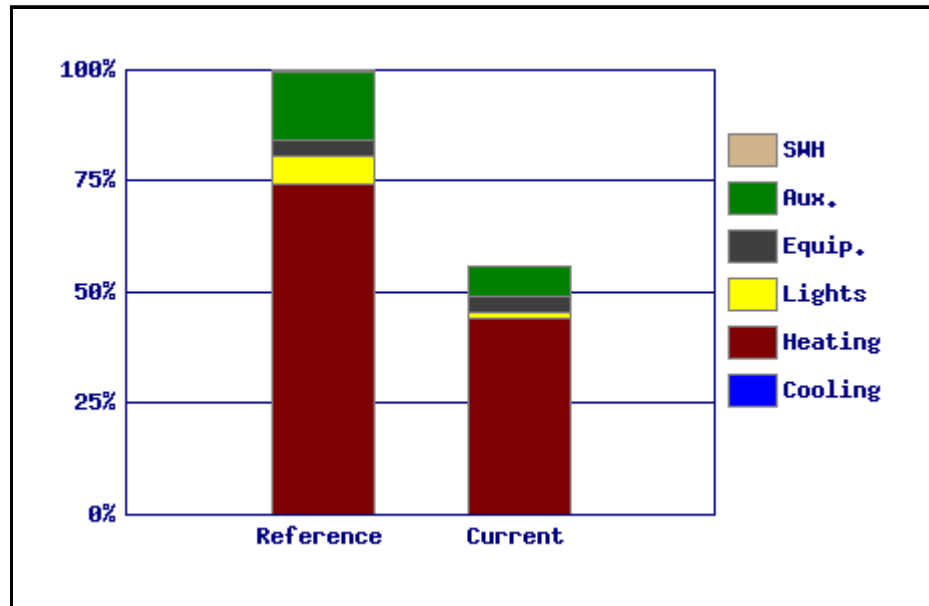
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **9 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 59,334 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0

Heating	2,128	16,500	587	\$4,944
Lights	5,431	0	20	\$4,290
Equip.	12,606	0	45	\$9,958
Aux.	25,137	0	90	\$19,858
SWH	0	84	3	\$17
Totals	45,302	16,584	745	\$39,067

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	8,200	27,273	986	\$11,871
Lights	23,896	0	86	\$18,878
Equip.	12,606	0	45	\$9,958
Aux.	56,887	0	205	\$44,941
SWH	0	213	7	\$42
Totals	101,589	27,486	1,330	\$85,690

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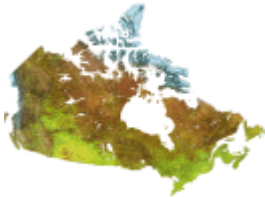


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Office of Energy Efficiency

**Screening Tool For New Building Design**

**Screening Tool Summary**



**Project Description**

Your Project Description:

**Building Profile Summary**

Proposed Building: Office, Small, 2608 m<sup>2</sup>  
 Location: Whitehorse (A), Yukon Territory  
 Heating System: Fossil (Variable Volume)

**Utility Rates**

Your marginal utility rates (including any taxes and fees):  
 \$ 0.150 per kWh                                      \$ 0 per Liters  
 \$ 11.990 per kW                                      \$ 0.544 per litre oil/propane

**Building Shell**

	Reference Building	Your Design
Average window-to-wall-area ratio:	26.1	26.1 %
Overall window USI-value:	2.1	1.66 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	2.703	4.3 m <sup>2</sup> C/W
Gross exterior wall area:	1162	1162 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	6.77
Gross exterior roof area:	1157	1157 m <sup>2</sup>

**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	84.2 %
Minimum outside air:	0.7	0.7 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	52 %
Percent of floor area cooled:	87	87 %
Cooling efficiency:	5.2	3.97 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	60 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	65 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	5.47 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	2,725	
Your Design	1,422	
<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>		
Energy Savings	<b>1,303</b>	<b>47.8%</b>
<b>Annual Energy Cost Savings</b>		<b>\$44,575.43</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$76,268.88
Your Design	\$31,693.45
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<b>Regulated Energy Cost Savings**</b>	<b>\$44,575.43 ( 58.4% )</b>

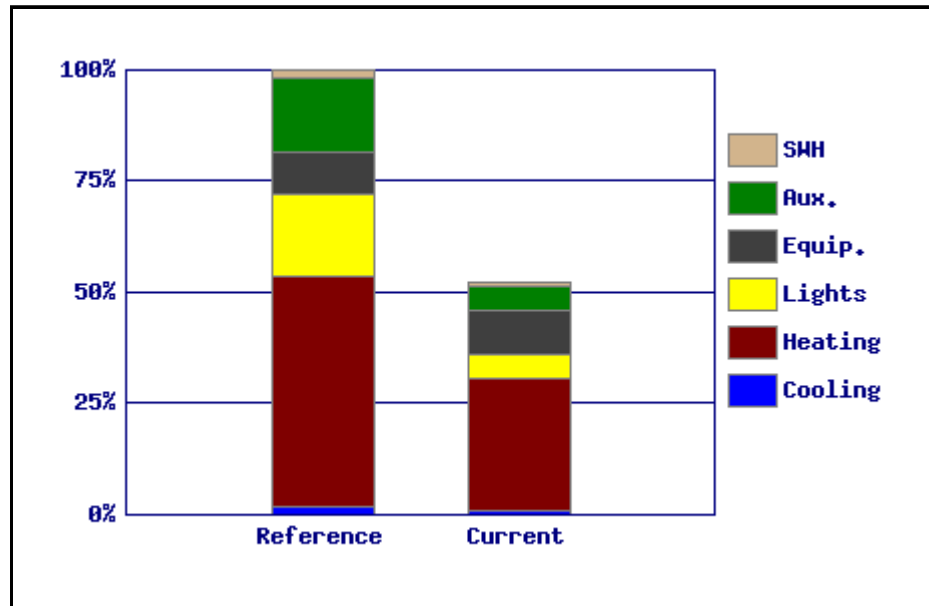
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **8 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 149,643 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	8,135	0	29	\$2,636

Heating	7,873	22,120	804	\$12,476
Lights	41,997	0	151	\$8,032
Equip.	72,894	0	262	\$13,479
Aux.	43,044	0	155	\$8,277
SWH	0	556	20	\$272
Totals	173,943	22,675	1,422	\$45,172

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	12,925	0	47	\$3,408
Heating	11,857	39,099	1,415	\$21,469
Lights	138,181	0	497	\$26,870
Equip.	72,894	0	262	\$13,479
Aux.	128,078	0	461	\$23,920
SWH	0	1,232	43	\$603
Totals	363,935	40,332	2,725	\$89,748

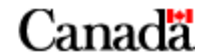
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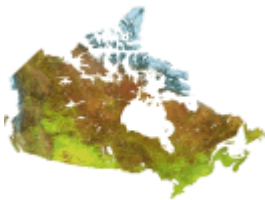


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: School, 6496 m<sup>2</sup>  
 Location: Yellowknife (B), Northwest Territories  
 Heating System: Fossil (Constant Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.151 per kWh                      \$ 0 per Liters  
 \$ 11.990 per kW                      \$ 0.544 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	5.1	5.1 %
Overall window USI-value:	2.1	2.18 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	3.03	4.3 m <sup>2</sup> C/W
Gross exterior wall area:	3607	3607 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	5.68
Gross exterior roof area:	5138	5138 m <sup>2</sup>

Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	86.5 %
Minimum outside air:	1.33	1.33 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	32.7 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	4.24 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	11,987	
Your Design	7,926	
	<hr/>	
Energy Savings	4,061	<b>33.9%</b>
<b>Annual Energy Cost Savings</b>		<b>\$98,198.48</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$267,543.72
Your Design	\$169,345.24
	<hr/>
<b>Regulated Energy Cost Savings**</b>	<b>\$98,198.48 ( 36.7% )</b>

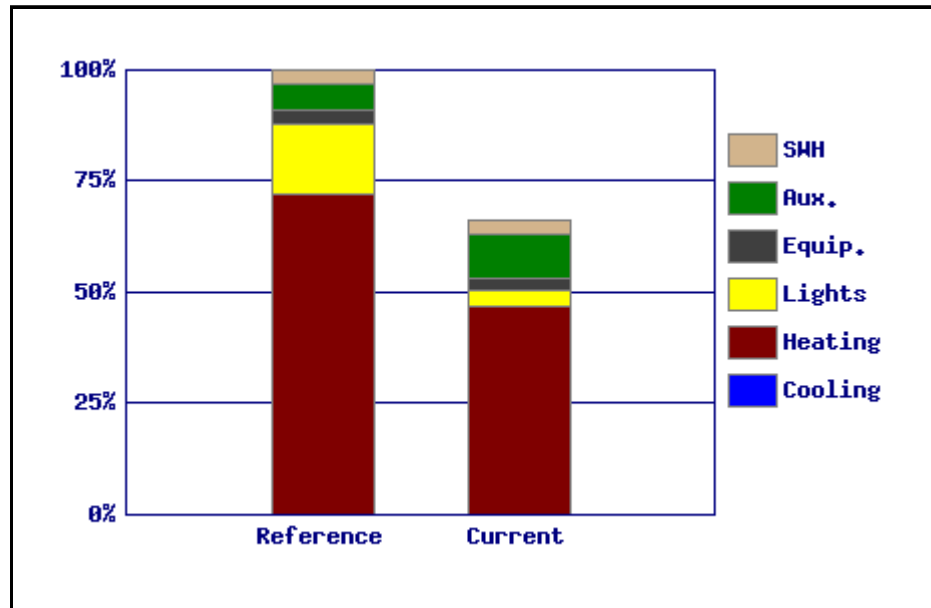
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 390,203 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0

Heating	47,008	155,113	5,612	\$84,142
Lights	117,657	0	424	\$21,426
Equip.	97,618	0	351	\$18,905
Aux.	327,590	0	1,179	\$58,758
SWH	0	10,266	360	\$5,020
Totals	589,873	165,379	7,926	\$188,251

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	66,589	238,955	8,624	\$128,817
Lights	529,998	0	1,908	\$96,479
Equip.	97,618	0	351	\$18,905
Aux.	206,522	0	743	\$37,228
SWH	0	10,266	360	\$5,020
Totals	900,728	249,221	11,987	\$286,449

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**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	100 %
Minimum outside air:	0.95	0.95 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	Occupancy sensor
Percent of outside air controlled by DCV:	0	23 %
Percent of floor area cooled:	80	80 %
Cooling efficiency:	3.8	2.8 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	63 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	259 %
Service water savings:	0	50 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	10	8.36 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Parkade lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Parkade floor area:	0	0 m <sup>2</sup>
Average lighting density:	3.2	3.2 W/m <sup>2</sup>
Percent of lighting load with occupancy sensor control:	0	0 %

**Process Loads**

Reference <u>Building</u>	Your <u>Design</u>
------------------------------	-----------------------

Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	2,062	
Your Design	785	
Energy Savings	<b>1,278</b>	<b>62.0%</b>

**Annual Energy Cost Savings \$26,262.17**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$40,208.19	
Your Design	\$13,946.02	
<b>Regulated Energy Cost Savings**</b>	<b>\$26,262.17</b>	<b>( 65.3% )</b>

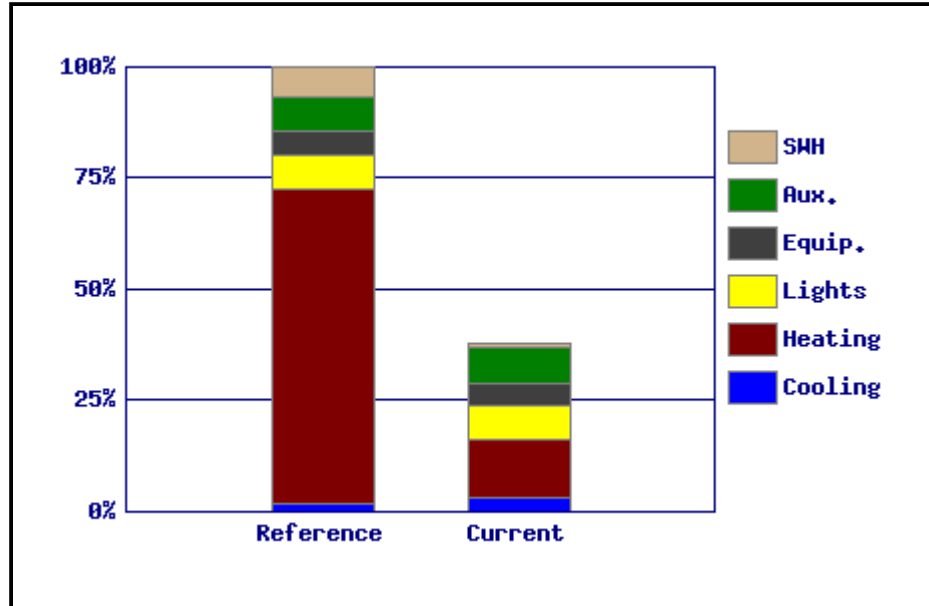
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1 10 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 46,885 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	18,955	0	68	\$1,403
Heating	75,219	0	271	\$5,566
Lights	42,061	0	151	\$3,113
Equip.	29,488	0	106	\$2,182
Aux.	44,844	0	161	\$3,318
SWH	7,380	0	27	\$546
Totals	217,947	0	785	\$16,128

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	10,664	0	38	\$789
Heating	0	1,454	1,454	\$29,887
Lights	44,997	0	162	\$3,330
Equip.	29,488	0	106	\$2,182
Aux.	45,590	0	164	\$3,374

SWH	38,228	0	138	\$2,829
Totals	168,967	1,454	2,062	\$42,390

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**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	94 %
Minimum outside air:	0.67	0.67 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	5	5 %
Cooling efficiency:	3.8	3.8 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	94 %
Service water savings:	0	25.9 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	10	9.82 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Parkade lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Parkade floor area:	20295.5	20295.5 m <sup>2</sup>
Average lighting density:	3.2	1.72 W/m <sup>2</sup>
Percent of lighting load with occupancy sensor control:	0	0 %

**Process Loads**

Reference <u>Building</u>	Your <u>Design</u>
------------------------------	-----------------------

Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	25,919	
Your Design	18,937	
Energy Savings	<b>6,981</b>	<b>26.9%</b>

**Annual Energy Cost Savings \$76,660.01**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$279,968.28	
Your Design	\$221,200.91	
<b>Regulated Energy Cost Savings**</b>	<b>\$58,767.37</b>	<b>( 21.0% )</b>

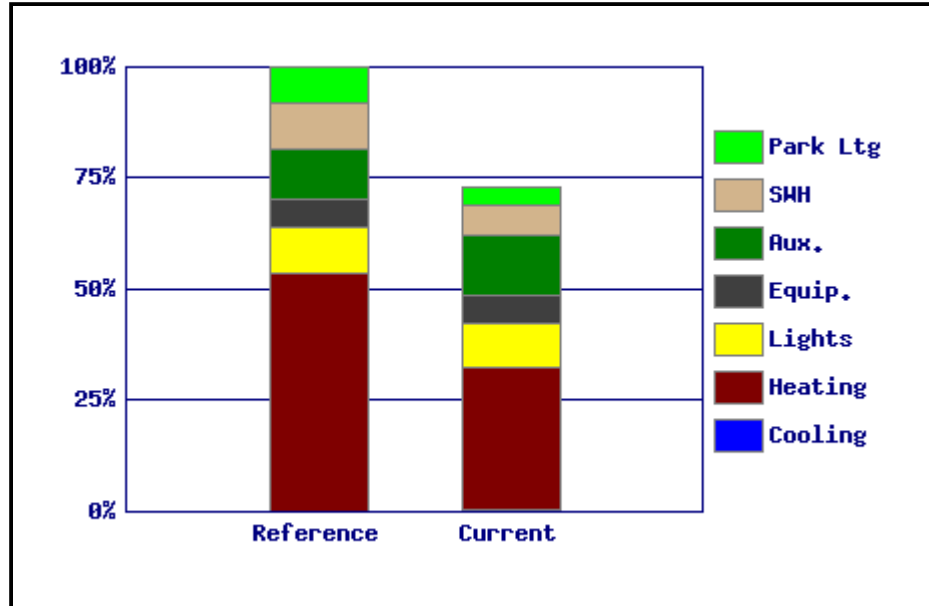
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1 0 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 387,999 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	24,196	0	87	\$1,645
Heating	0	8,268	8,268	\$87,291
Lights	719,277	0	2,589	\$48,911
Equip.	474,766	0	1,709	\$32,284
Aux.	954,625	0	3,437	\$64,914
SWH	0	1,747	1,747	\$18,440
Park Ltg	305,797	0	1,101	\$20,794
Totals	2,478,660	10,014	18,937	\$274,279

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	13,718	0	49	\$933
Heating	0	13,871	13,871	\$146,454
Lights	724,465	0	2,608	\$49,264
Equip.	474,766	0	1,709	\$32,284

Aux.	795,270	0	2,863	\$54,078
SWH	0	2,769	2,769	\$29,240
Park Ltg	568,924	0	2,048	\$38,687
Totals	2,577,143	16,641	25,919	\$350,939

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**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	86 %
Minimum outside air:	0.64	0.64 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	3.8	3.8 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	48.6 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	55 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	11.6 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is not 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building 1,757  
 Your Design 1,357

Energy Savings 400 22.8%

**Annual Energy Cost Savings \$47,321.99**

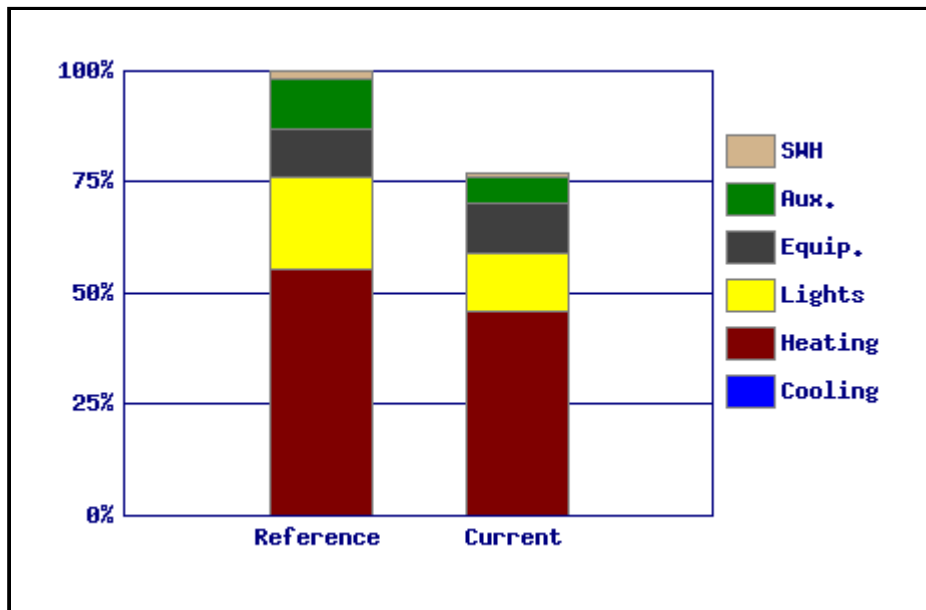
**LEED® Canada Energy & Atmosphere (EA)**

*Does not qualify (EA Prerequisite 2 is not satisfied)*

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 47,487 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0

Heating	4,402	22,452	804	\$32,999
Lights	65,426	0	236	\$41,474
Equip.	53,553	0	193	\$33,647
Aux.	30,138	0	108	\$18,999
SWH	0	485	17	\$654
Totals	153,519	22,936	1,357	\$127,772

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	7,894	26,855	971	\$41,317
Lights	101,517	0	365	\$64,388
Equip.	53,553	0	193	\$33,647
Aux.	54,648	0	197	\$34,521
SWH	0	905	32	\$1,221
Totals	217,612	27,761	1,757	\$175,094

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	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	2	2 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	59 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	3.52 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	43.9 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	55 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	11.33 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	3,534	
Your Design	1,803	
<hr/>		
Energy Savings	1,731	<b>49.0%</b>
<b>Annual Energy Cost Savings</b>		<b>\$43,370.58</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$88,442.66
Your Design	\$45,072.08
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$43,370.58 (49.0%)</b>

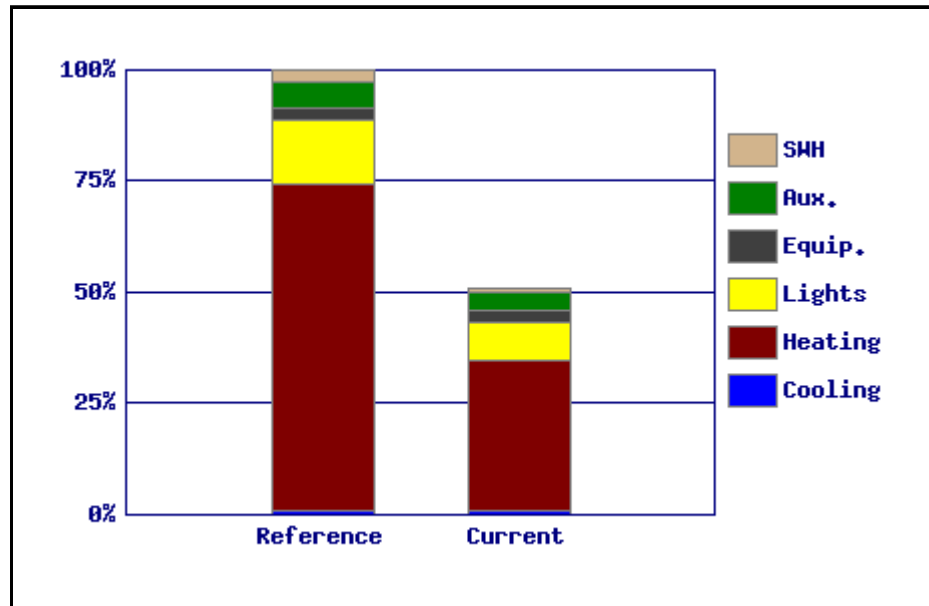
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **6 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 155,046 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	10,527	0	38	\$1,643

Heating	5,555	33,110	1,182	\$27,065
Lights	85,183	0	307	\$10,694
Equip.	26,448	0	95	\$3,474
Aux.	38,766	0	140	\$4,728
SWH	0	1,181	41	\$942
Totals	166,479	34,291	1,803	\$48,546

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	7,878	0	28	\$1,197
Heating	20,783	71,691	2,590	\$59,842
Lights	143,595	0	517	\$18,026
Equip.	26,448	0	95	\$3,474
Aux.	58,529	0	211	\$7,284
SWH	0	2,625	92	\$2,093
Totals	257,233	74,317	3,534	\$91,917

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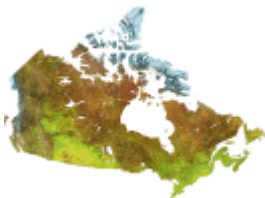


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: School, 5768 m<sup>2</sup>  
 Location: Yellowknife (B), Northwest Territories  
 Heating System: Fossil (Constant Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.122 per kWh                                      \$ 0 per Liters  
 \$ 11.220 per kW                                      \$ 0.600 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	12.4	12.4 %
Overall window USI-value:	2.1	2.38 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	3.03	5.5 m <sup>2</sup> C/W
Gross exterior wall area:	3314	3314 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	4.76
Gross exterior roof area:	3418	3418 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	70 %
Minimum outside air:	1.42	1.42 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	16 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	32.9 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	70 %
Service water savings:	0	20 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	12.75 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is not 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

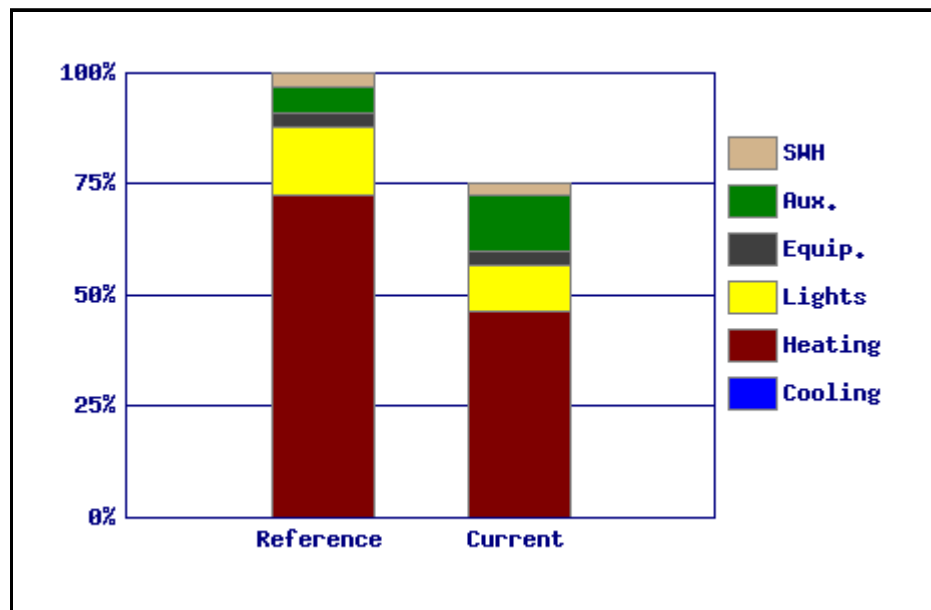
Reference Building	10,874	
Your Design	8,183	
Energy Savings	2,691	<b>24.7%</b>
<b>Annual Energy Cost Savings</b>		<b>\$40,742.19</b>

**LEED® Canada Energy & Atmosphere (EA)**  
*Does not qualify (EA Prerequisite 2 is not satisfied)*

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 197,051 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	38,265	140,155	5,055	\$81,230
Lights	314,151	0	1,131	\$47,453
Equip.	86,678	0	312	\$14,035
Aux.	386,805	0	1,392	\$56,625

SWH	0	8,334	292	\$4,495
Totals	825,900	148,489	8,183	\$203,839

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	60,738	218,261	7,877	\$126,790
Lights	470,602	0	1,694	\$71,081
Equip.	86,678	0	312	\$14,035
Aux.	186,429	0	671	\$27,757
SWH	0	9,116	320	\$4,916
Totals	804,448	227,376	10,874	\$244,581

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	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	87 %
Minimum outside air:	1.77	1.77 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	25 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	2.8 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	63.6 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	90 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18.8	12.34 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	4,630	
Your Design	3,265	
	<hr/>	
Energy Savings	1,364	<b>29.5%</b>
<b>Annual Energy Cost Savings</b>		<b>\$-6,426.20</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$59,801.36
Your Design	\$66,220.95
	<hr/>
<b>Regulated Energy Cost Savings**</b>	<b>\$-6,419.59 (-10.7%)</b>

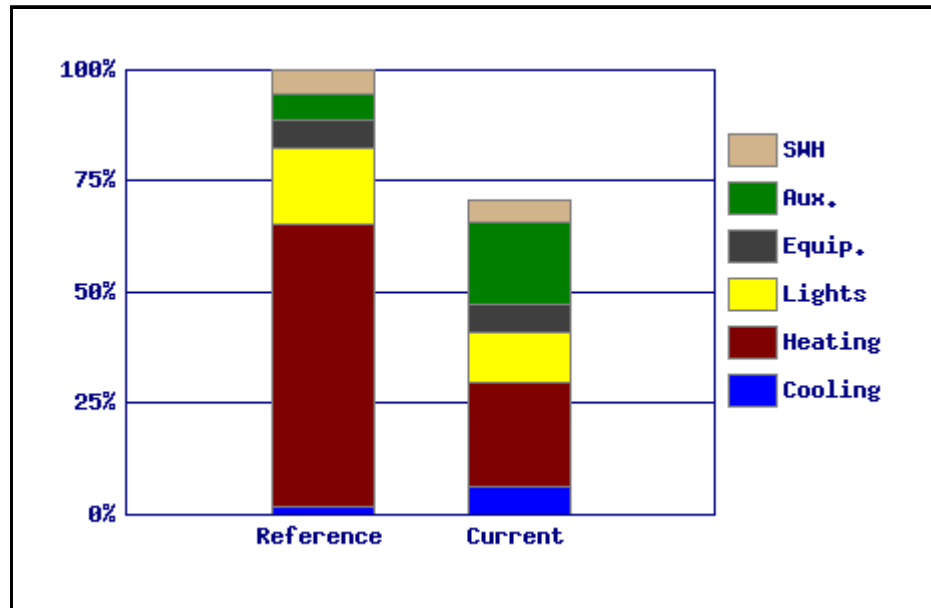
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **0 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 64,285 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	81,771	0	294	\$12,533

Heating	0	31,014	1,088	\$6,273
Lights	142,125	0	512	\$17,796
Equip.	84,279	0	303	\$10,569
Aux.	232,847	0	838	\$28,297
SWH	0	6,539	229	\$1,323
Totals	541,022	37,554	3,265	\$76,790

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	25,483	0	92	\$4,617
Heating	0	83,710	2,937	\$16,930
Lights	216,534	0	780	\$27,081
Equip.	84,280	0	303	\$10,562
Aux.	72,107	0	260	\$9,685
SWH	0	7,357	258	\$1,488
Totals	398,404	91,067	4,630	\$70,364

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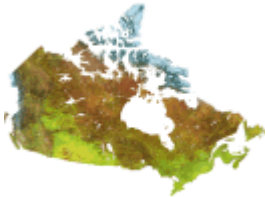


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Facility Description for 110-312

Your Facility Description:

#### Configuration

1. Office, Small, Ground-Source Heat Pumps - 50.5%
2. Warehouse, Electricity (Constant Volume) - 49.5%

Total Floor Area: 2,790 m<sup>2</sup>

Location: Whitehorse (A), Yukon Territory

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.120 per kWh

\$ 0 per Liters

\$ 6.900 per kW

\$ 0.846 per litre oil/propane

#### First Building Block

First Building Block: Office, Small, 1410 m<sup>2</sup>

Heating System: Ground-Source Heat Pumps

#### Building Shell (Office, Small)

	Reference Building	Your Design
Average window-to-wall-area ratio:	17.9	17.9 %
Overall window USI-value:	2.1	2.04 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.703	3.09 m <sup>2</sup> C/W
Gross exterior wall area:	955	955 m <sup>2</sup>
Roof type:	All other	All other

Overall roof RSI-value:	3.448	4.1
Gross exterior roof area:	746	746 m <sup>2</sup>

**Mechanical System (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	0.87	0.87 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	92	92 %
Cooling efficiency:	5.2	3.1 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	62 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	88 %
Service water savings:	0	25 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	17.43 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block:	Warehouse, 1380 m <sup>2</sup>
Heating System:	Electricity (Constant Volume)

**Building Shell (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	2.7	2.7 %
Overall window USI-value:	1.2	2.04 W/m <sup>2</sup> C
Window shading coefficient:	0.74	0.74
Overall wall RSI-value:	3.704	3.09 m <sup>2</sup> C/W
Gross exterior wall area:	1144	1144 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	4	4.1
Gross exterior roof area:	1257	1257 m <sup>2</sup>

**Mechanical System (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	100	100 %
Minimum outside air:	3.04	3.04 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	2.5	2.5 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	63.7 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	88 %
Service water savings:	0	25 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	6	14.82 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Warehouse)**

	Reference Building	Your Design
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is not 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	3,803	
Your Design	3,495	
Energy Savings	<b>308</b>	<b>8.1%</b>

**Annual Energy Cost Savings** **\$6,969.36**

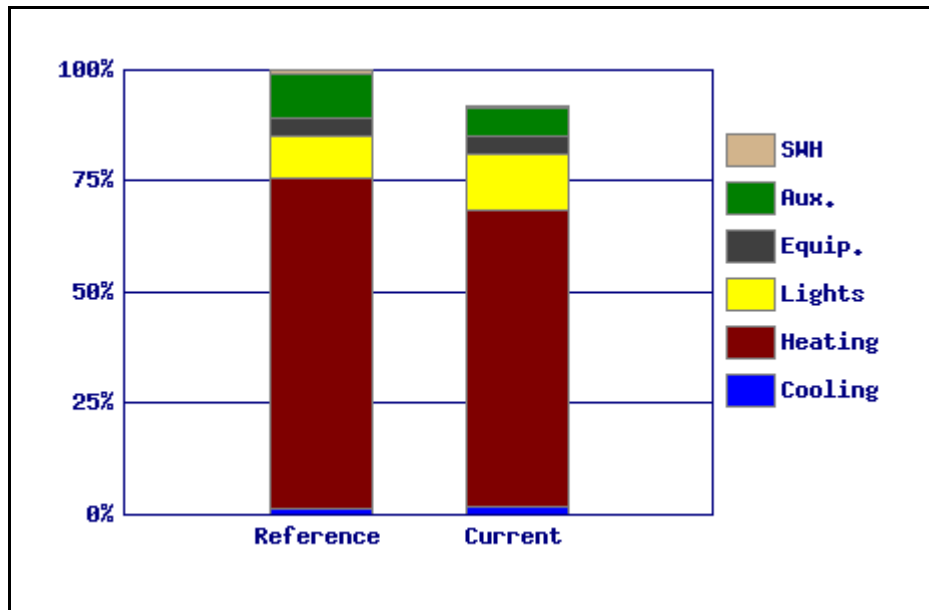
**LEED® Canada Energy & Atmosphere (EA)**

*Does not qualify (EA Prerequisite 2 is not satisfied)*

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) -33,622 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	18,185	0	65	\$2,399
Heating	707,260	0	2,546	\$96,456
Lights	130,306	0	469	\$17,933
Equip.	43,326	0	156	\$6,015
Aux.	65,839	0	237	\$8,973
SWH	0	600	21	\$456
Totals	964,916	600	3,495	\$132,232

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	12,458	0	45	\$2,137
Heating	494,954	30,125	2,839	\$101,659
Lights	98,173	0	353	\$13,855
Equip.	43,326	0	156	\$6,016
Aux.	105,765	0	381	\$14,907
SWH	0	826	29	\$628
Totals	754,677	30,951	3,803	\$139,202

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	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	86 %
Minimum outside air:	1.76	1.76 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	10	10 %
Cooling efficiency:	2.5	3.7 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	45.7 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	85 %
Service water savings:	0	10 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	17.1	11.28 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	6,424	
Your Design	3,575	
<hr/>		
Energy Savings	2,848	44.3%
<b>Annual Energy Cost Savings</b>		<b>\$111,657.99</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$282,619.65
Your Design	\$170,961.70
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$111,657.95 ( 39.5% )</b>

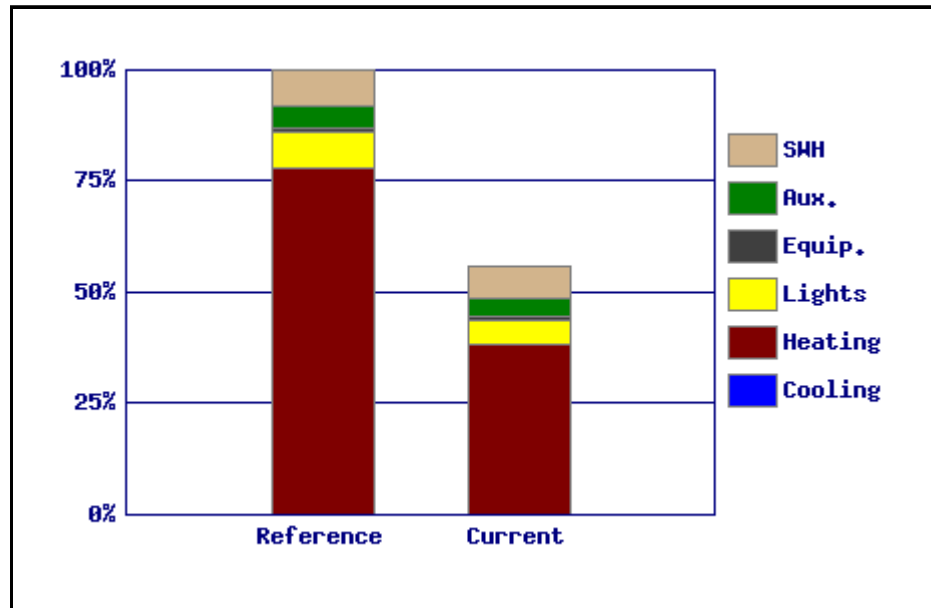
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** 4 points

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 231,070 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	241	0	1	\$113

Heating	0	70,217	2,464	\$78,075
Lights	92,415	0	333	\$43,266
Equip.	17,861	0	64	\$8,363
Aux.	75,955	0	273	\$35,557
SWH	0	12,547	440	\$13,951
Totals	186,472	82,764	3,575	\$179,324

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	91	0	0	\$43
Heating	0	142,928	5,015	\$158,923
Lights	140,100	0	504	\$65,591
Equip.	17,861	0	64	\$8,363
Aux.	88,848	0	320	\$41,593
SWH	0	14,812	520	\$16,470
Totals	246,900	157,740	6,424	\$290,982

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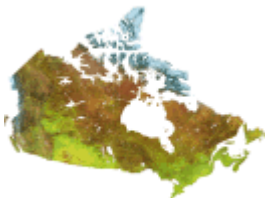


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Office, Small, 1400 m<sup>2</sup>  
 Location: Yellowknife (B), Northwest Territories  
 Heating System: Fossil Fed Distributed Heat Pumps

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.181 per kWh                                      \$ 0 per Liters  
 \$ 8.180 per kW                                      \$ 0.840 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	9.2	9.2 %
Overall window USI-value:	2.1	2.04 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	3.03	4.3 m <sup>2</sup> C/W
Gross exterior wall area:	1140	1140 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	6.29
Gross exterior roof area:	754	754 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	87 %
Minimum outside air:	0.57	0.57 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	28 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	4.34 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	22.5 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	30 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	12.92 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	2539	2539
Percent served by electricity:	100	100 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	10,504	
Your Design	7,393	
	<hr/>	
Energy Savings (with Process Loads)	3,111	<b>29.6%</b>
<b>Annual Energy Cost Savings</b>		<b>\$167,480.01</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$303,577.52
Your Design	\$136,033.02
	<hr/>
<b>Regulated Energy Cost Savings**</b>	<b>\$167,544.50 ( 55.2% )</b>

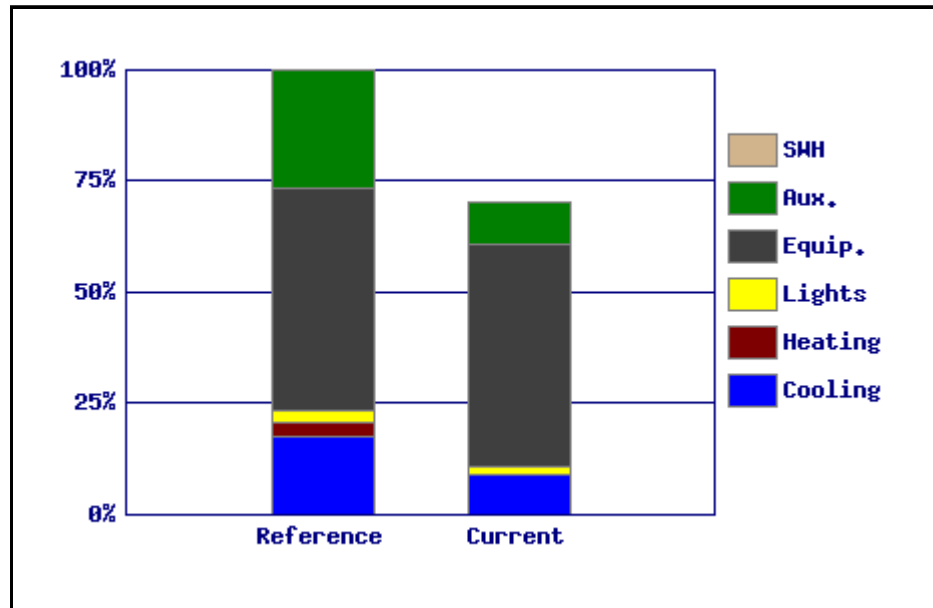
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **8 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 443,486 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	258,191	0	929	\$66,423

Heating	545	202	9	\$251
Lights	53,245	0	192	\$12,347
Equip.	1,458,449	0	5,250	\$298,778
Aux.	277,252	0	998	\$56,211
SWH	3,851	0	14	\$801
Totals	2,051,534	202	7,393	\$434,811

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	506,644	0	1,824	\$118,139
Heating	2,927	9,602	347	\$7,798
Lights	74,177	0	267	\$15,652
Equip.	1,458,449	0	5,250	\$298,713
Aux.	776,827	0	2,797	\$161,024
SWH	5,158	0	19	\$965
Totals	2,824,182	9,602	10,504	\$602,291

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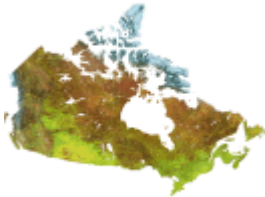


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Office, Large, 5122 m<sup>2</sup>  
 Location: Edmonton (B), Alberta  
 Heating System: Fossil (Variable Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.073 per kWh                      \$ 10.560 per GJ  
 \$ 3.120 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	40.36 %
Overall window USI-value:	3.2	0.96 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	2.083	3.47 m <sup>2</sup> C/W
Gross exterior wall area:	2681	2681 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	8.26
Gross exterior roof area:	1802	1802 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	86.3 %
Minimum outside air:	0.56	0.56 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	3.6 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	75 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	94 %
Service water savings:	0	55 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	11.35 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	9,285	
Your Design	3,399	
<hr/>		
Energy Savings	5,886	<b>63.4%</b>
<b>Annual Energy Cost Savings</b>		<b>\$69,744.26</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$122,795.96
Your Design	\$53,051.70
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$69,744.26 ( 56.8% )</b>

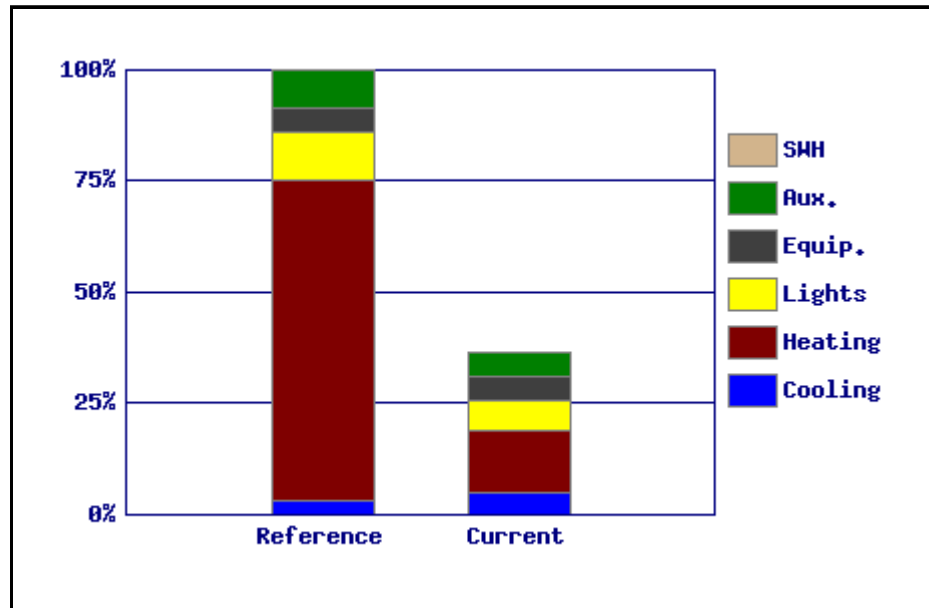
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **8 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 359,843 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	131,598	0	474	\$12,486

Heating	12,959	1,252	1,299	\$14,237
Lights	171,119	0	616	\$14,430
Equip.	143,161	0	515	\$11,751
Aux.	135,545	0	488	\$11,831
SWH	0	6	6	\$68
Totals	594,382	1,259	3,399	\$64,803

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	79,889	0	288	\$8,221
Heating	55,252	6,505	6,704	\$72,970
Lights	271,382	0	977	\$22,918
Equip.	143,161	0	515	\$11,751
Aux.	218,544	0	787	\$18,538
SWH	0	14	14	\$149
Totals	768,229	6,519	9,285	\$134,547

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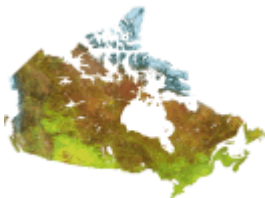


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Office of Energy Efficiency

**Screening Tool For New Building Design**

**Screening Tool Summary**



**Project Description**

Your Project Description:

**Building Profile Summary**

Proposed Building: School, 4654 m<sup>2</sup>  
 Location: Fort McMurray (C), Alberta  
 Heating System: Fossil (Variable Volume)

**Utility Rates**

Your marginal utility rates (including any taxes and fees):

\$ 0.120 per kWh                      \$ 0 per Liters  
 \$ 0.000 per kW                      \$ 0.550 per litre oil/propane

**Building Shell**

	Reference Building	Your Design
Average window-to-wall-area ratio:	13.25	13.25 %
Overall window USI-value:	3.2	1.4 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	2.083	4.56 m <sup>2</sup> C/W
Gross exterior wall area:	1970	1970 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.439	7.54
Gross exterior roof area:	4181	4181 m <sup>2</sup>

**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	87 %
Minimum outside air:	1.22	1.22 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	37.5 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	2.9 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	32.2 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	85 %
Service water savings:	0	21 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	8.57 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	6,964	
Your Design	3,567	
<hr/>		
Energy Savings	3,397	<b>48.8%</b>
<b>Annual Energy Cost Savings</b>		<b>\$68,230.32</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$137,233.61
Your Design	\$69,003.29
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$68,230.32 (49.7%)</b>

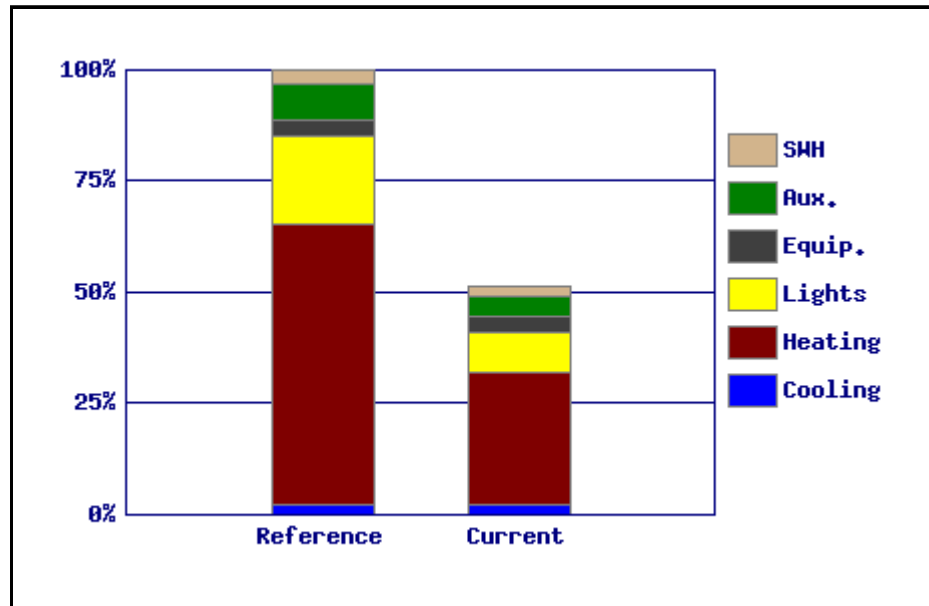
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **6 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 335,591 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	46,188	0	166	\$5,543

Heating	19,548	56,814	2,064	\$30,434
Lights	170,384	0	613	\$20,446
Equip.	69,937	0	252	\$8,392
Aux.	85,672	0	308	\$10,281
SWH	0	4,653	163	\$2,300
Totals	391,729	61,467	3,567	\$77,396

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	42,107	0	152	\$5,053
Heating	34,788	121,856	4,401	\$64,418
Lights	379,712	0	1,367	\$45,565
Equip.	69,937	0	252	\$8,392
Aux.	159,195	0	573	\$19,103
SWH	0	6,258	220	\$3,094
Totals	685,740	128,114	6,964	\$145,626

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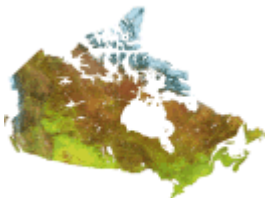


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Office of Energy Efficiency

**Screening Tool For New Building Design**

**Screening Tool Summary**



**Project Description**

Your Project Description:

**Building Profile Summary**

Proposed Building: Extended Care, 1478 m<sup>2</sup>  
 Location: Victoria (C), British Columbia  
 Heating System: Ground-Source Heat Pumps

**Utility Rates**

Your marginal utility rates (including any taxes and fees):

\$ 0.071 per kWh                      \$ 17.163 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

**Building Shell**

	Reference Building	Your Design
Average window-to-wall-area ratio:	12.7	12.7 %
Overall window USI-value:	3.2	1.57 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.4 m <sup>2</sup> C/W
Gross exterior wall area:	1258	1258 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	6.67
Gross exterior roof area:	394	394 m <sup>2</sup>

**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	92 %
Minimum outside air:	1.82	1.82 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	2.5	2.2 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	70 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	95 %
Service water savings:	0	14.7 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	16.6	10.3 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	2,647
--------------------	-------

Your Design	1,046	
Energy Savings	1,601	<b>60.5%</b>
<b>Annual Energy Cost Savings</b>		<b>\$27,240.91</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$46,506.60
Your Design	\$19,265.69

**Regulated Energy Cost Savings\*\*** **\$27,240.91 ( 58.6% )**

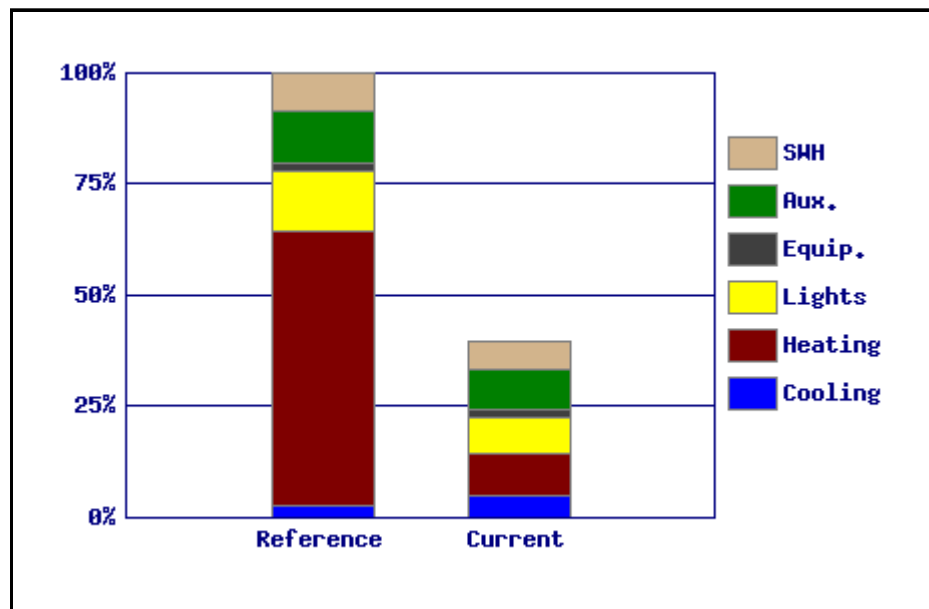
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **8 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 71,978 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	35,359	0	127	\$2,510

Heating	70,341	0	253	\$4,994
Lights	61,177	0	220	\$4,344
Equip.	13,502	0	49	\$959
Aux.	65,554	0	236	\$4,654
SWH	0	161	161	\$2,763
Totals	245,933	161	1,046	\$20,224

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	21,289	0	77	\$1,511
Heating	0	1,626	1,626	\$27,904
Lights	98,596	0	355	\$7,000
Equip.	13,502	0	49	\$959
Aux.	87,941	0	317	\$6,244
SWH	0	224	224	\$3,847
Totals	221,328	1,850	2,647	\$47,465

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	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	1.45	1.45 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	81.3	81.3 %
Cooling efficiency:	5.2	3.8 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	58 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	85 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	11.92 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	12,605	
Your Design	6,830	
<hr/>		
Energy Savings	5,775	<b>45.8%</b>
<b>Annual Energy Cost Savings</b>		<b>\$197,326.57</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$451,832.30
Your Design	\$254,505.73
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$197,326.57 (43.7%)</b>

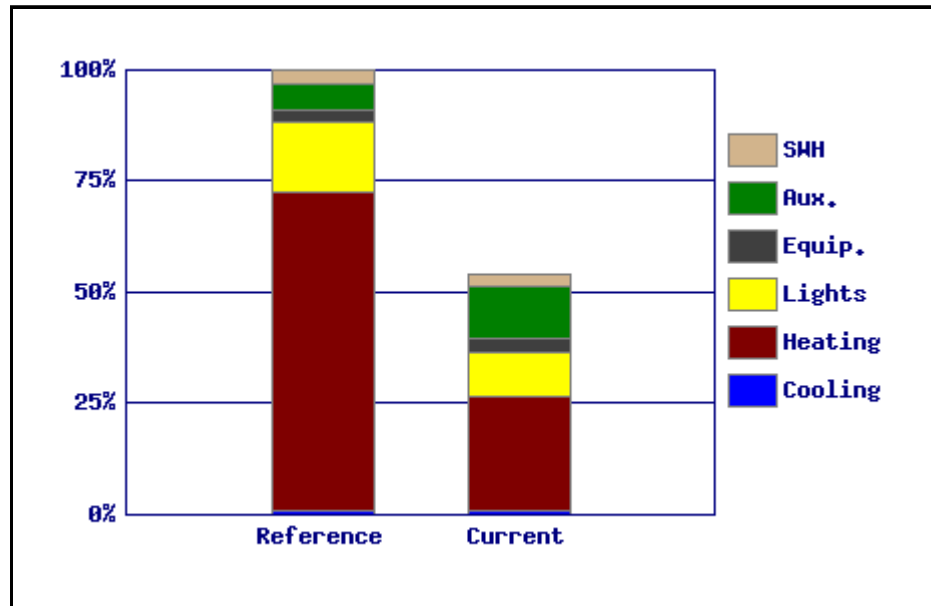
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **5 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 445,133 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	34,830	0	125	\$7,568

Heating	30,189	89,550	3,251	\$111,105
Lights	346,353	0	1,247	\$57,254
Equip.	102,216	0	368	\$17,788
Aux.	412,183	0	1,484	\$66,574
SWH	0	10,117	355	\$12,004
Totals	925,772	99,667	6,830	\$272,294

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	30,510	0	110	\$6,028
Heating	69,409	249,783	9,014	\$307,798
Lights	554,964	0	1,998	\$91,734
Equip.	102,216	0	368	\$17,788
Aux.	204,862	0	738	\$33,517
SWH	0	10,750	377	\$12,755
Totals	961,962	260,532	12,605	\$469,621

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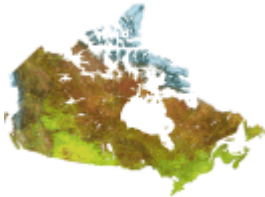


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: School, 1379 m<sup>2</sup>  
 Location: London (A), Ontario  
 Heating System: Fossil (Variable Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.109 per kWh                      \$ 11.860 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	29.4	29.4 %
Overall window USI-value:	3.2	2.35 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	1.818	2.94 m <sup>2</sup> C/W
Gross exterior wall area:	837	837 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	6.19
Gross exterior roof area:	1432	1432 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	81 %
Minimum outside air:	1.49	1.49 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	4.3 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	72 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	95 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	5.53 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	2,091	
Your Design	918	
<hr/>		
Energy Savings	1,173	<b>56.1%</b>
<b>Annual Energy Cost Savings</b>		<b>\$21,809.13</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$37,364.20
Your Design	\$15,555.07
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$21,809.13 ( 58.4% )</b>

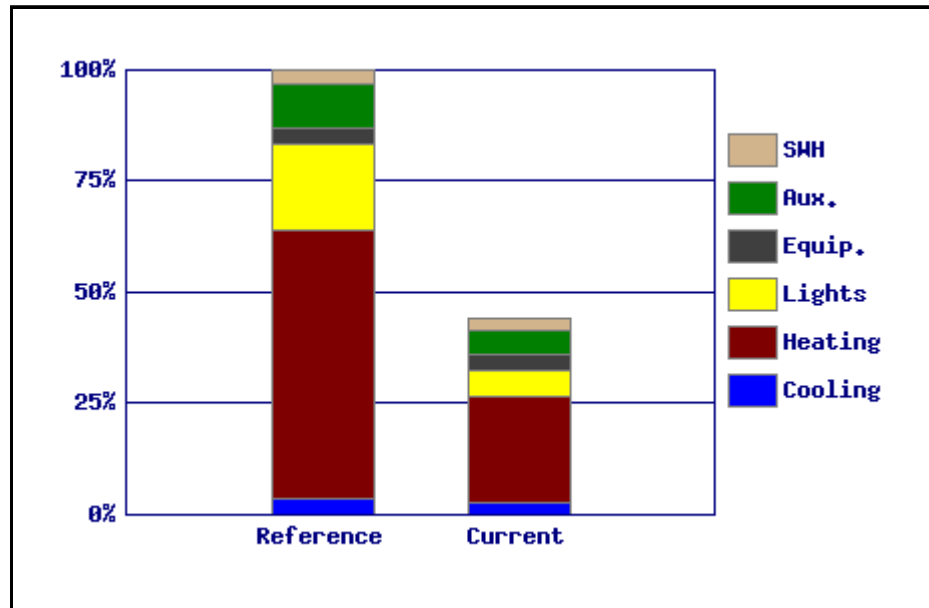
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **8 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 102,128 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	14,562	0	52	\$1,587

Heating	4,196	490	505	\$6,270
Lights	32,573	0	117	\$3,550
Equip.	20,723	0	75	\$2,259
Aux.	32,347	0	116	\$3,526
SWH	0	52	52	\$622
Totals	104,401	543	918	\$17,814

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	21,083	0	76	\$2,298
Heating	10,222	1,224	1,261	\$15,628
Lights	112,510	0	405	\$12,264
Equip.	20,723	0	75	\$2,259
Aux.	59,042	0	213	\$6,436
SWH	0	62	62	\$738
Totals	223,580	1,286	2,091	\$39,623

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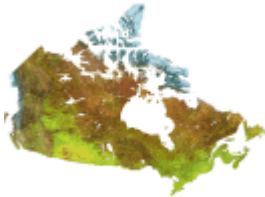


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Office, Small, 434 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil (Variable Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.110 per kWh                      \$ 16.046 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	17.2	17.2 %
Overall window USI-value:	3.2	1.97 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	1.818	2.89 m <sup>2</sup> C/W
Gross exterior wall area:	383	383 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	6.42
Gross exterior roof area:	434	434 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	81 %
Minimum outside air:	1.15	1.15 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	4.45 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	83 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	37.4 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	14.3 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	715	
Your Design	403	
	312	<b>43.7%</b>
<b>Energy Savings</b>		
<b>Annual Energy Cost Savings</b>		<b>\$5,528.20</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$15,047.05
Your Design	\$9,518.85
	<b>\$5,528.20 ( 36.7% )</b>

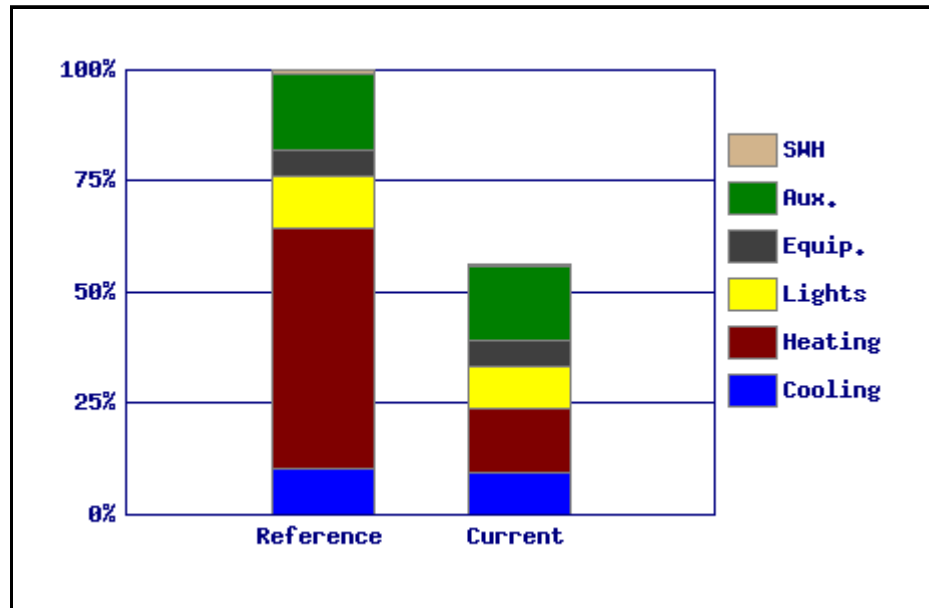
**\*\*Regulated energy costs exclude plug loads (equipment) for LEED.**

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 19,359 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	19,126	0	69	\$2,104

Heating	888	100	103	\$1,702
Lights	18,269	0	66	\$2,010
Equip.	12,130	0	44	\$1,334
Aux.	32,576	0	117	\$3,583
SWH	1,094	0	4	\$120
Totals	84,083	100	403	\$10,853

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	20,311	0	73	\$2,234
Heating	3,254	376	388	\$6,389
Lights	22,995	0	83	\$2,529
Equip.	12,130	0	44	\$1,334
Aux.	33,803	0	122	\$3,718
SWH	1,599	0	6	\$176
Totals	94,092	376	715	\$16,381

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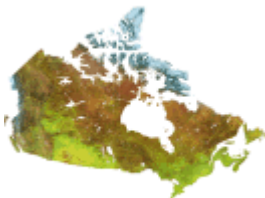


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Office of Energy Efficiency

**Screening Tool For New Building Design**

**Screening Tool Summary**



**Project Description**

Your Project Description:

**Building Profile Summary**

Proposed Building: Office, Small, 5811 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil Fed Distributed Heat Pumps

**Utility Rates**

Your marginal utility rates (including any taxes and fees):

\$ 0.072 per kWh                                      \$ 10.890 per GJ  
 \$ 7.320 per kW                                        \$ 0 per litre oil/propane

**Building Shell**

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	43.55 %
Overall window USI-value:	3.2	2.43 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	2.25 m <sup>2</sup> C/W
Gross exterior wall area:	1565	1565 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	4.82
Gross exterior roof area:	1880	1880 m <sup>2</sup>

**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	0.75	0.75 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	4.08 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	72 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	42.8 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	11.53 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	4,899	
Your Design	2,921	
<hr/>		
Energy Savings	1,978	<b>40.4%</b>
<b>Annual Energy Cost Savings</b>		<b>\$32,714.48</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$91,449.13
Your Design	\$58,898.77
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$32,550.36 ( 35.6% )</b>

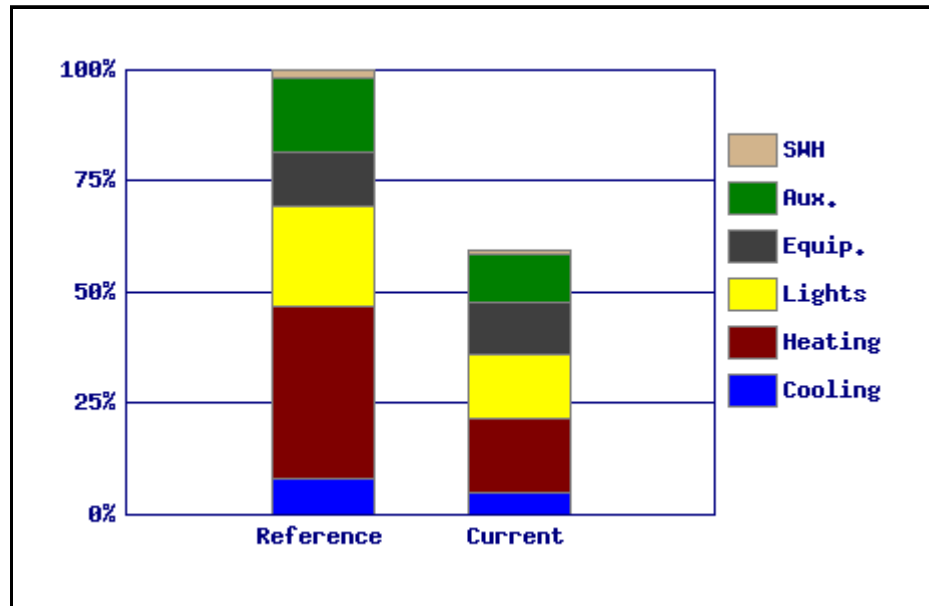
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 152,609 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	68,364	0	246	\$7,636

Heating	106,958	420	805	\$18,668
Lights	197,233	0	710	\$19,277
Equip.	162,419	0	585	\$14,991
Aux.	142,790	0	514	\$12,648
SWH	0	62	62	\$670
Totals	677,765	481	2,921	\$73,890

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	111,149	0	400	\$15,398
Heating	15,509	1,836	1,892	\$21,418
Lights	307,888	0	1,108	\$30,418
Equip.	162,419	0	585	\$15,156
Aux.	227,223	0	818	\$23,167
SWH	0	96	96	\$1,049
Totals	824,189	1,932	4,899	\$106,605

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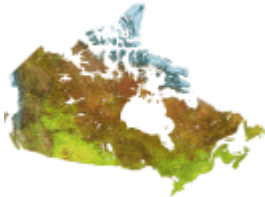


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Office of Energy Efficiency

**Screening Tool For New Building Design**

**Screening Tool Summary**



**Project Description**

Your Project Description:

**Building Profile Summary**

Proposed Building: Office, Large, 22861 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil (Variable Volume)

**Utility Rates**

Your marginal utility rates (including any taxes and fees):

\$ 0.084 per kWh                                      \$ 9.057 per GJ  
 \$ 0.000 per kW                                      \$ 0 per litre oil/propane

**Building Shell**

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	56.83 %
Overall window USI-value:	3.2	2 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.34
Overall wall RSI-value:	1.818	1.68 m <sup>2</sup> C/W
Gross exterior wall area:	9537	9537 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	4.23
Gross exterior roof area:	6534	6534 m <sup>2</sup>

**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	98 %
Minimum outside air:	2.04	2.04 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	75 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	6.16 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	60 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	8.61 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	43,444	
Your Design	23,764	
<hr/>		
Energy Savings	19,680	<b>45.3%</b>
<b>Annual Energy Cost Savings</b>		<b>\$251,060.83</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$526,825.82
Your Design	\$275,764.98
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$251,060.84 ( 47.7% )</b>

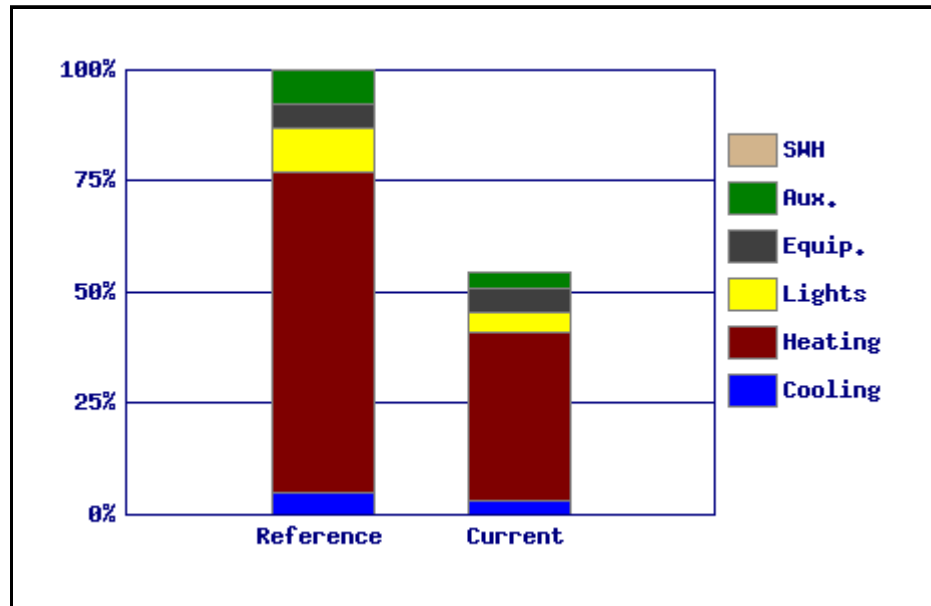
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **6 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 1,504,084 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	358,950	0	1,292	\$30,152

Heating	186,787	15,763	16,435	\$158,426
Lights	579,410	0	2,086	\$48,670
Equip.	638,971	0	2,300	\$53,673
Aux.	451,613	0	1,626	\$37,935
SWH	6,924	0	25	\$582
Totals	2,222,656	15,763	23,764	\$329,438

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	585,755	0	2,109	\$49,203
Heating	256,893	30,340	31,265	\$296,318
Lights	1,211,260	0	4,361	\$101,746
Equip.	638,971	0	2,300	\$53,673
Aux.	933,090	0	3,359	\$78,379
SWH	14,038	0	51	\$1,179
Totals	3,640,007	30,340	43,444	\$580,499

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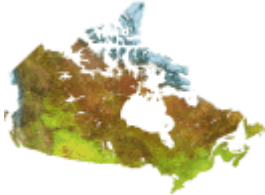


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Office, Large, 116975 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil (Variable Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.110 per kWh                      \$ 10.479 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	54.09 %
Overall window USI-value:	3.2	2.08 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.32
Overall wall RSI-value:	1.818	1.52 m <sup>2</sup> C/W
Gross exterior wall area:	43070	43070 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.69
Gross exterior roof area:	2523	2523 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	89.6 %
Minimum outside air:	0.63	0.63 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	90 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	65.7 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	7.47 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	95,636	
Your Design	66,202	
<hr/>		
Energy Savings	29,433	<b>30.8%</b>
<b>Annual Energy Cost Savings</b>		<b>\$740,903.88</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$1,688,696.72
Your Design	\$947,792.84
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$740,903.88 (43.9%)</b>

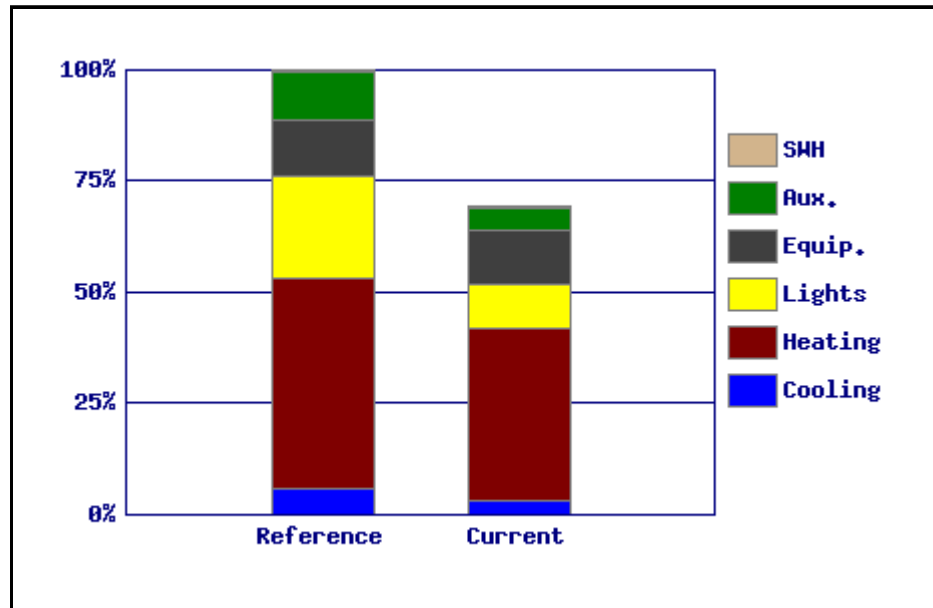
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **5 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 3,640,575 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	858,907	0	3,092	\$94,480

Heating	392,681	35,631	37,044	\$416,499
Lights	2,572,219	0	9,260	\$282,944
Equip.	3,269,479	0	11,770	\$359,642
Aux.	1,366,852	0	4,921	\$150,354
SWH	31,972	0	115	\$3,517
Totals	8,492,110	35,631	66,202	\$1,307,435

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	1,609,436	0	5,794	\$177,038
Heating	374,104	43,522	44,869	\$497,136
Lights	6,197,766	0	22,312	\$681,754
Equip.	3,269,479	0	11,770	\$359,642
Aux.	2,953,345	0	10,632	\$324,868
SWH	71,830	0	259	\$7,901
Totals	14,475,961	43,522	95,636	\$2,048,339

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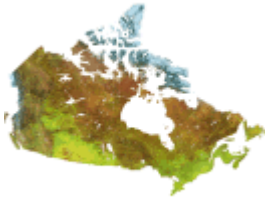


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Office, Large, 133206 m<sup>2</sup>  
 Location: Calgary (A), Alberta  
 Heating System: Fossil (Variable Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.106 per kWh                      \$ 8.900 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	57.8 %
Overall window USI-value:	3.2	2.18 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	1.818	1.01 m <sup>2</sup> C/W
Gross exterior wall area:	47308	47308 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	4.45
Gross exterior roof area:	3658	3658 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	92.9 %
Minimum outside air:	0.71	0.71 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	90 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	6.89 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	61 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	5.04 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	116,278	
Your Design	86,361	
<hr/>		
Energy Savings	29,917	<b>25.7%</b>
<b>Annual Energy Cost Savings</b>		<b>\$783,798.92</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$1,836,092.42
Your Design	\$1,052,293.47
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$783,798.95 ( 42.7% )</b>

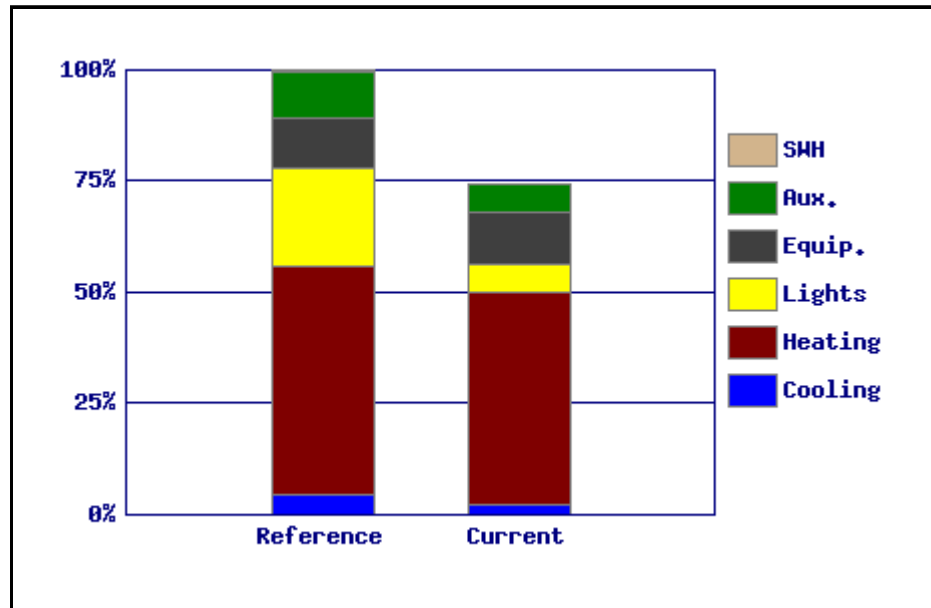
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **5 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 4,029,960 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	779,681	0	2,807	\$82,646

Heating	619,565	53,339	55,569	\$540,298
Lights	1,976,114	0	7,114	\$209,468
Equip.	3,723,139	0	13,403	\$394,652
Aux.	2,034,696	0	7,325	\$215,678
SWH	39,655	0	143	\$4,203
Totals	9,172,849	53,339	86,361	\$1,446,946

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	1,420,325	0	5,113	\$150,554
Heating	497,263	58,064	59,854	\$569,383
Lights	7,057,744	0	25,408	\$748,120
Equip.	3,723,139	0	13,403	\$394,652
Aux.	3,390,235	0	12,205	\$359,365
SWH	81,797	0	294	\$8,670
Totals	16,170,503	58,064	116,278	\$2,230,745

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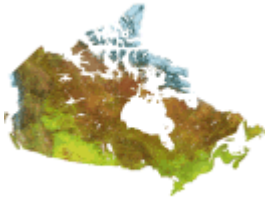


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: School, 12127 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil (Constant Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.080 per kWh                      \$ 11.369 per GJ  
 \$ 5.010 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	26.2	26.2 %
Overall window USI-value:	3.2	2.07 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	1.818	1.72 m <sup>2</sup> C/W
Gross exterior wall area:	3636	3636 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.47
Gross exterior roof area:	6233	6233 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	1.55	1.55 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	68.2 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	41.5 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	9.27 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	14,366	
Your Design	8,893	
	<hr/>	
Energy Savings	5,473	<b>38.1%</b>
<b>Annual Energy Cost Savings</b>		<b>\$81,556.94</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$243,423.16
Your Design	\$161,866.22
	<hr/>
<b>Regulated Energy Cost Savings**</b>	<b>\$81,556.94 ( 33.5% )</b>

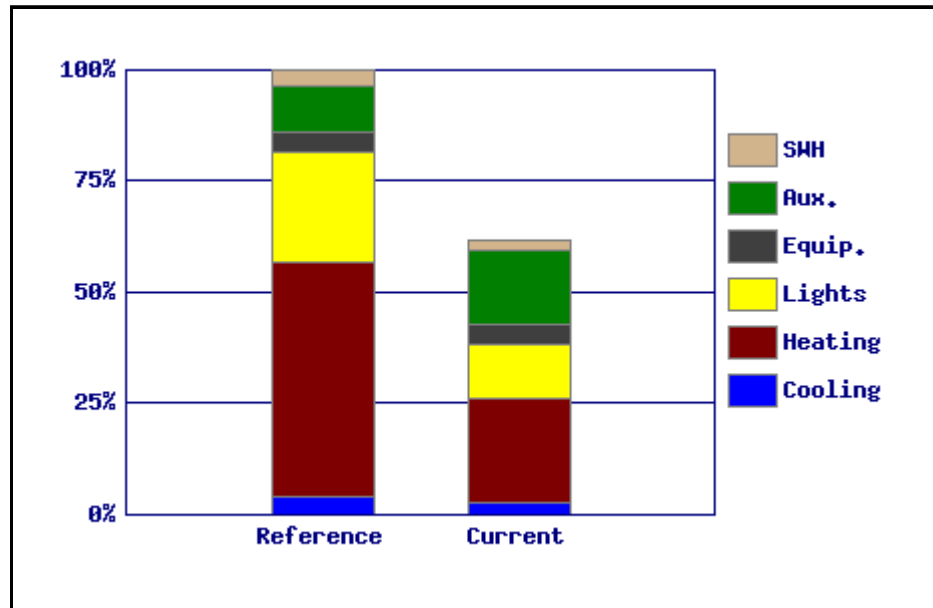
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 394,815 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	103,569	0	373	\$12,216

Heating	27,886	3,283	3,383	\$39,785
Lights	480,216	0	1,729	\$44,649
Equip.	182,237	0	656	\$17,828
Aux.	675,836	0	2,433	\$61,584
SWH	0	320	320	\$3,632
Totals	1,469,744	3,602	8,893	\$179,694

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	156,963	0	565	\$18,012
Heating	60,966	7,345	7,564	\$88,910
Lights	989,423	0	3,562	\$91,985
Equip.	182,237	0	656	\$17,828
Aux.	409,095	0	1,473	\$38,307
SWH	0	546	546	\$6,209
Totals	1,798,684	7,891	14,366	\$261,251

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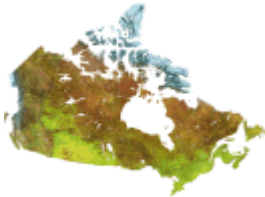


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Office, Large, 7451 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil (Variable Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.080 per kWh                      \$ 11.535 per GJ  
 \$ 8.960 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	44.13 %
Overall window USI-value:	3.2	2 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	1.818	1.27 m <sup>2</sup> C/W
Gross exterior wall area:	3948	3948 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	2.99
Gross exterior roof area:	2440	2440 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85.5 %
Minimum outside air:	0.74	0.74 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	7.03 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	35 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	94 %
Service water savings:	0	52.6 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	9.73 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	13,034	
Your Design	8,583	
	<hr/>	
Energy Savings	4,451	<b>34.2%</b>
<b>Annual Energy Cost Savings</b>		<b>\$77,571.02</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$229,098.24
Your Design	\$151,527.22
	<hr/>
<b>Regulated Energy Cost Savings**</b>	<b>\$77,571.02 ( 33.9% )</b>

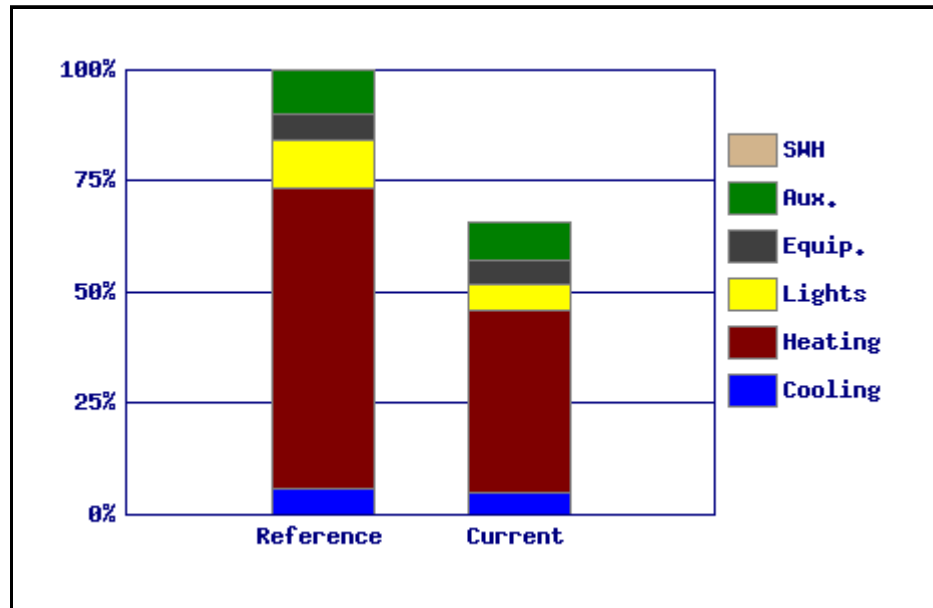
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 327,219 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	182,592	0	657	\$24,628

Heating	52,092	5,116	5,303	\$63,582
Lights	213,398	0	768	\$24,036
Equip.	208,257	0	750	\$22,093
Aux.	304,062	0	1,095	\$39,169
SWH	0	10	10	\$112
Totals	960,402	5,125	8,583	\$173,621

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	218,622	0	787	\$33,513
Heating	73,746	8,532	8,798	\$104,907
Lights	394,781	0	1,421	\$44,561
Equip.	208,257	0	750	\$22,093
Aux.	349,495	0	1,258	\$45,879
SWH	0	21	21	\$237
Totals	1,244,902	8,553	13,034	\$251,192

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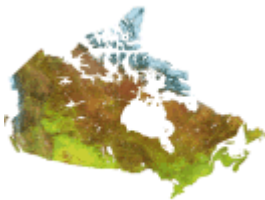


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Multi-Unit Residential, 9457 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil Fed Fan Coils

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.080 per kWh                      \$ 11.371 per GJ  
 \$ 5.010 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	39.6	39.6 %
Overall window USI-value:	3.2	2.01 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.39
Overall wall RSI-value:	1.818	3.27 m <sup>2</sup> C/W
Gross exterior wall area:	4698	4698 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.47
Gross exterior roof area:	1551	1551 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	1.76	1.76 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	3.8 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	65 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	54 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	10	7.85 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Parkade lighting

	Reference <u>Building</u>	Your <u>Design</u>
Parkade floor area:	0	0 m <sup>2</sup>
Average lighting density:	3.2	3.2 W/m <sup>2</sup>
Percent of lighting load with occupancy sensor control:	0	0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	21,428	
Your Design	7,949	
	<hr/>	
Energy Savings	<b>13,479</b>	<b>62.9%</b>

**Annual Energy Cost Savings \$167,492.56**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$279,210.22	
Your Design	\$111,717.66	
	<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$167,492.56</b>	<b>( 60.0% )</b>

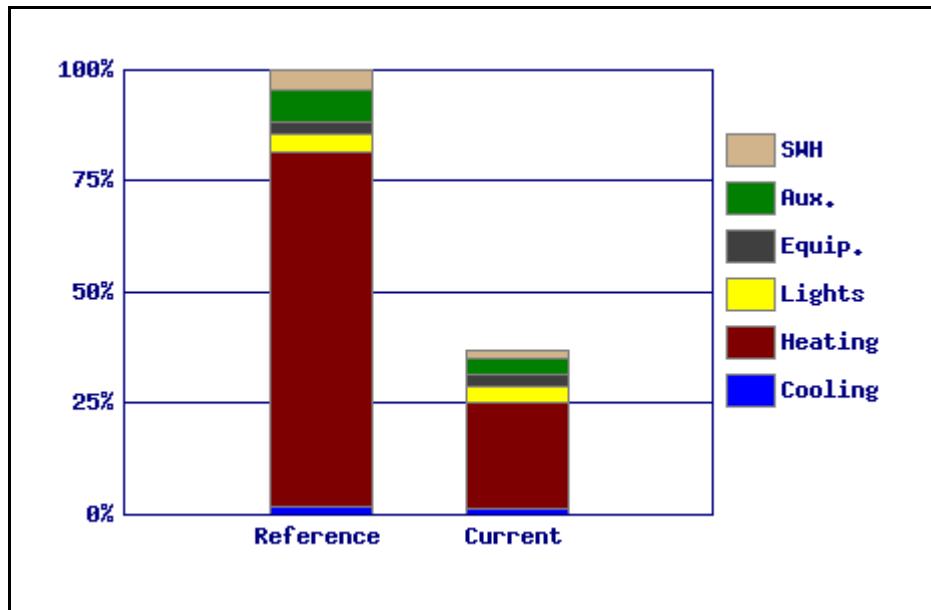
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1 9 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 779,049 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	76,882	0	277	\$8,096
Heating	0	5,127	5,127	\$58,282
Lights	221,980	0	799	\$22,290
Equip.	159,082	0	573	\$14,930
Aux.	207,618	0	747	\$18,197
SWH	0	427	427	\$4,853
Totals	665,563	5,553	7,949	\$126,647

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	104,137	0	375	\$12,005
Heating	0	17,120	17,120	\$194,636
Lights	242,747	0	874	\$24,135
Equip.	159,082	0	573	\$14,930
Aux.	432,882	0	1,558	\$37,885
SWH	0	928	928	\$10,550
Totals	938,849	18,048	21,428	\$294,140

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	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	1.56	1.56 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	50 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	42.8 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	8.7 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	14,279	
Your Design	8,778	
<hr/>		
Energy Savings	5,501	<b>38.5%</b>
<b>Annual Energy Cost Savings</b>		<b>\$89,399.48</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$204,039.76
Your Design	\$114,640.28
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$89,399.48 (43.8%)</b>

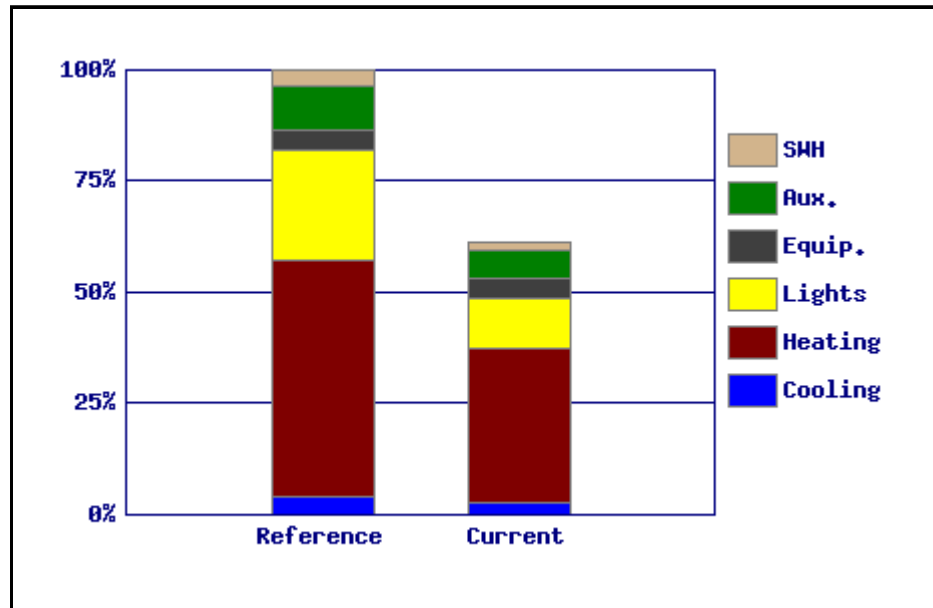
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **5 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 548,434 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	106,866	0	385	\$12,667

Heating	40,326	4,817	4,962	\$33,363
Lights	441,410	0	1,589	\$42,366
Equip.	178,495	0	643	\$17,997
Aux.	248,029	0	893	\$24,356
SWH	0	306	306	\$1,888
Totals	1,015,127	5,123	8,778	\$132,638

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	163,678	0	589	\$18,729
Heating	61,426	7,383	7,604	\$51,175
Lights	969,107	0	3,489	\$93,004
Equip.	178,495	0	643	\$17,997
Aux.	394,149	0	1,419	\$37,832
SWH	0	535	535	\$3,300
Totals	1,766,855	7,918	14,279	\$222,037

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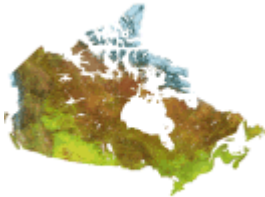


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Project Description

Your Project Description:

#### Building Profile Summary

Proposed Building: Office, Large, 115987 m<sup>2</sup>  
 Location: Toronto (A), Ontario  
 Heating System: Fossil (Variable Volume)

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.133 per kWh                      \$ 10.024 per GJ  
 \$ 0.000 per kW                      \$ 0 per litre oil/propane

#### Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	82.9 %
Overall window USI-value:	3.2	1.81 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.31
Overall wall RSI-value:	1.818	1.64 m <sup>2</sup> C/W
Gross exterior wall area:	39225	39225 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	4.69
Gross exterior roof area:	4333	4333 m <sup>2</sup>

#### Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	0.46	0.46 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	85 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	67 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	10 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is not 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

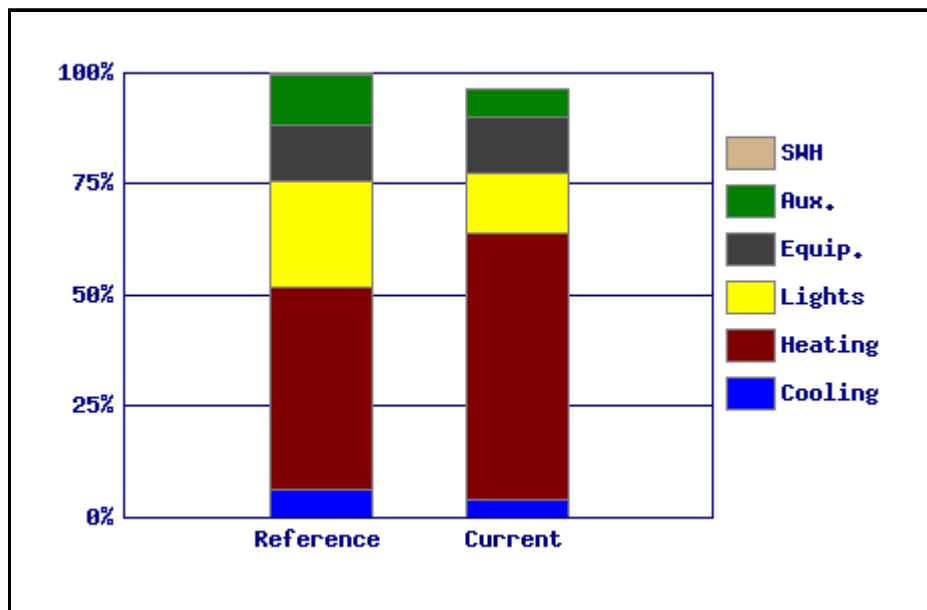
Reference Building	91,712	
Your Design	88,548	
Energy Savings	3,164	<b>3.4%</b>
<b>Annual Energy Cost Savings</b>		<b>\$469,701.65</b>

**LEED® Canada Energy & Atmosphere (EA)**  
*Does not qualify (EA Prerequisite 2 is not satisfied)*

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 1,786,646 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	1,004,365	0	3,616	\$133,580
Heating	458,666	53,406	55,057	\$596,243
Lights	3,414,129	0	12,291	\$454,079
Equip.	3,241,864	0	11,671	\$431,168
Aux.	1,611,815	0	5,803	\$214,371

SWH	30,920	0	111	\$4,112
Totals	9,761,759	53,406	88,548	\$1,833,553

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	1,607,802	0	5,788	\$213,838
Heating	347,635	40,301	41,552	\$450,132
Lights	6,145,419	0	22,123	\$817,340
Equip.	3,241,864	0	11,671	\$431,168
Aux.	2,866,955	0	10,321	\$381,305
SWH	71,223	0	256	\$9,473
Totals	14,280,898	40,301	91,712	\$2,303,255

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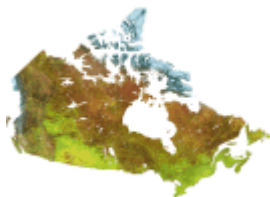
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## Office of Energy Efficiency



### Screening Tool For New Building Design

#### Screening Tool Summary

#### Facility Description for 128-CRJ (CEH)

Your Facility Description:

128-CRJ  
Represented by Curt using two building blocks.

#### Configuration

1. Office, Large, Fossil (Variable Volume) - 95.9%
2. Retail, Strip Mall, Fossil (Constant Volume) - 4.1%

Total Floor Area: 72,000 m<sup>2</sup>

Location: Toronto (A), Ontario

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.070 per kWh	\$ 10.040 per GJ
\$ 7.300 per kW	\$ 0 per litre oil/propane

#### First Building Block

First Building Block: Office, Large, 69055 m<sup>2</sup>  
Heating System: Fossil (Variable Volume)

#### Building Shell (Office, Large)

Slightly higher; I used window U-value from EE4 file (not DOE file).

I traded off since south office were designated as such, but it didn't make much difference.

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	76.2 %
Overall window USI-value:	3.2	2.12 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.26
Overall wall RSI-value:	1.818	0.79 m <sup>2</sup> C/W

A fair bit lower than 4.69 derived from SIM file, but it doesn't make much difference to results.

Gross exterior wall area:	24581	24581 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.52
Gross exterior roof area:	1253	1253 m <sup>2</sup>

**Mechanical System (Office, Large)**

This is the huge difference as the Web Screening Tool blows up the cooling when this is set off! Note that I appreciate the argument for setting it off since the economizer is significantly constrained.

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	0.51	0.51 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	100 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	66 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		Yes

**Lighting (Office, Large)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	6.74 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Office, Large)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block: Retail, Strip Mall, 2945 m<sup>2</sup>  
 Heating System: Fossil (Constant Volume)

### Building Shell (Retail, Strip Mall)

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	40	82.2 %
Overall window USI-value:	3.2	2.12 W/m <sup>2</sup> °C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	0.97 m <sup>2</sup> °C/W
Gross exterior wall area:	1374	1374 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.52
Gross exterior roof area:	251	251 m <sup>2</sup>

### Mechanical System (Retail, Strip Mall)

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	80 %
Minimum outside air:	0.31	0.31 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	2.5	2.5 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80 %
Service water savings:	0	66 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting (Retail, Strip Mall)

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	26.7	17.79 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		

None	0 %
None	0 %

**Process Loads (Retail, Strip Mall)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is not 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	57,304	
Your Design	63,891	
	<hr/>	
Energy Savings	<b>-6,588</b>	<b>-11.5%</b>

**Annual Energy Cost Savings**

**\$162,693.27**

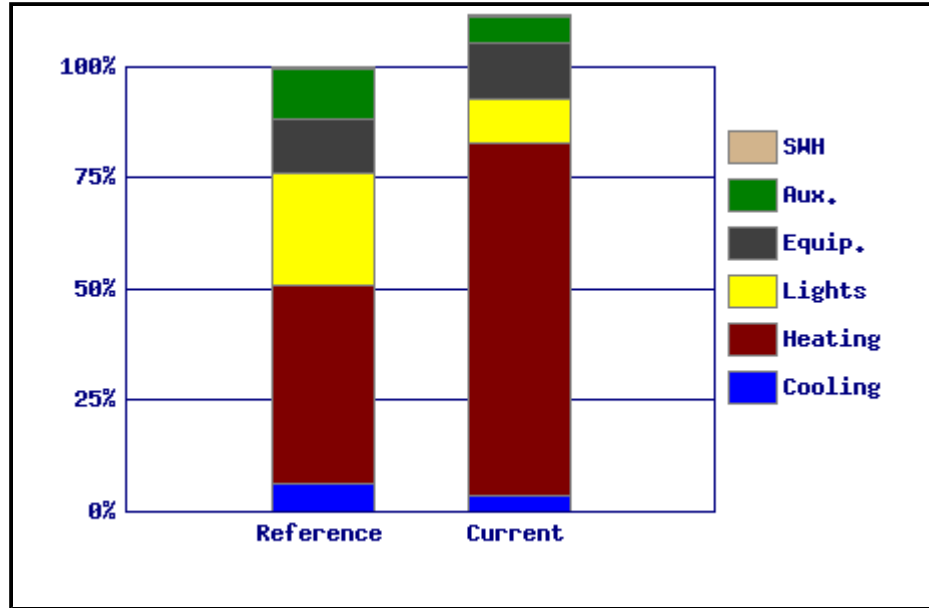
**LEED® Canada Energy & Atmosphere (EA)**

*Does not qualify (EA Prerequisite 2 is not satisfied)*

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 906,141 kg

**Annual Energy Use Comparison**



**Your Design**

Energy Savings  
(vs. Actual Sim)

40% vs 58%

**-76% vs -34%**

60% vs 60%

**46% vs 56%**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	591,110	0	2,128	\$82,738
Heating	362,730	44,180	45,486	\$474,936
Lights	1,572,333	0	5,660	\$150,037
Equip.	1,955,489	0	7,040	\$178,367
Aux.	954,335	0	3,436	\$100,490
SWH	0	142	142	\$1,422
Totals	5,435,997	44,322	63,891	\$987,991

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	982,409	0	3,537	\$132,988
Heating	202,689	25,000	25,730	\$269,933
Lights	3,962,328	0	14,264	\$381,324
Equip.	1,955,489	0	7,040	\$178,398
Aux.	1,774,238	0	6,387	\$184,572

SWH	0	346	346	\$3,469
Totals	8,877,153	25,346	57,304	\$1,150,684

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	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	0.93	0.93 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	3.8 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	57 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	99.1 %
Service water savings:	0	68.7 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		Yes

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	16.9 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	6,816	
Your Design	3,878	
<hr/>		
Energy Savings	2,938	<b>43.1%</b>
<b>Annual Energy Cost Savings</b>		<b>\$53,792.62</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$137,169.46
Your Design	\$83,405.32
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$53,764.14 ( 39.2% )</b>

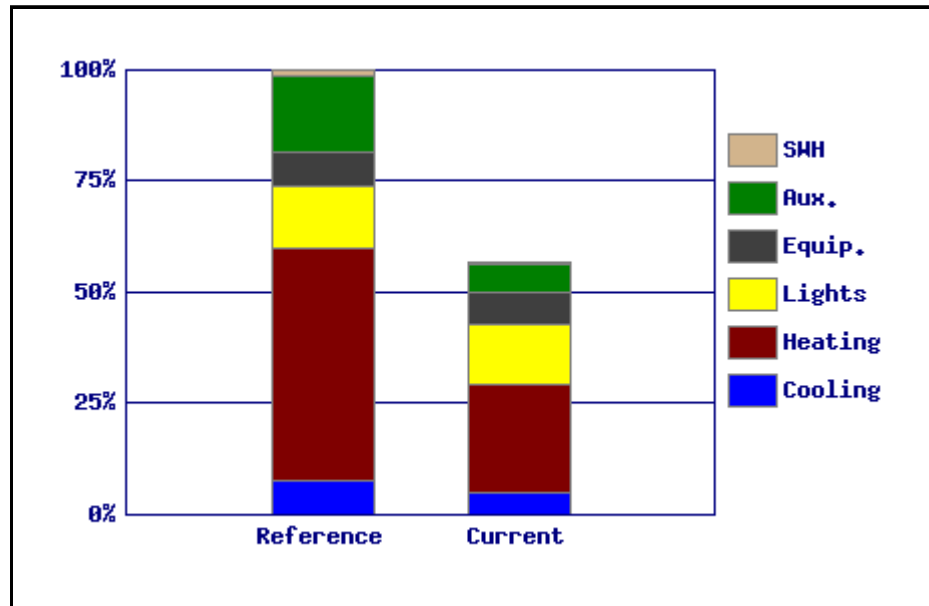
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **4 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 249,120 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	97,209	0	350	\$17,823

Heating	16,791	1,581	1,641	\$18,837
Lights	253,802	0	914	\$30,176
Equip.	142,602	0	513	\$15,721
Aux.	119,887	0	432	\$16,265
SWH	0	29	29	\$305
Totals	630,292	1,609	3,878	\$99,126

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	141,847	0	511	\$25,218
Heating	29,951	3,455	3,563	\$40,002
Lights	270,323	0	973	\$32,182
Equip.	142,602	0	513	\$15,750
Aux.	325,458	0	1,172	\$38,867
SWH	0	85	85	\$901
Totals	910,182	3,540	6,816	\$152,919

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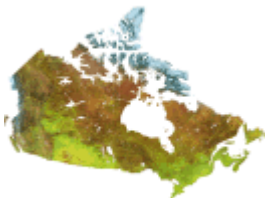


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Office of Energy Efficiency

**Screening Tool For New Building Design**

**Screening Tool Summary**



**Facility Description for 130-312**

Your Facility Description:

**Configuration**

- 1. Office, Small, Fossil Fed Distributed Heat Pumps - 50.5%
- 2. Warehouse, Fossil (Constant Volume) - 49.5%

Total Floor Area: 2,790 m<sup>2</sup>

Location: Whitehorse (A), Yukon Territory

**Utility Rates**

Your marginal utility rates (including any taxes and fees):

\$ 0.120 per kWh	\$ 0 per Liters
\$ 6.900 per kW	\$ 0.846 per litre oil/propane

**First Building Block**

First Building Block: Office, Small, 1410 m<sup>2</sup>  
 Heating System: Fossil Fed Distributed Heat Pumps

**Building Shell (Office, Small)**

	Reference Building	Your Design
Average window-to-wall-area ratio:	17.9	17.9 %
Overall window USI-value:	2.1	1.62 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.703	4.89 m <sup>2</sup> C/W
Gross exterior wall area:	955	955 m <sup>2</sup>
Roof type:	All other	All other

Overall roof RSI-value:	3.448	7.66
Gross exterior roof area:	746	746 m <sup>2</sup>

**Mechanical System (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	0.87	0.87 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	70 %
Percent of floor area cooled:	92	92 %
Cooling efficiency:	5.2	4.2 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	62 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	88 %
Service water savings:	0	25 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	9.5 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block:	Warehouse, 1380 m <sup>2</sup>
Heating System:	Fossil (Constant Volume)

**Building Shell (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	2.7	2.7 %
Overall window USI-value:	2.1	1.84 W/m <sup>2</sup> C
Window shading coefficient:	0.74	0.74
Overall wall RSI-value:	2.703	4.89 m <sup>2</sup> C/W
Gross exterior wall area:	1144	1144 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	7.66
Gross exterior roof area:	1257	1257 m <sup>2</sup>

**Mechanical System (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	85 %
Minimum outside air:	3.04	3.04 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	2.5	2.5 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	63.7 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	88 %
Service water savings:	0	25 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Modulating
Variable speed fans:		No

**Lighting (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	6	8.06 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	5,121	
Your Design	1,715	
	-----	
Energy Savings	<b>3,405</b>	<b>66.5%</b>

**Annual Energy Cost Savings** **\$76,797.34**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$122,704.67	
Your Design	\$45,924.37	
	-----	
<b>Regulated Energy Cost Savings**</b>	<b>\$76,780.30</b>	<b>( 62.6% )</b>

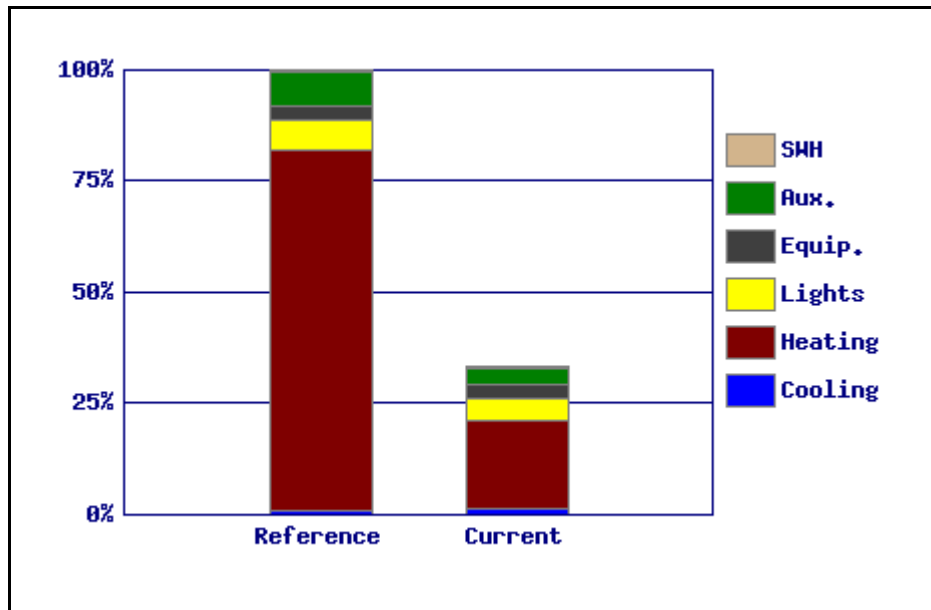
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **9 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 269,085 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	16,733	0	60	\$2,333
Heating	39,330	25,391	1,033	\$25,606
Lights	70,956	0	255	\$10,321
Equip.	43,326	0	156	\$6,077
Aux.	52,840	0	190	\$7,209
SWH	0	600	21	\$456
<b>Totals</b>	<b>223,185</b>	<b>25,991</b>	<b>1,715</b>	<b>\$52,001</b>

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	12,458	0	45	\$2,137
Heating	9,123	117,514	4,156	\$90,697
Lights	98,173	0	353	\$14,320
Equip.	43,326	0	156	\$6,094
Aux.	105,879	0	381	\$14,922
SWH	0	826	29	\$628
<b>Totals</b>	<b>268,959</b>	<b>118,340</b>	<b>5,121</b>	<b>\$128,799</b>

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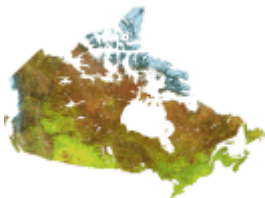


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Office of Energy Efficiency

Screening Tool For New Building Design

Screening Tool Summary



Project Description

Your Project Description:

Building Profile Summary

Proposed Building: Extended Care, 463 m<sup>2</sup>  
 Location: Whitehorse (A), Yukon Territory  
 Heating System: Fossil (Constant Volume)

Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.095 per kWh                      \$ 0 per Liters  
 \$ 6.790 per kW                      \$ 0.775 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	8.4	8.4 %
Overall window USI-value:	2.1	2.17 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.74
Overall wall RSI-value:	2.703	3.83 m <sup>2</sup> C/W
Gross exterior wall area:	453	453 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	3.448	8.81
Gross exterior roof area:	278	278 m <sup>2</sup>

Mechanical System

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	84.2 %
Minimum outside air:	1.2	1.2 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	2.5	4.59 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	68.1 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	16.6	14.17 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	1,158	
Your Design	704	
	455	<b>39.2%</b>
<b>Annual Energy Cost Savings</b>		<b>\$9,363.26</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$25,932.46
Your Design	\$16,562.88
	<b>\$9,369.58 ( 36.1% )</b>

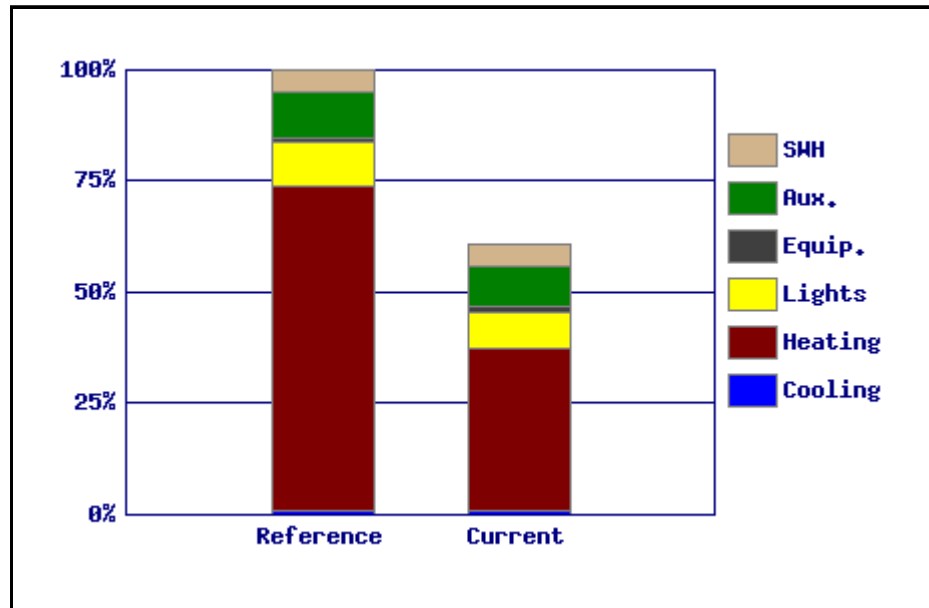
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 36,369 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	3,021	0	11	\$406

Heating	0	11,977	420	\$8,344
Lights	26,364	0	95	\$2,937
Equip.	4,230	0	15	\$469
Aux.	29,583	0	106	\$3,167
SWH	15,607	0	56	\$1,709
Totals	78,805	11,977	704	\$17,032

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	2,812	0	10	\$444
Heating	0	24,132	847	\$16,811
Lights	30,886	0	111	\$3,445
Equip.	4,230	0	15	\$463
Aux.	33,050	0	119	\$3,525
SWH	15,607	0	56	\$1,708
Totals	86,585	24,132	1,158	\$26,395

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	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	84.9 %
Minimum outside air:	0.92	0.92 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	68	68 %
Cooling efficiency:	5.2	4.9 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	55.2 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	86.5 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	30	19.18 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	1,757	
Your Design	1,154	
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Energy Savings	<b>603</b>	<b>34.3%</b>
<b>Annual Energy Cost Savings</b>		<b>\$8,676.64</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$28,910.94
Your Design	\$20,234.30
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<b>Regulated Energy Cost Savings**</b>	<b>\$8,676.64 ( 30.0% )</b>

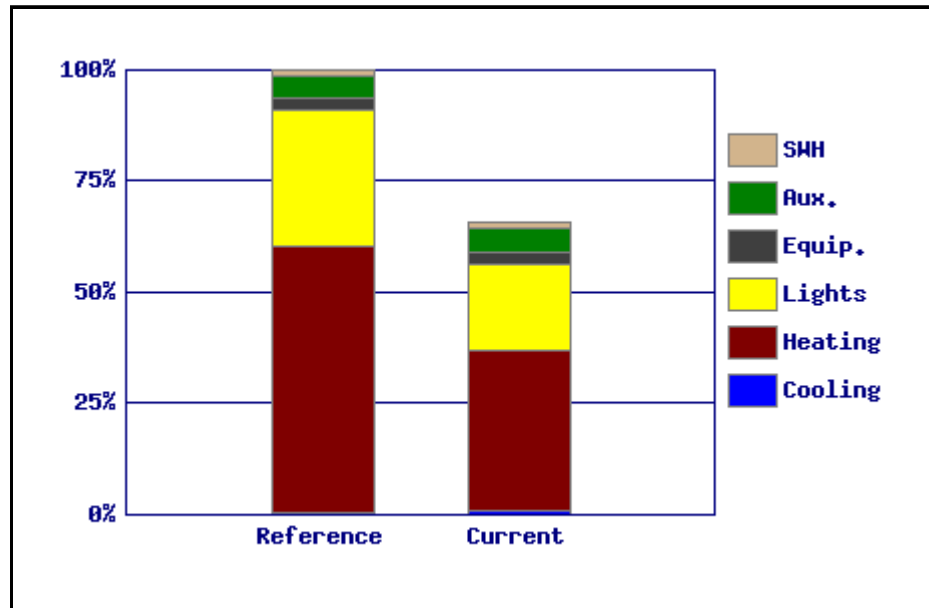
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **2 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 54,443 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	5,032	0	18	\$568

Heating	23,414	15,505	628	\$8,952
Lights	95,489	0	344	\$8,186
Equip.	12,432	0	45	\$1,066
Aux.	27,188	0	98	\$2,264
SWH	0	611	21	\$263
Totals	163,555	16,116	1,154	\$21,300

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	2,225	0	8	\$330
Heating	8,532	29,225	1,056	\$13,335
Lights	149,355	0	538	\$12,803
Equip.	12,432	0	45	\$1,066
Aux.	24,265	0	87	\$2,158
SWH	0	661	23	\$285
Totals	196,809	29,886	1,757	\$29,977

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	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	87 %
Minimum outside air:	0.95	0.95 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	0	0 %
Cooling efficiency:	5.2	5.2 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	53.4 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	100 %
Service water savings:	0	0 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		On/Off
Variable speed fans:		No

### Lighting

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	8.22 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

### Process Loads

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

### Building Performance Results

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

### Current Design Performance

#### Annual Energy Use (GJ)

Reference Building	5,619	
Your Design	3,429	
<hr/>		
Energy Savings	2,190	<b>39.0%</b>
<b>Annual Energy Cost Savings</b>		<b>\$56,551.74</b>

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$156,736.78
Your Design	\$100,185.04
<hr/>	
<b>Regulated Energy Cost Savings**</b>	<b>\$56,551.74 (36.1%)</b>

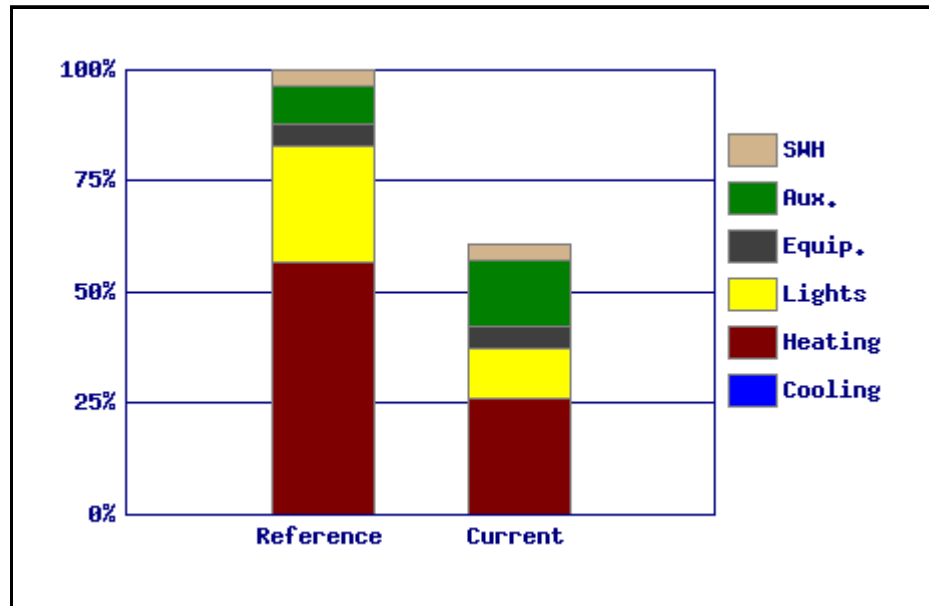
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **3 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 204,273 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0

Heating	13,197	40,676	1,475	\$30,943
Lights	176,317	0	635	\$26,607
Equip.	75,452	0	272	\$12,117
Aux.	232,660	0	838	\$34,088
SWH	58,407	0	210	\$8,547
Totals	556,033	40,676	3,429	\$112,302

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel Liters	Total Energy GJ	Costs
Cooling	0	0	0	\$0
Heating	25,836	88,223	3,189	\$66,912
Lights	409,655	0	1,475	\$61,811
Equip.	75,452	0	272	\$12,117
Aux.	131,573	0	474	\$19,640
SWH	58,407	0	210	\$8,374
Totals	700,924	88,223	5,619	\$168,853

### Disclaimer

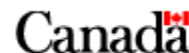
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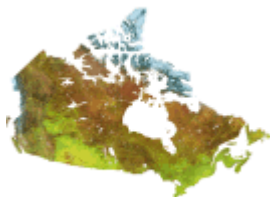
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## Office of Energy Efficiency



### Screening Tool For New Building Design

#### Screening Tool Summary

#### Facility Description for 134-368

Your Facility Description:

134-368: Split into two block to represent portion of estimated heating load met by GSHP and gas heat, respectively.

#### Configuration

1. School, Ground-Source Heat Pumps - 60.2%
2. School, Fossil (Variable Volume) - 39.8%

Total Floor Area: 10,300 m<sup>2</sup>

Location: Vancouver (A), British Columbia

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.072 per kWh	\$ 9.700 per GJ
\$ 0.000 per kW	\$ 0 per litre oil/propane

#### First Building Block

First Building Block: School, 6200 m<sup>2</sup>  
 Heating System: Ground-Source Heat Pumps

#### Building Shell (School)

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	34	34 %
Overall window USI-value:	3.2	2.38 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.52 m <sup>2</sup> C/W

Gross exterior wall area:	4719	4719 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	2.39
Gross exterior roof area:	4366	4366 m <sup>2</sup>

**Mechanical System (School)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	90 %
Minimum outside air:	1.28	1.28 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	90 %
Percent of floor area cooled:	7.8	7.8 %
Cooling efficiency:	5.2	2.56 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	42.8 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	90 %
Service water savings:	0	44 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		Yes

**Lighting (School)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	12.92 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
Occupancy sensor		39.3 %
None		0 %

**Process Loads (School)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block: School, 4100 m<sup>2</sup>

Heating System: Fossil (Variable Volume)

### Building Shell (School)

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	34	34 %
Overall window USI-value:	3.2	2.38 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.52 m <sup>2</sup> C/W
Gross exterior wall area:	4719	4719 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	2.39
Gross exterior roof area:	4366	4366 m <sup>2</sup>

### Mechanical System (School)

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	90 %
Minimum outside air:	1.28	1.28 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	90 %
Percent of floor area cooled:	7.8	7.8 %
Cooling efficiency:	5.2	2.56 COP
Outdoor air economizer?	Yes	Yes
Efficiency of exhaust air heat recovery:	0	42.8 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	90 %
Service water savings:	0	44 %

Mechanical Efficiency Options (only applies to Your Design):

Heating plant option:	Condensing
Variable speed fans:	Yes

### Lighting (School)

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	19.1	12.92 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
Occupancy sensor		39.3 %

None 0 %

**Process Loads (School)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	13,026	
Your Design	5,647	
Energy Savings	<b>7,379</b>	<b>56.6%</b>

**Annual Energy Cost Savings \$84,292.71**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$168,001.85	
Your Design	\$84,292.40	
<b>Regulated Energy Cost Savings**</b>	<b>\$83,709.45</b>	<b>( 49.8% )</b>

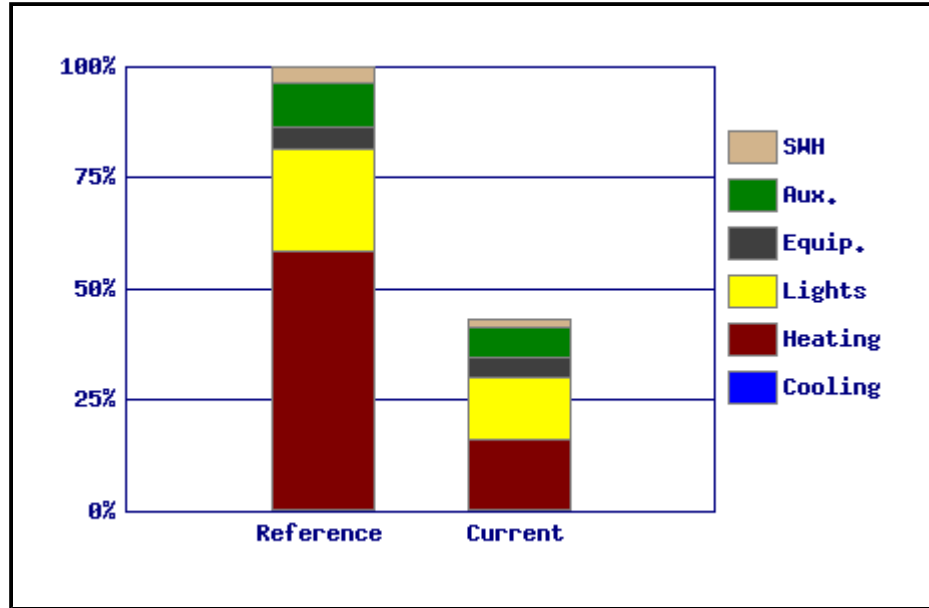
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1 6 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 496,224 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	11,036	0	40	\$795
Heating	176,495	1,442	2,077	\$26,689
Lights	501,445	0	1,805	\$36,104
Equip.	160,139	0	577	\$11,530
Aux.	257,939	0	929	\$18,572
SWH	0	220	220	\$2,133
Totals	1,107,055	1,662	5,647	\$95,822

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	8,466	0	30	\$610
Heating	62,705	7,363	7,588	\$75,918
Lights	840,361	0	3,025	\$60,506
Equip.	168,240	0	606	\$12,113
Aux.	370,615	0	1,334	\$26,684

SWH	0	442	442	\$4,284
Totals	1,450,387	7,804	13,026	\$180,115

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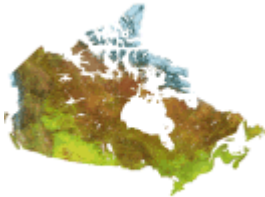


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## Office of Energy Efficiency

### Screening Tool For New Building Design

#### Screening Tool Summary



#### Facility Description for 135-356

Your Facility Description:

#### Configuration

- Office, Small, Fossil Fed Fan Coils - 84.3%
- Warehouse, Fossil (Constant Volume) - 15.7%

Total Floor Area: 3,850 m<sup>2</sup>

Location: Ottawa (A), Ontario

#### Utility Rates

Your marginal utility rates (including any taxes and fees):

\$ 0.061 per kWh	\$ 8.670 per GJ
\$ 6.800 per kW	\$ 0 per litre oil/propane

#### First Building Block

First Building Block: Office, Small, 3246 m<sup>2</sup>

Heating System: Fossil Fed Fan Coils

#### Building Shell (Office, Small)

	Reference Building	Your Design
Average window-to-wall-area ratio:	28	28 %
Overall window USI-value:	3.2	3.2 W/m <sup>2</sup> C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	2.51 m <sup>2</sup> C/W
Gross exterior wall area:	1182	1182 m <sup>2</sup>
Roof type:	All other	All other

Overall roof RSI-value:	2.128	5.68
Gross exterior roof area:	3298	3298 m <sup>2</sup>

**Mechanical System (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	90.2 %
Minimum outside air:	0.91	0.91 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	CO2 sensor
Percent of outside air controlled by DCV:	0	100 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	3.8	3.05 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	62 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80.2 %
Service water savings:	0	63 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		No

**Lighting (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	6.69 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Office, Small)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Second Building Block**

Second Building Block:	Warehouse, 604 m <sup>2</sup>
Heating System:	Fossil (Constant Volume)

**Building Shell (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Average window-to-wall-area ratio:	3.6	3.6 %
Overall window USI-value:	3.2	1.94 W/m <sup>2</sup> C
Window shading coefficient:	0.74	0.736
Overall wall RSI-value:	1.818	2.51 m <sup>2</sup> C/W
Gross exterior wall area:	239	239 m <sup>2</sup>
Roof type:	All other	All other
Overall roof RSI-value:	2.128	5.68
Gross exterior roof area:	604	604 m <sup>2</sup>

**Mechanical System (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	90.2 %
Minimum outside air:	0.04	0.04 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	2.5	3.05 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	62 %
Service water heating fuel type:	Fossil	Fossil
Service water heating efficiency:	80	80.2 %
Service water savings:	0	63 %
Mechanical Efficiency Options (only applies to Your Design):		
Heating plant option:		Condensing
Variable speed fans:		No

**Lighting (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	6	5.18 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

**Process Loads (Warehouse)**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	0	0
Percent served by electricity:	0	0 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	4,084	
Your Design	2,012	
	-----	
Energy Savings	<b>2,072</b>	<b>50.7%</b>

**Annual Energy Cost Savings** **\$30,671.56**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$57,537.90	
Your Design	\$26,878.46	
	-----	
<b>Regulated Energy Cost Savings**</b>	<b>\$30,659.44</b>	<b>( 53.3% )</b>

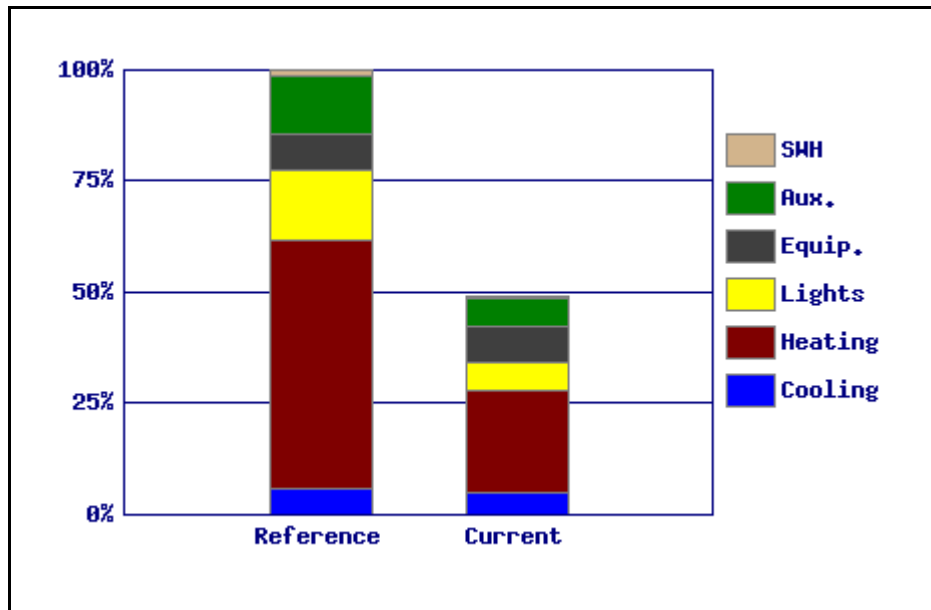
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **7 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 179,055 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	54,621	0	197	\$6,096
Heating	6,955	911	937	\$8,394
Lights	72,790	0	262	\$6,238
Equip.	92,440	0	333	\$7,479
Aux.	71,529	0	258	\$5,921
SWH	0	27	27	\$230
<b>Totals</b>	<b>298,335</b>	<b>938</b>	<b>2,012</b>	<b>\$34,357</b>

**Reference Building**

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	68,321	0	246	\$8,405
Heating	16,414	2,209	2,268	\$20,317
Lights	182,256	0	656	\$15,701
Equip.	92,440	0	333	\$7,491
Aux.	145,651	0	524	\$12,628
SWH	0	56	56	\$487
<b>Totals</b>	<b>505,082</b>	<b>2,266</b>	<b>4,084</b>	<b>\$65,029</b>

**Disclaimer**

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**Mechanical System**

	Reference <u>Building</u>	Your <u>Design</u>
Heating efficiency:	80	350 %
Minimum outside air:	1.13	1.13 l/s/m <sup>2</sup>
Demand control ventilation (DCV) type:	None	None
Percent of outside air controlled by DCV:	0	0 %
Percent of floor area cooled:	100	100 %
Cooling efficiency:	5.2	2.83 COP
Outdoor air economizer?	No	No
Efficiency of exhaust air heat recovery:	0	0 %
Service water heating fuel type:	Electric	Electric
Service water heating efficiency:	100	142 %
Service water savings:	0	30 %
Mechanical Efficiency Options (only applies to Your Design):		
Variable speed fans:		No

**Lighting**

	Reference <u>Building</u>	Your <u>Design</u>
Average lighting density:	18	8.1 W/m <sup>2</sup>
Lighting controls (select if applicable and enter floor area):		
Daylighting (continuous dimming)		20 %
Occupancy sensor		10 %

**Process Loads**

	Reference <u>Building</u>	Your <u>Design</u>
Average process load density:	69	69
Percent served by electricity:	100	100 %

**Building Performance Results**

Based on the information you provided, your building design is at least 25% more energy efficient than the reference building that meets the Model National Energy Code for Buildings.

**Current Design Performance**

**Annual Energy Use (GJ)**

Reference Building	82,439
Your Design	39,778

Energy Savings (with Process Loads)	<b>42,661</b>	<b>51.7%</b>
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**Annual Energy Cost Savings** **\$492,254.27**

**LEED® Canada Energy & Atmosphere (EA)**

Reference Building	\$914,130.63
Your Design	\$421,876.33

**Regulated Energy Cost Savings\*\*** **\$492,254.30 ( 53.8% )**

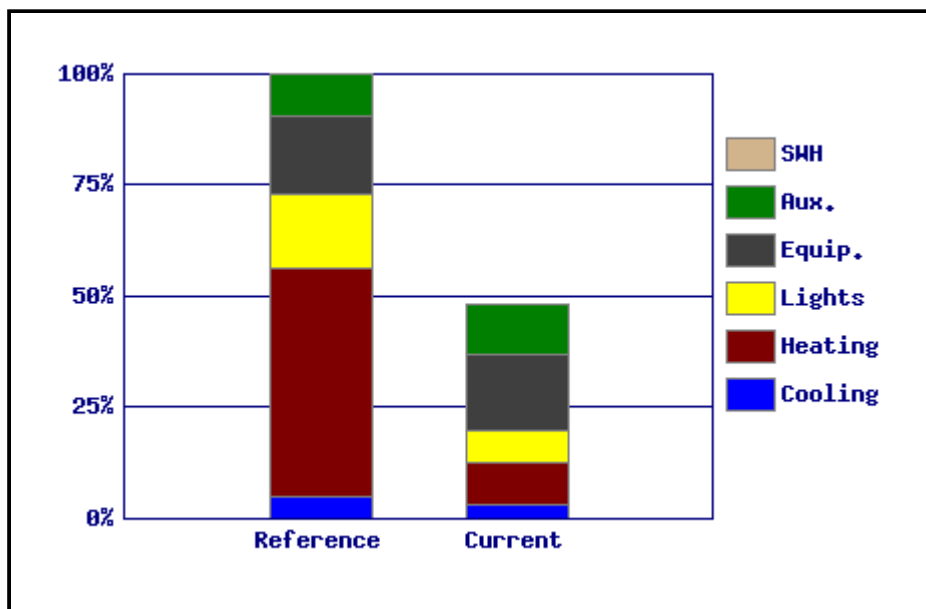
\*\*Regulated energy costs exclude plug loads (equipment) for LEED.

**LEED Canada EA Credit 1** **7 points**

**Emissions Savings**

Carbon Dioxide (CO<sub>2</sub>) 2,305,195 kg

**Annual Energy Use Comparison**



**Your Design**

Annual Energy and Costs

End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	709,250	0	2,553	\$42,555
Heating	2,209,082	0	7,953	\$132,545
Lights	1,570,876	0	5,655	\$94,252
Equip.	4,018,295	0	14,466	\$241,098
Aux.	2,518,695	0	9,067	\$151,122
SWH	23,376	0	84	\$1,403
Totals	11,049,574	0	39,778	\$662,974

### Reference Building

Annual Energy and Costs				
End Use	Electricity kWh	Fossil Fuel GJ	Total Energy GJ	Costs
Cooling	1,128,364	0	4,062	\$67,702
Heating	346,048	41,153	42,398	\$487,880
Lights	3,836,019	0	13,810	\$230,161
Equip.	4,018,295	0	14,466	\$241,097
Aux.	2,095,340	0	7,543	\$125,720
SWH	44,458	0	160	\$2,667
Totals	11,468,524	41,153	82,439	\$1,155,228

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