REPORT

Verification Analysis of Natural Resources Canada's Screening Tool

prepared for

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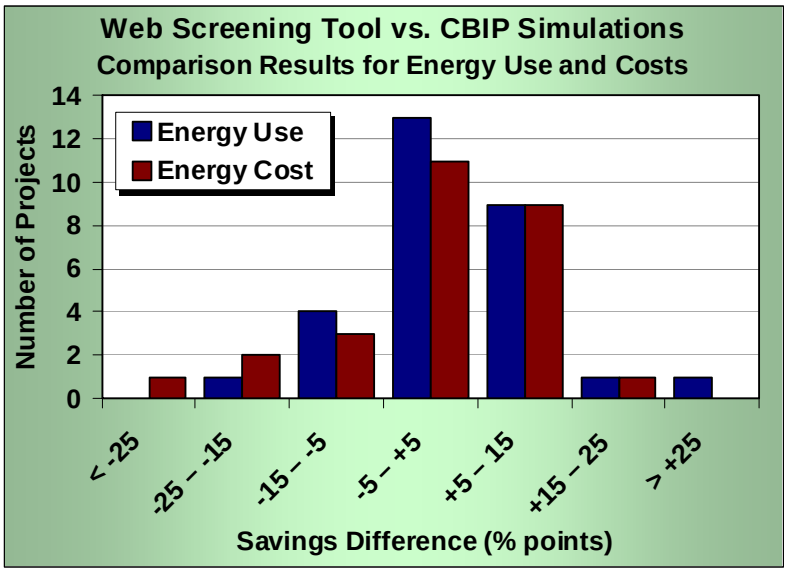
EXECUTIVE SUMMARY

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 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. The CBIP approach of requiring 25% savings on energy use is the main basis used by LEED Canada.

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 accuracy in comparison to detailed energy performance compliance modelling.

The verification effort involved entering a sampling of 29 CBIP projects into the Screening Tool, and evaluating how well the energy and cost savings compared to the original simulations. The identified projects were weighted toward buildings located in the Canadian North or in relatively cold climates, and included ten identifiable building types, ranging in size from 268 m² to 60,000 m². 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. The adjacent figure illustrates that the Screening Tool was within ±15% points for (1) 90% for projects based on energy use savings and (2) nearly 80% of the projects based on energy cost savings. The overall discrepancy on savings averaged +2.8% for energy use and -0.1% 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 90% of the projects within ±2 LEED points.

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INTRODUCTION

The Yukon Government is embarking on an initiative to influence designers to adopt the principals 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)[1]. 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." Often 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.

[1] 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).

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 skewed based on our in-depth knowledge of the background assumptions for 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 roughly 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).

METHODOLOGY

In summary, the verification effort involved taking a sampling of CBIP projects, entering them into the Screening Tool, 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 provided by 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 a few older ones employed mainly the DOE2.1e engine used by EE4. 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.

We used projects that were readily available to us from our own modelling efforts or from verifications we performed on behalf of CBIP. Because of the limited scope and schedule, this study could not allow for a statistically valid sampling, but the objective was to include as many projects as possible to get an initial indication as to the Screening Tool's relative accuracy. From our direct access to well over a hundred projects, we identified 29 projects in the verification study (four more than originally intended). 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 (nine of the projects were in the Territories or Nunavut).

Most of the projects were submitted to NRCan for evaluation under their CBIP program, but several were not submitted to NRCan due to timing with discontinuation of the program incentives. Finally, about four projects were simulated for submission directly to LEED and were 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.

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

Project ID	Floor Area (m^2)	Building Type(s)		Location
		Simulation	Screening Tool	City
001-225	60,000	Hospital	Hospital	Abbotsford, 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

Of the selected projects, 10 different building type functions were represented, ranging in size from 268 m^2 to 60,000 m^2. These building types are listed below, along with the occurrence of each.

- Extended care (3)
- Hospital (1)
- Multi-unit Residential (1)
- Office, Large (4)
- Office, Small[2] (3)
- School (10)[2]
- Dormitory (2)
- Police Station (1)
- Recreation Centre (3)
- Shelter (2)

Note that the Screening Tool allows for direct evaluation of only a select list of building types, including extended care, hospital, multiunit residential, large and small offices, and schools. It does not include dormitory, police station, recreation centre, or shelter

[2] One building was a university building with half office and half school building type functions.

building types. We represented these building types using what we assessed to be the closest building type(s) available (note that the Screening Tool allows for a building to broken into up to two major building type blocks).

DATA PREPARATION AND INPUT

As the Screening Tool is a simplified modelling application, it requires significantly less 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 average characteristics for similar schools in the limited sampling used in this study. Screen captures for this example are presented in the following figures to show the Screening Tool inputs. (Note that inputs and results from the 29 actual buildings in the study can be found in Appendix A.)

Figure 1. Sample Configuration and Rate Input Screen

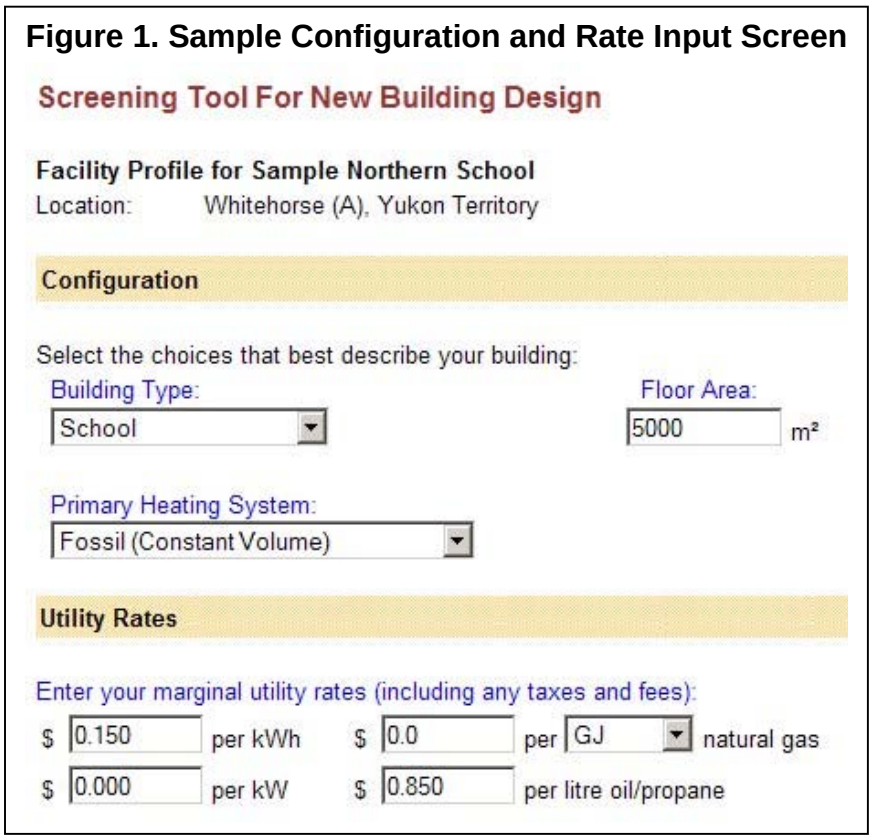
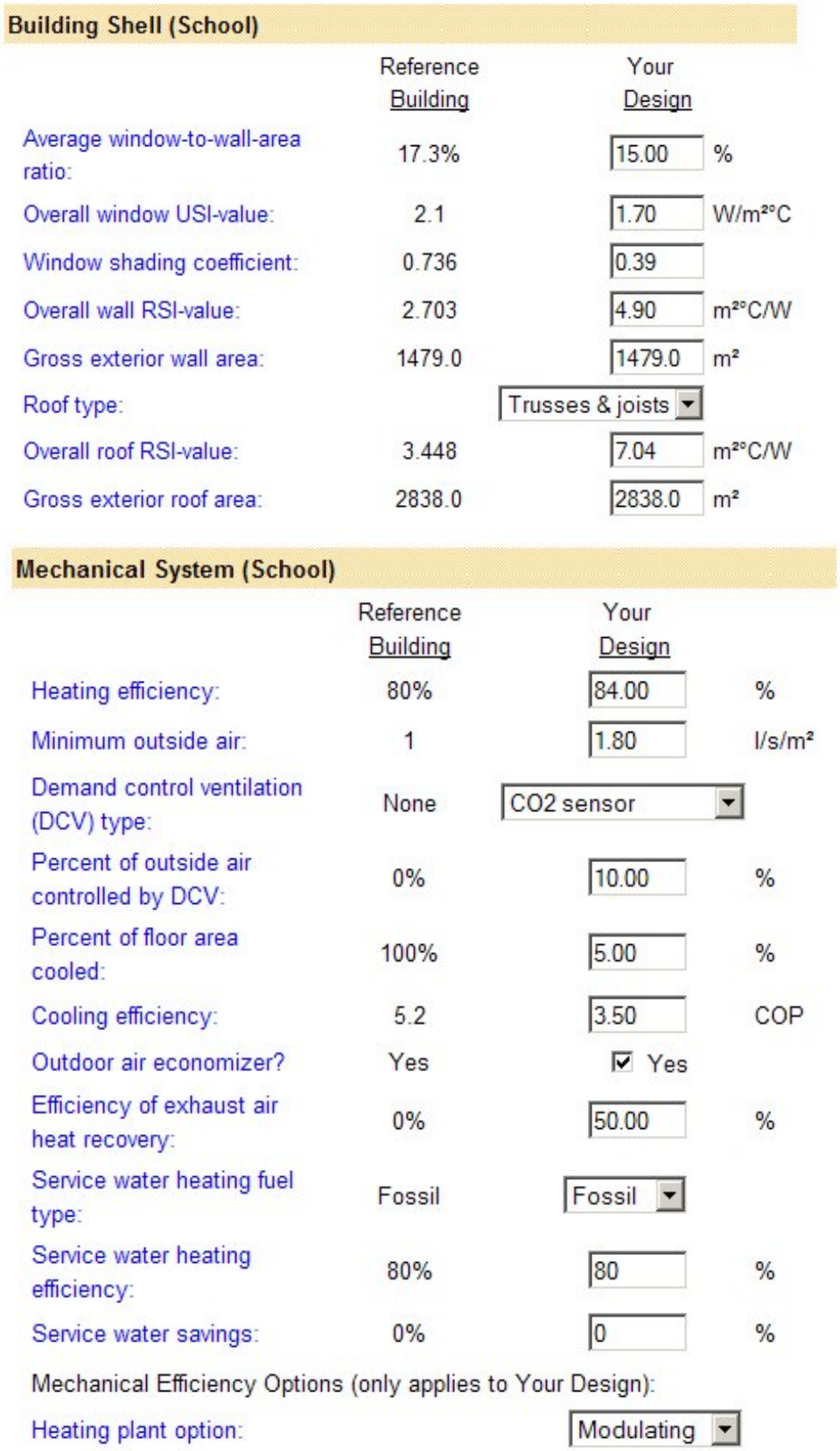


Figure 2. Sample Building Characteristics Input Screen



Building Shell (School)

	Reference Building	Your Design	
Average window-to-wall-area ratio:	17.3%	15.00	%
Overall window USI-value:	2.1	1.70	W/m²°C
Window shading coefficient:	0.736	0.39	
Overall wall RSI-value:	2.703	4.90	m²°C/W
Gross exterior wall area:	1479.0	1479.0	m²
Roof type:		Trusses & joists	
Overall roof RSI-value:	3.448	7.04	m²°C/W
Gross exterior roof area:	2838.0	2838.0	m²

Mechanical System (School)

	Reference Building	Your Design	
Heating efficiency:	80%	84.00	%
Minimum outside air:	1	1.80	l/s/m²
Demand control ventilation (DCV) type:	None	CO2 sensor	
Percent of outside air controlled by DCV:	0%	10.00	%
Percent of floor area cooled:	100%	5.00	%
Cooling efficiency:	5.2	3.50	COP
Outdoor air economizer?	Yes	☑ Yes	
Efficiency of exhaust air heat recovery:	0%	50.00	%
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

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

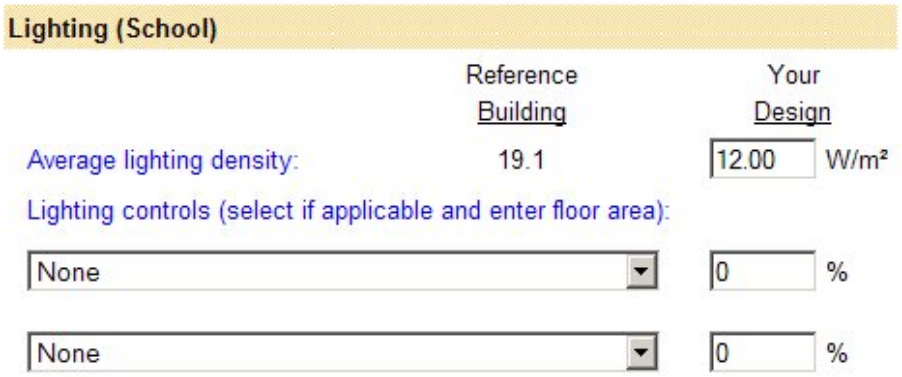


Figure 3 presents the results from the Web Screening Tool for the typical school. As shown, the design satisfied the LEED Canada EAp2 requirement since it resulted in well over 25% energy use savings. This qualified the sample school for 4 EAc1 points.

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

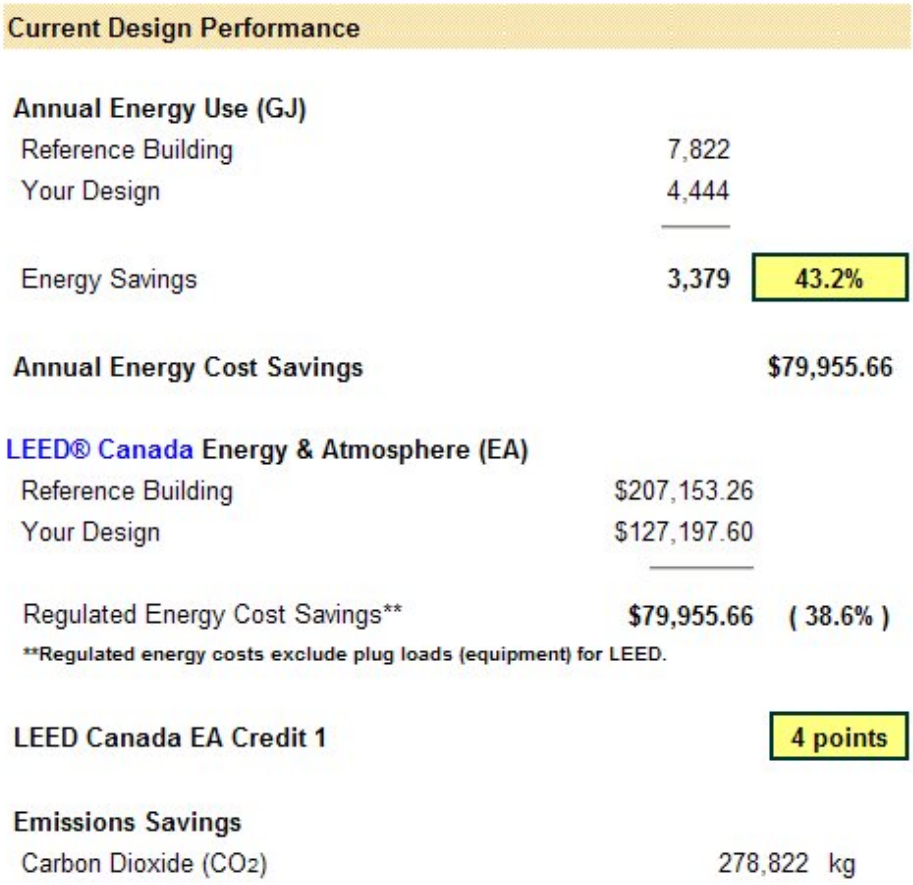
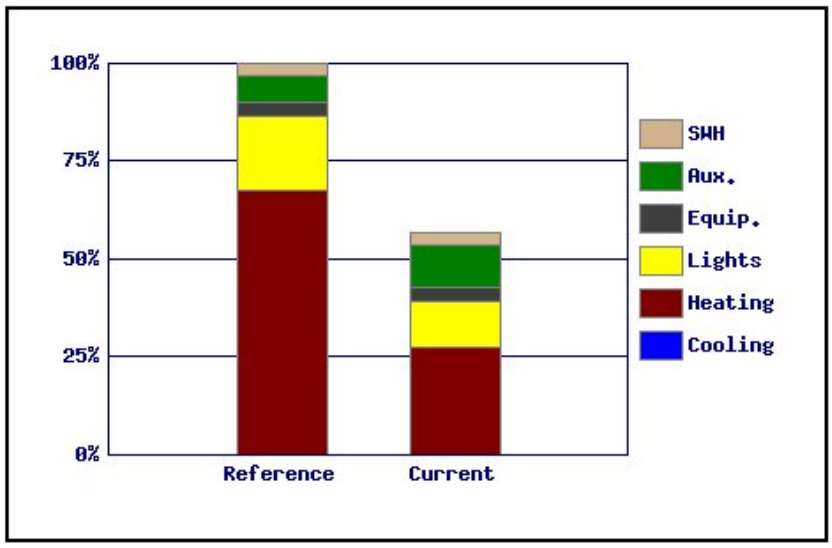


Figure 3. Sample Building Results Screen (cont.)

Annual Energy Use Comparison



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

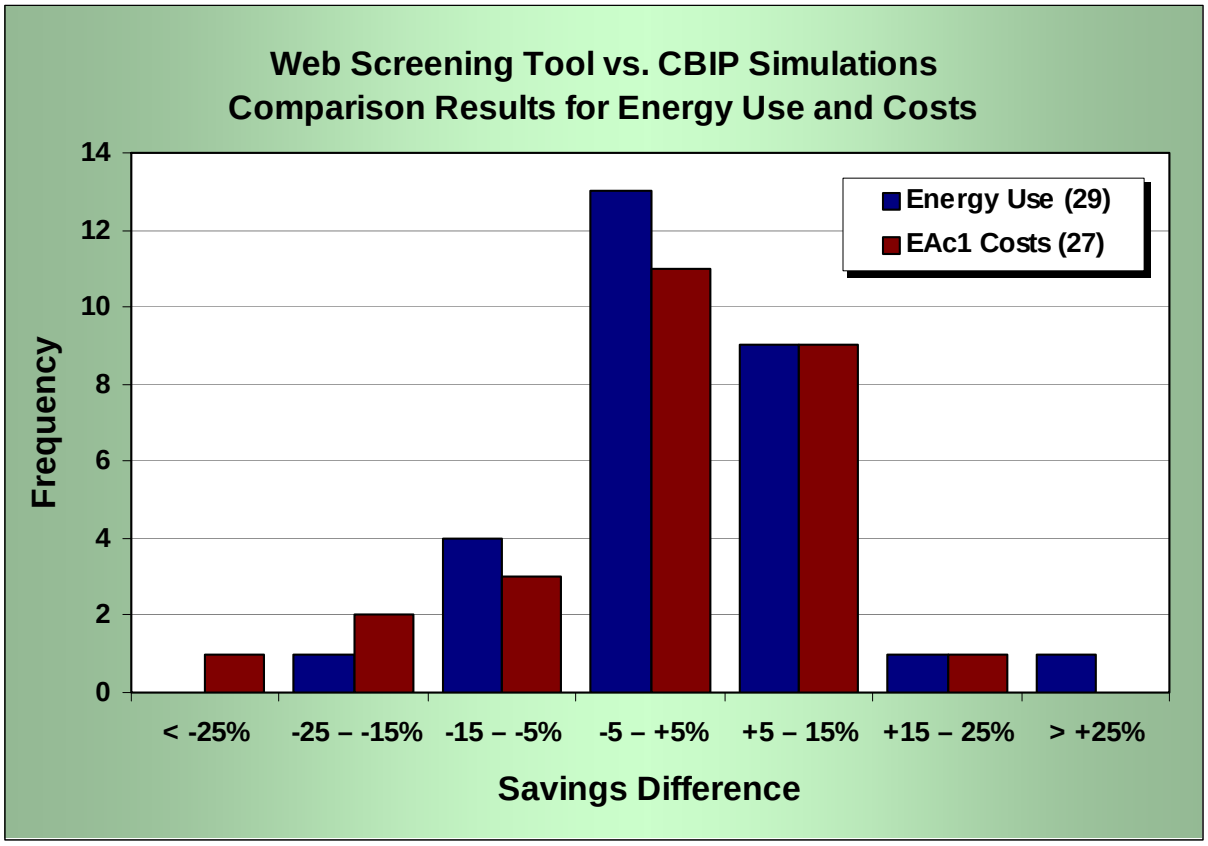
RESULTS

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 ±15% points for 90% of the projects included in the verification assessment, and 45% of the projects were within ±5% points. On average, the Screening Tool predicted energy savings to within 2.8% points (higher) in comparison to the detailed simulations, with a standard deviation of 9.7% points.

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, 79% of the projects were within ±15% points and 38% of the projects were within ±5% points. Note that because two of the projects did not meet

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



the 25% savings requirement to qualify for LEED EAp2, the Screening Tool did not report EAc1 cost savings. This is why Figure 4 has two fewer samples for the EAc1 cost savings results than for the energy use savings. On average, the Screening Tool predicted energy savings to within -0.1% points (slightly lower) in comparison to the detailed simulations, with a standard deviation of 10.7% 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 ±2 points for 90% of the projects included in the verification assessment, and 59% of the projects were within ±1 point. Over a third of the projects predicted the same number of EAc1 points. On average, the Screening Tool predicted EAc1 points to within 0.1 point (slightly higher) in comparison to the detailed simulations, with a standard deviation of 1.8 points.

Figure 5. LEED EAc1 Point Differences, Frequency Distribution

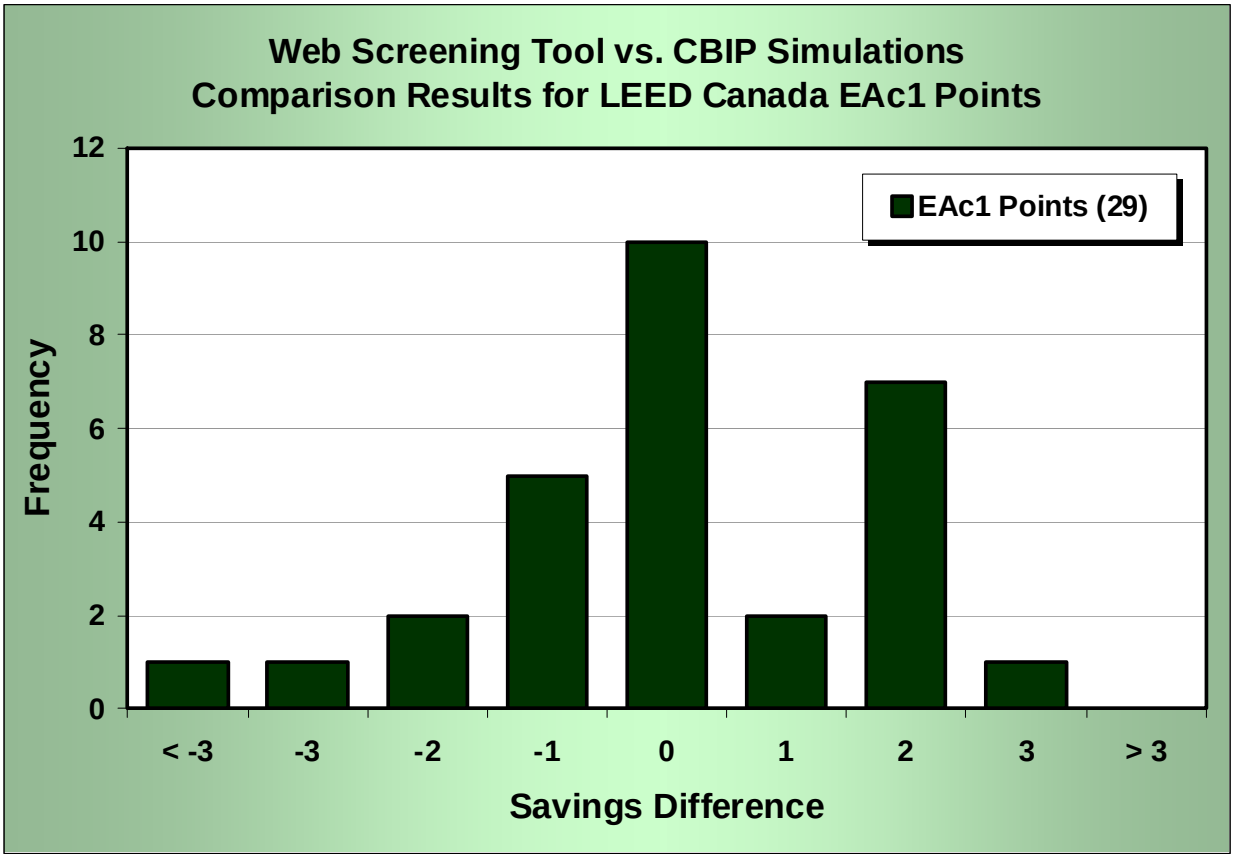


Table 2 provides the background comparisons that are represented in Figures 4 and 5. The green entries indicate differences that were within ±10%, for energy use and EAc1 cost savings, or within ±1 EAc1 point. The red entries indicate differences that were outside of ±20%, for energy use and EAc1 cost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

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%	N/A	0
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%	N/A	0
027-129	-4.3%	5.8%	2
028-129	5.5%	10.2%	2
029-129	3.0%	-3.4%	-1
Average	**2.8%**	**-0.1%**	**0.1**
Min	**-23.5%**	**-28.7%**	**-5**
Max	**26.2%**	**16.0%**	**3**

REVIEW OF DISCREPANCIES

While the 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 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 configures 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 over half the proposed heating energy requirements were provided by the GSHP (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[3]. The net effect was that the effective fuel switch for the

[3] 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.

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. The project with the worst comparison on energy use savings (26.2%), as well as the project with the worst comparison on EAc1 cost savings (-28.7%) and points (-5), exhibit this problem.

2. **Projects where electricity rates were high in comparison to fossil fuel rates** were also susceptible to having relatively high discrepancies. 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 (including the second worst project in terms of EAc1 cost savings comparison at -24.4%), with some remote Northern projects having local utility rates of over $1.00/kWh versus $0.87/liter of fuel oil.

3. **Schedule discrepancies** could introduce discrepancies in many 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). In these cases, electricity use was most affected because the Screening Tool includes 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.

4. **Projects with relatively low auxiliary energy use** cannot *presently* be represented with the Screening Tool. Hence, projects with mixed mode ventilation and/or displacement ventilation, for instance, may have their electricity use overstated in the Screening Tool. The second worst project exhibited this problem, which was exacerbated when combined with the issue of having relatively high electricity rates in comparison to the natural gas rates.

5. **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.

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, 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 the third worst comparison in terms of energy savings.

7. **Demand charges for electricity** can cause problems as the Screening Tool can provide for problematic predictions of peak demand on occasion. 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. For this reason, and for reasons of simplicity, we typically recommend entering an overall cost for electricity on a dollar per kWh basis and leaving the demand charges at zero.

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 (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 exceeds the minimum prescriptive requirement of the MNECB. But it was only registered for about 38% 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 nearly half of the projects. More generally, exhaust heat recovery in all its forms were prevalent in all but two of the projects, averaging nearly 50% overall effectiveness for the 27 projects with heat recovery. Except for five projects with ground-source heat pump systems (and similar centralized 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 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.

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
Heating - heat recovery, heat wheel	**16**
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
Windows - Losses 25-40% lower than Ref	**7**
Windows - Losses 10-25% lower than Ref	**7**

CONCLUSION

For the vast majority of cases, NRCan's Screening Tool provided for a relatively good representation of the relative energy savings one can expect from performing a much more detailed compliance simulation for LEED Canada purposes. However, the simplified tool could easily 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 is including 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 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. Our recommendation has been to 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.

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.

REFERENCES

Cane, Doug and Andrew Morrison. 2001. "The Prescriptive Path — Its Construction and Place in the Commercial Building Incentive Program." Esim 2001 Conference Proceedings.

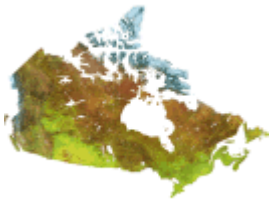
Commercial Building Incentive Program for Energy Efficient New Construction. 1999. Technical Guide. Natural Resources Canada.

LEED-NC for New Construction. October 2005. Reference Guide, Version 2.2. U.S. Green Building Council. Pages 174–195.

APPENDIX A

Web Screening Tool Summaries

Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

001-225

Building Profile Summary

Proposed Building:	Hospital, 60000 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	2.71 m²°C/W
Gross exterior wall area:	15856	15856 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	5.68
Gross exterior roof area:	17549	17549 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	86.5 %
Minimum outside air:	2.56	2.56 l/s/m²
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 Building	Your Design
Average lighting density:	18.8	8.9 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	Reference Building	Your Design
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	**38,956**	**32.6%**

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%)**

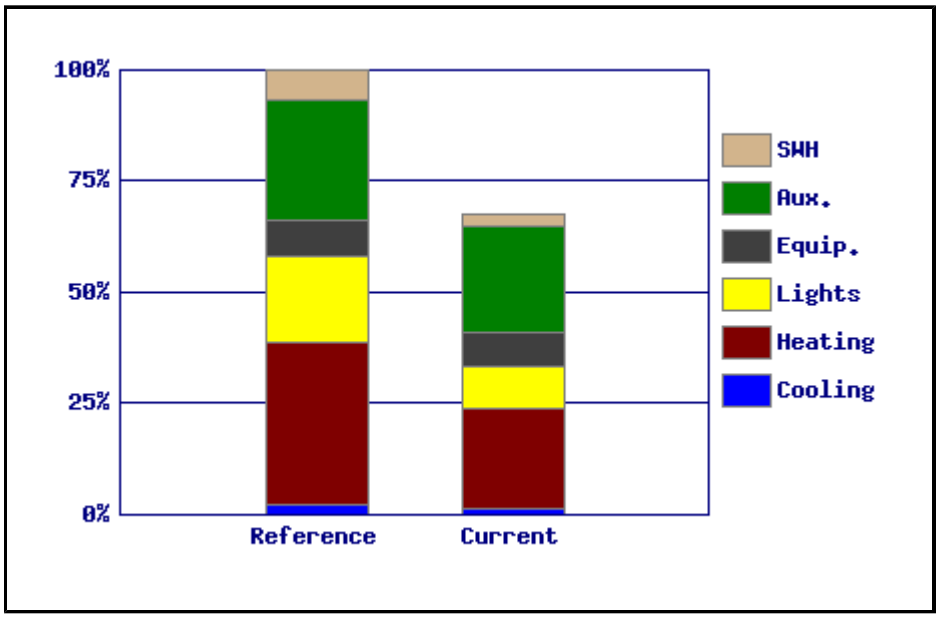
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **3 points**

Emissions Savings

Carbon Dioxide (CO_2) 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

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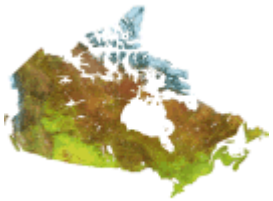
Web Screening Tool Summaries

Office of Energy Efficiency



Screening Tool For New Building Design

Screening Tool Summary

Facility Description for 002-259

Your Facility Description:

002-259

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 m²

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 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.52 m²°C/W
Gross exterior wall area:	855	855 m²
Roof type:	All other	All other

Web Screening Tool Summaries

Overall roof RSI-value:	2.128	3.61
Gross exterior roof area:	1091	1091 m²

Mechanical System (Office, Small)

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	1.4	1.4 l/s/m²
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 Building	Your Design
Average lighting density:	18	5.79 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads (Office, Small)

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

Second Building Block

Second Building Block:	Retail, Big Box, 1697 m²
Heating System:	Ground-Source Heat Pumps

Web Screening Tool Summaries

Building Shell (Retail, Big Box)

	Reference Building	Your Design
Average window-to-wall-area ratio:	9.9	9.9 %
Overall window USI-value:	3.2	3.5 W/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.9 m²°C/W
Gross exterior wall area:	960	960 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.61
Gross exterior roof area:	950	950 m²

Mechanical System (Retail, Big Box)

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	2.2	2.2 l/s/m²
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 Building	Your Design
Average lighting density:	30	25.3 W/m²
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	
Energy Savings	**1,881**	**51.4%**

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

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$50,541.53	
Your Design	$22,834.24	
Regulated Energy Cost Savings**	**$27,707.29**	**(54.8%)**

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

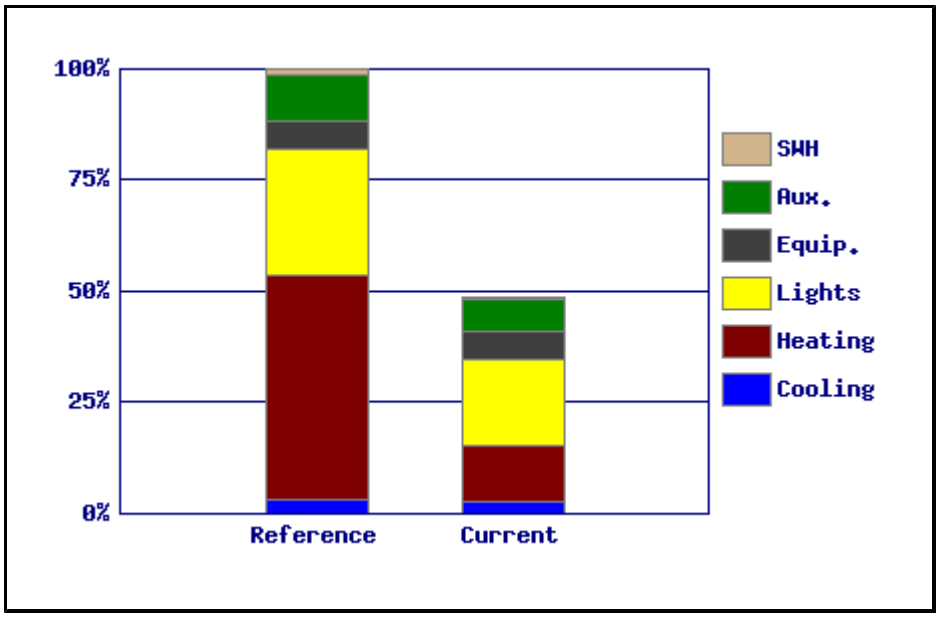
LEED Canada EA Credit 1 **7 points**

Emissions Savings

Carbon Dioxide (CO_2) 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
Totals	494,839	0	1,781	$26,226

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
Totals	522,732	1,781	3,663	$53,934

Web Screening Tool Summaries

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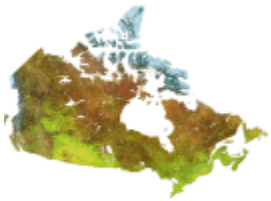
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

003-204 (Corrected)

Building Profile Summary

Proposed Building:	School, 2848 m²
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/m²°C
Window shading coefficient:	0.736	0.36
Overall wall RSI-value:	3.333	3.15 m²°C/W
Gross exterior wall area:	1757	1757 m²
Roof type:	Trusses & joists	Trusses & joists
Overall roof RSI-value:	4.348	3.94
Gross exterior roof area:	2645	2645 m²

Web Screening Tool Summaries

Mechanical System

	Reference Building	Your Design
Heating efficiency:	80	82.3 %
Minimum outside air:	2.55	2.55 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	15.29 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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

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%)**

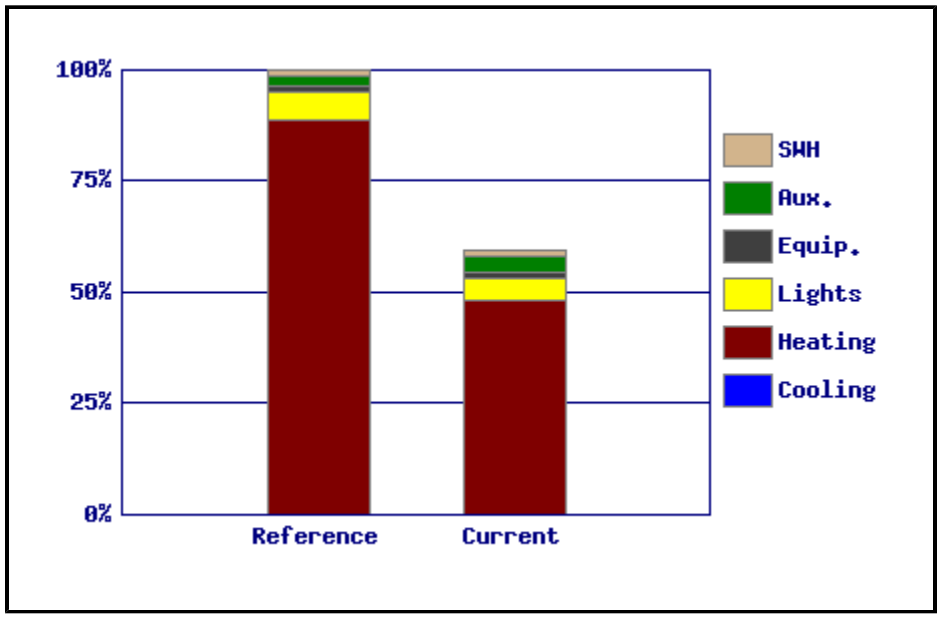
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **2 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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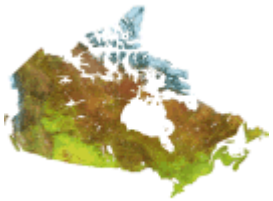
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

004-234

Building Profile Summary

Proposed Building:	School, 1833 m²
Location:	Whitehorse (A), Yukon Territory
Heating System:	Fossil (Constant Volume)

Utility Rates

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

$ 0.134 per kWh	$ 0 per Liters
$ 11.810 per kW	$ 0.983 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	5.65	5.65 %
Overall window USI-value:	2.1	2.15 W/m²°C
Window shading coefficient:	0.736	0.36
Overall wall RSI-value:	2.703	4.03 m²°C/W
Gross exterior wall area:	748	748 m²
Roof type:	All other	All other
Overall roof RSI-value:	3.448	4.56
Gross exterior roof area:	1174	1174 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	1.73	1.73 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	6.69 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	2,981	
Your Design	1,698	
Energy Savings	**1,283**	**43.0%**
Annual Energy Cost Savings		**$38,494.56**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$89,169.01	
Your Design	$50,674.45	
Regulated Energy Cost Savings**	**$38,494.56**	**(43.2%)**

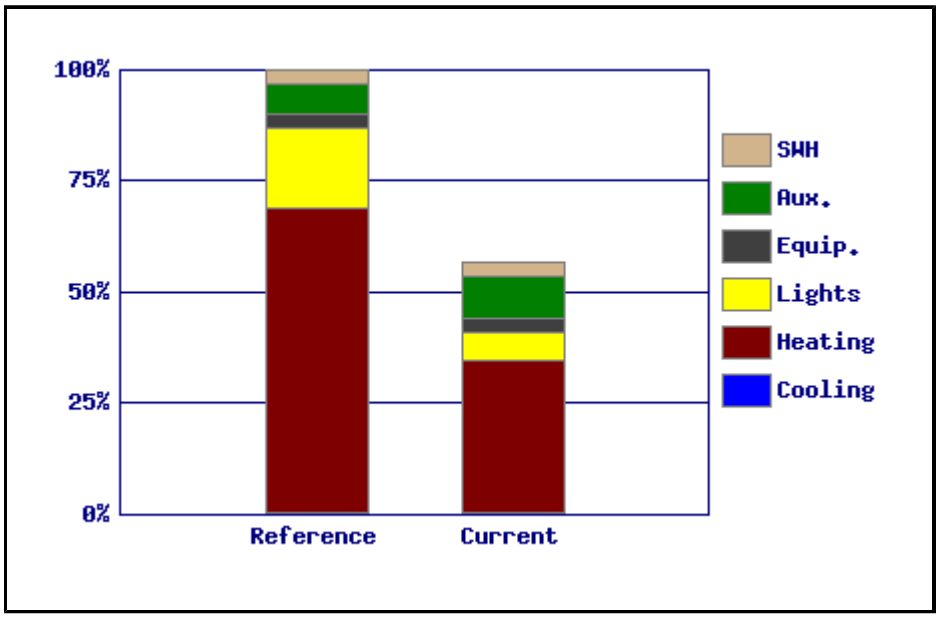
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**5 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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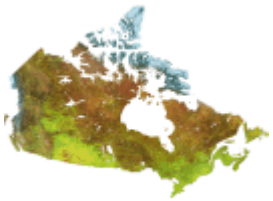
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

005-227

Building Profile Summary

Proposed Building:	School, 2630 m²
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/m²°C
Window shading coefficient:	0.736	0.5
Overall wall RSI-value:	3.704	3.4 m²°C/W
Gross exterior wall area:	1705	1705 m²
Roof type:	All other	All other
Overall roof RSI-value:	3.704	5.1
Gross exterior roof area:	2031	2031 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	88 %
Minimum outside air:	1.39	1.39 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	13.7 W/m²
Lighting controls (select if applicable and enter floor area):		
Occupancy sensor		62 %
Occupancy and daylighting (multiple step dimming)		14 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	5,832	
Your Design	2,807	
Energy Savings	**3,025**	**51.9%**

Annual Energy Cost Savings **$108,281.31**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$363,772.81	
Your Design	$255,491.50	
Regulated Energy Cost Savings**	**$108,281.31**	**(29.8%)**

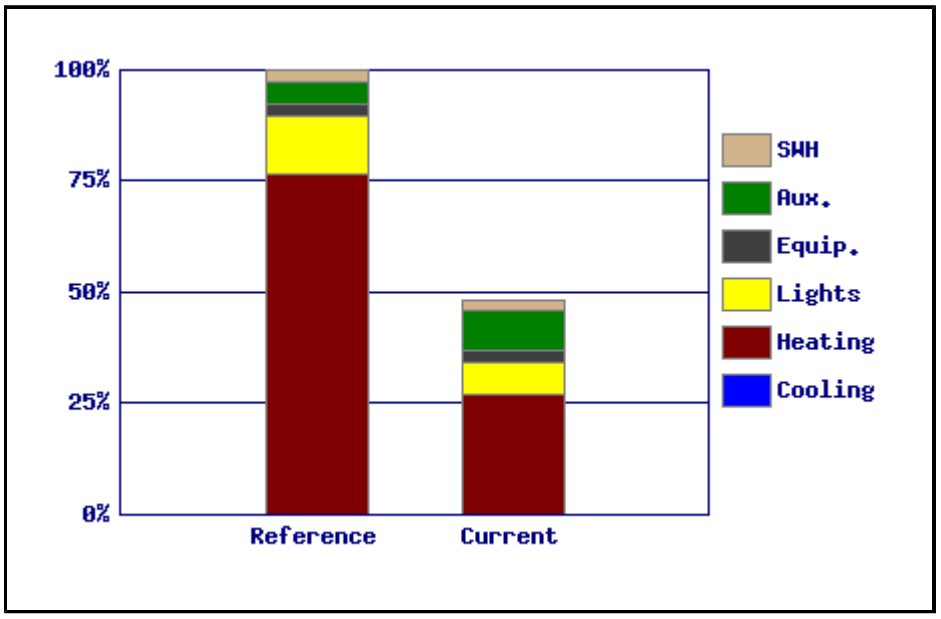
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **2 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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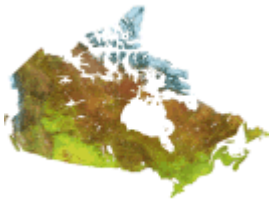
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

006-245

Building Profile Summary

Proposed Building:	School, 2980 m²
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/m²°C
Window shading coefficient:	0.736	0.48
Overall wall RSI-value:	3.03	5.11 m²°C/W
Gross exterior wall area:	964	964 m²
Roof type:	All other	All other
Overall roof RSI-value:	3.448	6.18
Gross exterior roof area:	1489	1489 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	84.5 %
Minimum outside air:	1	1 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	12.2 W/m²
Lighting controls (select if applicable and enter floor area):		
Occupancy and daylighting (multiple step dimming)		45 %
Occupancy sensor		25 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	4,156	
Your Design	2,224	
Energy Savings	**1,932**	**46.5%**
Annual Energy Cost Savings		**$132,849.25**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$436,166.17	
Your Design	$303,316.92	
Regulated Energy Cost Savings**	**$132,849.25**	**(30.5%)**

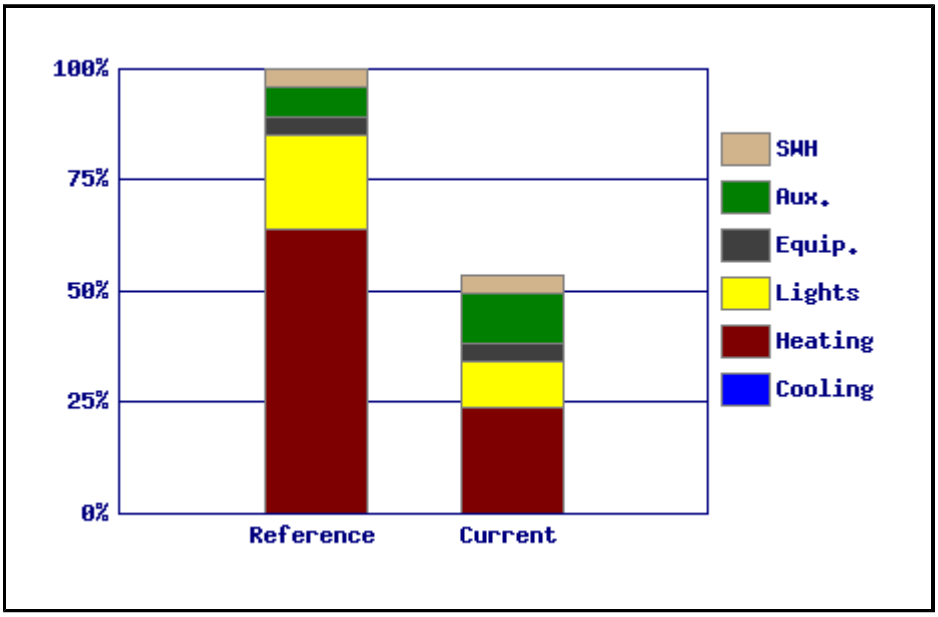
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **2 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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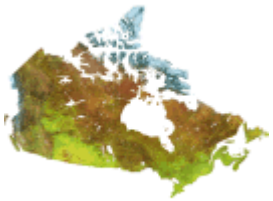
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

008-251

Building Profile Summary

Proposed Building:	School, 1182 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.03	3.39 m²°C/W
Gross exterior wall area:	884	884 m²
Roof type:	All other	All other
Overall roof RSI-value:	3.448	5.87
Gross exterior roof area:	1185	1185 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	85 %
Minimum outside air:	1.8	1.8 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	14.6 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	2,944	
Your Design	1,733	
Energy Savings	**1,210**	**41.1%**
Annual Energy Cost Savings		**$22,345.22**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$71,621.59	
Your Design	$49,276.37	
Regulated Energy Cost Savings**	**$22,345.22**	**(31.2%)**

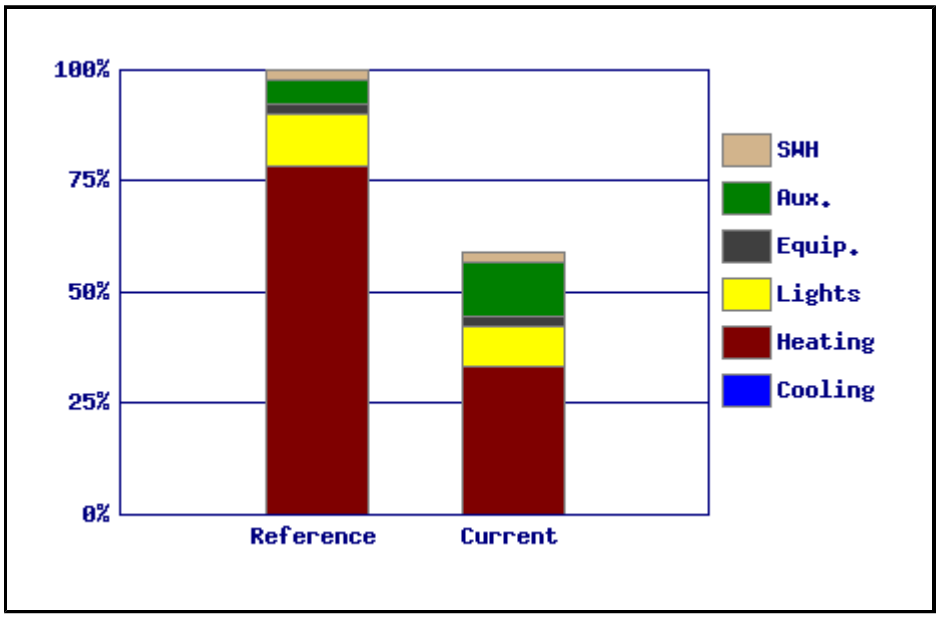
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **2 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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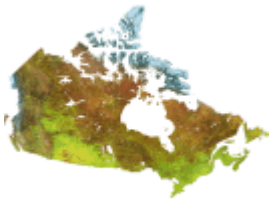
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

009-270

Building Profile Summary

Proposed Building:	School, 7566 m²
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/m²°C
Window shading coefficient:	0.736	0.52
Overall wall RSI-value:	1.818	2.63 m²°C/W
Gross exterior wall area:	3353	3353 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	5.25
Gross exterior roof area:	3954	3954 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	85 %
Minimum outside air:	1.88	1.88 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	6.17 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	10,440	
Your Design	6,663	
Energy Savings	**3,776**	**36.2%**
Annual Energy Cost Savings		**$58,798.03**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$140,397.33	
Your Design	$81,599.29	
Regulated Energy Cost Savings**	**$58,798.04**	**(41.9%)**

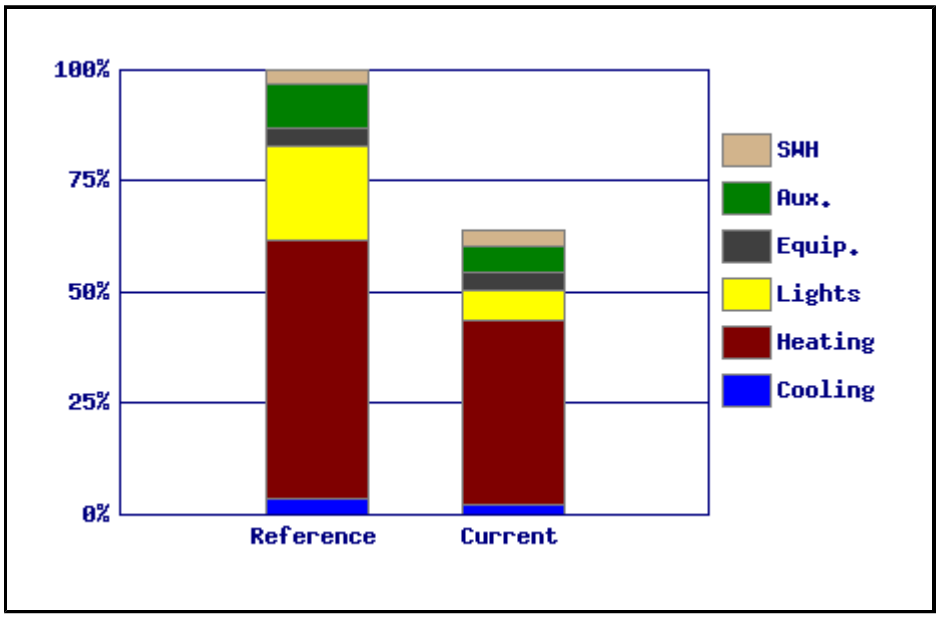
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**4 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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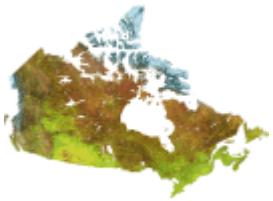
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

010-302

Building Profile Summary

Proposed Building:	Multi-Unit Residential, 12488 m²
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/m²°C
Window shading coefficient:	0.736	0.43
Overall wall RSI-value:	2.083	1.99 m²°C/W
Gross exterior wall area:	4701	4701 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.439	7.22
Gross exterior roof area:	3093	3093 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	0.51	0.51 l/s/m²
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 Building	Your Design
Average lighting density:	10	8.45 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Parkade lighting

	Reference Building	Your Design
Parkade floor area:	0	0 m²
Average lighting density:	3.2	3.2 W/m²
Percent of lighting load with occupancy sensor control:	0	0 %

Process Loads

	Reference Building	Your Design
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	
Energy Savings	**3,948**	**37.5%**

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

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$182,951.00	
Your Design	$116,480.17	
Regulated Energy Cost Savings**	**$66,470.83**	**(36.3%)**

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

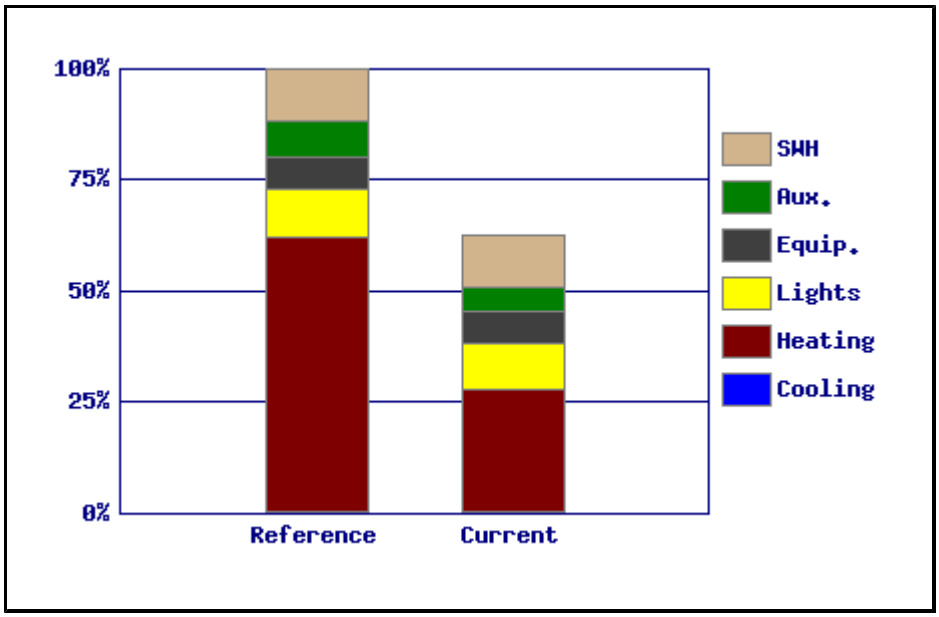
LEED Canada EA Credit 1 **3 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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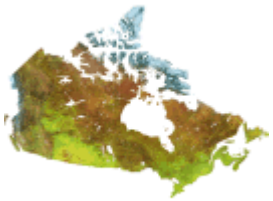
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Facility Description for 011-193

Your Facility Description:

011-193

Configuration

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

Total Floor Area: 4,460 m²

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 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.222	2.2 m²°C/W
Gross exterior wall area:	1998	1998 m²
Roof type:	All other	All other

Web Screening Tool Summaries

Overall roof RSI-value:	2.439	3.91
Gross exterior roof area:	2298	2298 m²

Mechanical System (School)

	Reference Building	Your Design
Heating efficiency:	80	85 %
Minimum outside air:	2.17	2.17 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	12.16 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads (School)

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

Second Building Block

Second Building Block:	School, 482 m²
Heating System:	Fossil (Variable Volume)

Web Screening Tool Summaries

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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.222	2.2 m²°C/W
Gross exterior wall area:	242	242 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.439	3.91
Gross exterior roof area:	278	278 m²

Mechanical System (School)

	Reference Building	Your Design
Heating efficiency:	80	85 %
Minimum outside air:	2.17	2.17 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	12.16 W/m²
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	
Energy Savings	**4,125**	**57.5%**

Annual Energy Cost Savings **$45,758.91**

LEED® Canada Energy & Atmosphere (EA)

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

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

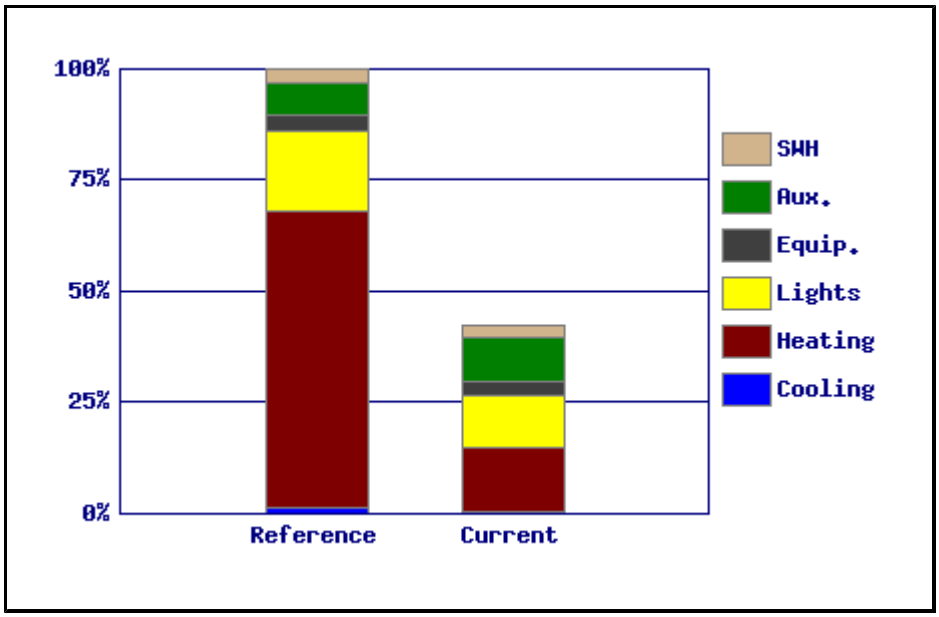
LEED Canada EA Credit 1 **7 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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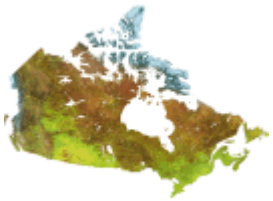
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Facility Description for 012-246

Your Facility Description:

012-246

Configuration

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

Total Floor Area: 637 m²

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 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.03	5.01 m²°C/W
Gross exterior wall area:	286	286 m²
Roof type:	All other	All other

Web Screening Tool Summaries

Overall roof RSI-value:	3.448	6.69
Gross exterior roof area:	435	435 m²

Mechanical System (Hotel)

	Reference Building	Your Design
Heating efficiency:	80	85 %
Minimum outside air:	2.25	2.25 l/s/m²
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 Building	Your Design
Average lighting density:	17.1	16.47 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads (Hotel)

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

Second Building Block

Second Building Block:	Office, Small, 261 m²
Heating System:	Fossil Fed Fan Coils

Web Screening Tool Summaries

Building Shell (Office, Small)

	Reference Building	Your Design	
Average window-to-wall-area ratio:	13	13	%
Overall window USI-value:	2.1	2.16	W/m²°C
Window shading coefficient:	0.736	0.736	
Overall wall RSI-value:	3.03	5.01	m²°C/W
Gross exterior wall area:	198	198	m²
Roof type:	All other	All other	
Overall roof RSI-value:	3.448	6.69	
Gross exterior roof area:	302	302	m²

Mechanical System (Office, Small)

	Reference Building	Your Design	
Heating efficiency:	80	85	%
Minimum outside air:	2.25	2.25	l/s/m²
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 Building	Your Design	
Average lighting density:	18	13.78	W/m²
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	
Energy Savings	**769**	**44.1%**

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

LEED® Canada Energy & Atmosphere (EA)

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

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

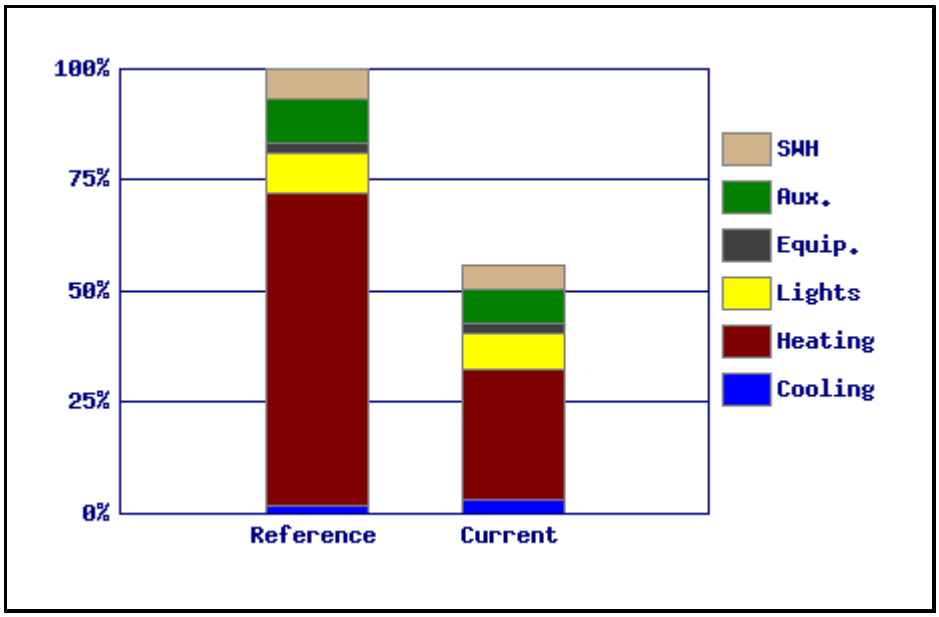
LEED Canada EA Credit 1 **3 points**

Emissions Savings

Carbon Dioxide (CO_2) 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
Totals	102,800	17,207	974	$29,816

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
Totals	116,258	37,733	1,743	$43,985

Web Screening Tool Summaries

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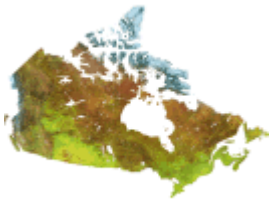


Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

013-119

Building Profile Summary

Proposed Building:	Extended Care, 11673 m²
Location:	Whitehorse (A), Yukon Territory
Heating System:	Fossil (Variable Volume)

Utility Rates

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

$ 0.131 per kWh	$ 0 per Liters
$ 11.870 per kW	$ 0.430 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	15.1	15.1 %
Overall window USI-value:	2.1	1.65 W/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.703	3.8 m²°C/W
Gross exterior wall area:	4554	4554 m²
Roof type:	Trusses & joists	Trusses & joists
Overall roof RSI-value:	4.348	4.76
Gross exterior roof area:	8400	8400 m²

Web Screening Tool Summaries

Mechanical System

	Reference Building	Your Design
Heating efficiency:	80	84.1 %
Minimum outside air:	0.61	0.61 l/s/m²
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 Building	Your Design
Average lighting density:	16.6	12.9 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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

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%)**

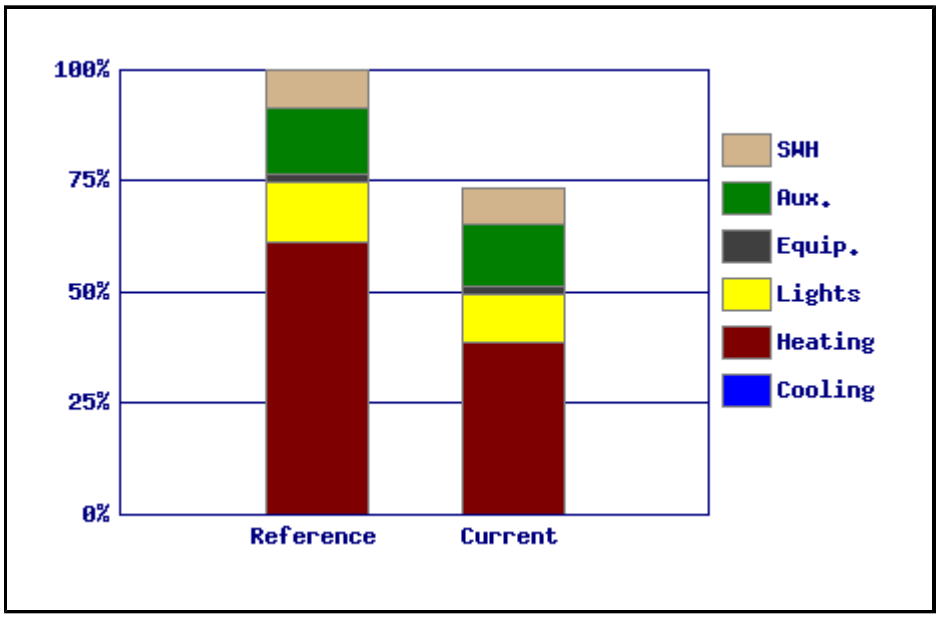
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **0 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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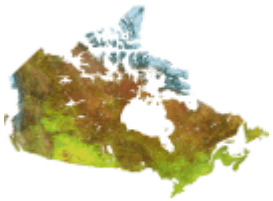
Web Screening Tool Summaries

Office of Energy Efficiency



Screening Tool For New Building Design

Screening Tool Summary

Facility Description for 014-205

Your Facility Description:

014-205

Configuration

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

Total Floor Area: 3,294 m²

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 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.333	3.83 m²°C/W
Gross exterior wall area:	1190	1190 m²
Roof type:	All other	All other

Web Screening Tool Summaries

Overall roof RSI-value:	3.448	5.03
Gross exterior roof area:	824	824 m²

Mechanical System (Hotel)

	Reference Building	Your Design
Heating efficiency:	80	88 %
Minimum outside air:	4.1	4.1 l/s/m²
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 Building	Your Design
Average lighting density:	17.1	14.5 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads (Hotel)

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

Second Building Block

Second Building Block:	Office, Small, 1910 m²
Heating System:	Fossil (Variable Volume)

Web Screening Tool Summaries

Building Shell (Office, Small)

	Reference Building	Your Design
Average window-to-wall-area ratio:	24	24 %
Overall window USI-value:	2.1	1.58 W/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	3.333	3.83 m²°C/W
Gross exterior wall area:	1643	1643 m²
Roof type:	All other	All other
Overall roof RSI-value:	3.448	5.03
Gross exterior roof area:	1138	1138 m²

Mechanical System (Office, Small)

	Reference Building	Your Design
Heating efficiency:	80	88 %
Minimum outside air:	0.96	0.96 l/s/m²
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 Building	Your Design
Average lighting density:	18	14.5 W/m²
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**	**57.0%**

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

LEED® Canada Energy & Atmosphere (EA)

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

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

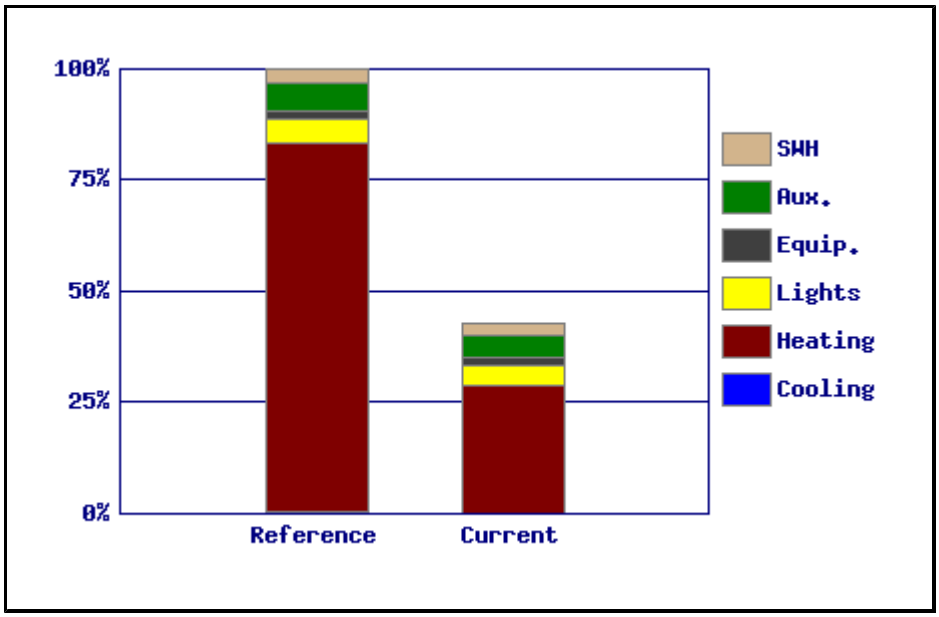
LEED Canada EA Credit 1 **5 points**

Emissions Savings

Carbon Dioxide (CO_2) 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
Totals	456,879	122,320	5,937	$180,839

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
Totals	570,701	335,085	13,812	$300,163

Web Screening Tool Summaries

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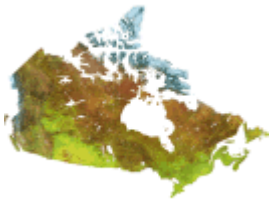
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

015-244

Building Profile Summary

Proposed Building:	Office, Small, 3242 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.32 m²°C/W
Gross exterior wall area:	1475	1475 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	4.3
Gross exterior roof area:	1127	1127 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	83.5 %
Minimum outside air:	1.09	1.09 l/s/m²
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 Building	Your Design
Average lighting density:	18	9.16 W/m²
Lighting controls (select if applicable and enter floor area):		
Occupancy sensor		1.7 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	3,768	
Your Design	1,809	
Energy Savings	**1,959**	**52.0%**
Annual Energy Cost Savings		**$24,728.33**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$48,695.34	
Your Design	$23,983.94	
Regulated Energy Cost Savings**	**$24,711.40**	**(50.7%)**

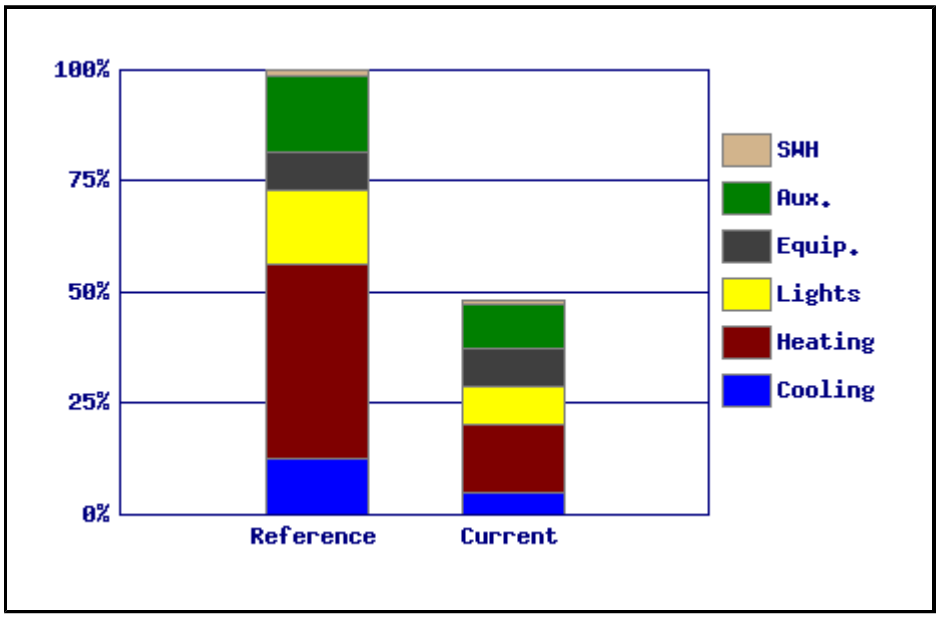
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**6 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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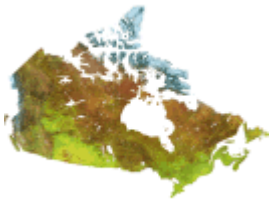
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

016-214

Building Profile Summary

Proposed Building:	Multi-Unit Residential, 14077 m²
Location:	Vancouver (A), British Columbia
Heating System:	Ground-Source Heat Pumps

Utility Rates

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

$ 0.071 per kWh	$ 9.078 per GJ
$ 0.000 per kW	$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	40	66.3 %
Overall window USI-value:	3.2	2.27 W/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	0.79 m²°C/W
Gross exterior wall area:	8274	8274 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.91
Gross exterior roof area:	629	629 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	0.42	0.42 l/s/m²
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 Building	Your Design
Average lighting density:	10	8.82 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Parkade lighting

	Reference Building	Your Design
Parkade floor area:	6381.1	6381.1 m²
Average lighting density:	3.2	2.15 W/m²
Percent of lighting load with occupancy sensor control:	0	0 %

Process Loads

	Reference Building	Your Design
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**	**6.0%**
Annual Energy Cost Savings		**$-42,356.78**

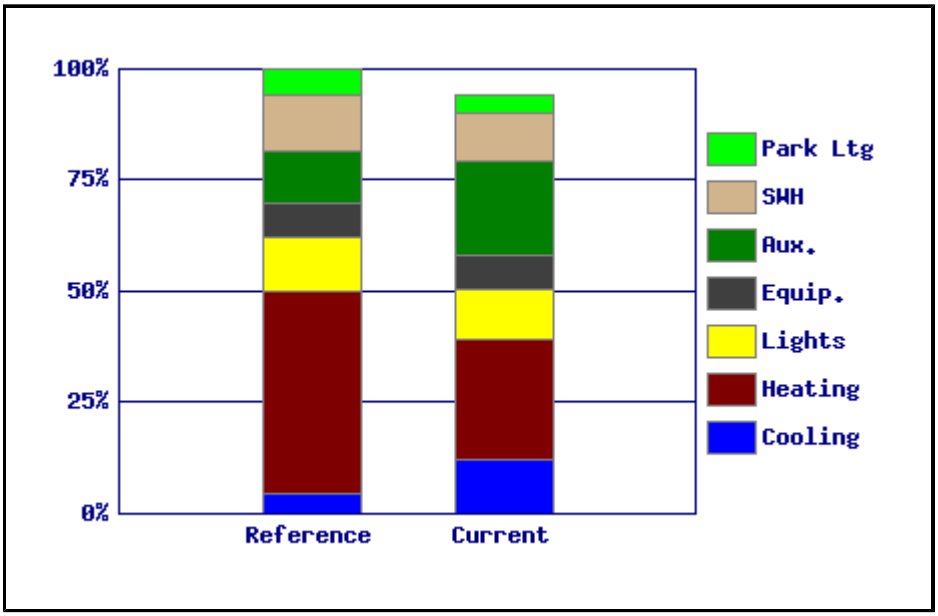
LEED® Canada Energy & Atmosphere (EA)

Does not qualify (EA Prerequisite 2 is not satisfied)

Emissions Savings

Carbon Dioxide (CO_2)	-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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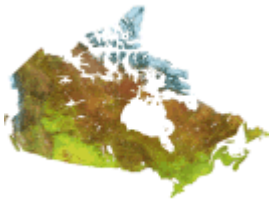
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

017-199

Building Profile Summary

Proposed Building:	School, 1300 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	3.04 m²°C/W
Gross exterior wall area:	1109	1109 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.45
Gross exterior roof area:	1333	1333 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	1.11	1.11 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	18.38 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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	1,550

Web Screening Tool Summaries

Your Design	747	
Energy Savings	**803**	**51.8%**
Annual Energy Cost Savings		**$13,648.65**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$79,828.43	
Your Design	$66,818.45	
Regulated Energy Cost Savings**	**$13,009.98**	**(16.3%)**

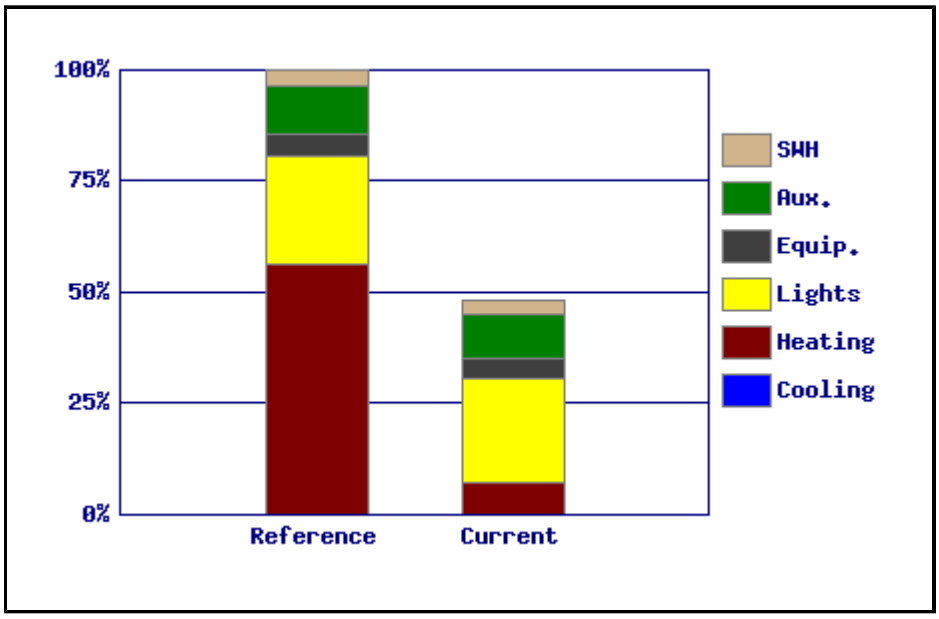
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**0 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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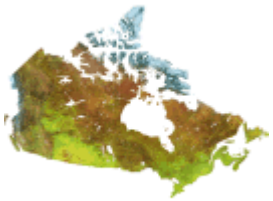
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

018-230

Building Profile Summary

Proposed Building:	Office, Large, 10937 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	1.27 m²°C/W
Gross exterior wall area:	4219	4219 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	2.89
Gross exterior roof area:	2631	2631 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	0.59	0.59 l/s/m²
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 Building	Your Design
Average lighting density:	18	11.56 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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	8,079

Web Screening Tool Summaries

Your Design	4,918	
Energy Savings	**3,161**	**39.1%**
Annual Energy Cost Savings		**$29,825.29**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$92,204.44	
Your Design	$62,379.15	
Regulated Energy Cost Savings**	**$29,825.29**	**(32.3%)**

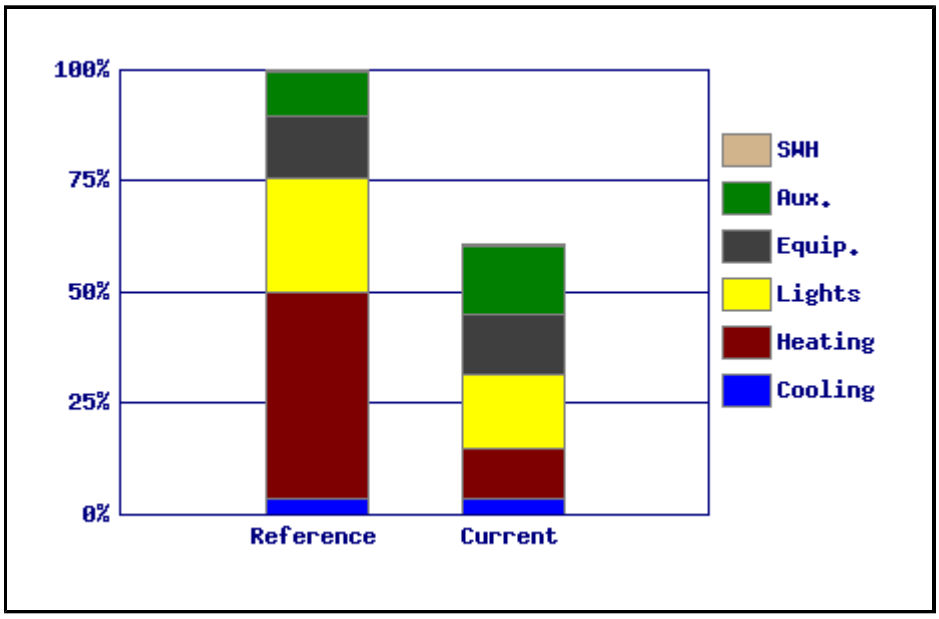
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**2 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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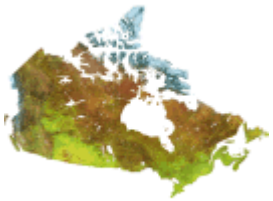
Office of Energy Efficiency



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

019-129

Building Profile Summary

Proposed Building:	School, 2505 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.235	0.79 m²°C/W
Gross exterior wall area:	2114	2114 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.83
Gross exterior roof area:	2072	2072 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	5	5 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	9.68 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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	5,779

Web Screening Tool Summaries

Your Design	1,276	
Energy Savings	**4,504**	**77.9%**
Annual Energy Cost Savings		**$50,923.39**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$69,392.94	
Your Design	$18,669.20	
Regulated Energy Cost Savings**	**$50,723.74**	**(73.1%)**

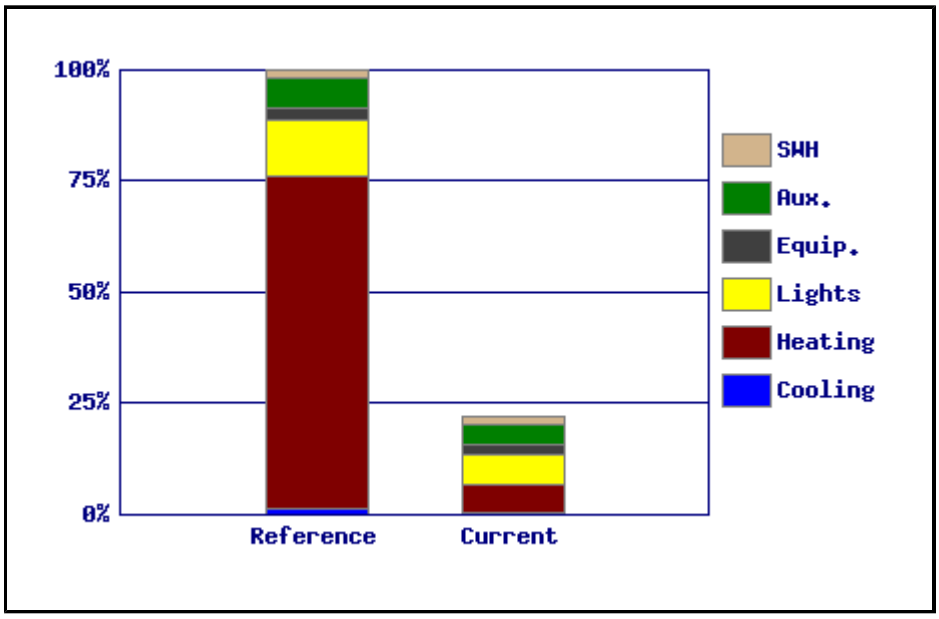
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**10 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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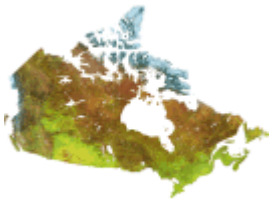
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

020-129

Building Profile Summary

Proposed Building:	School, 5554 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	2.29 m²°C/W
Gross exterior wall area:	3410	3410 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	8.81
Gross exterior roof area:	3118	3118 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	90 %
Minimum outside air:	1.08	1.08 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	13.94 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	6,647	
Your Design	4,480	
Energy Savings	**2,168**	**32.6%**
Annual Energy Cost Savings		**$32,821.13**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$112,434.40	
Your Design	$79,613.27	
Regulated Energy Cost Savings**	**$32,821.13**	**(29.2%)**

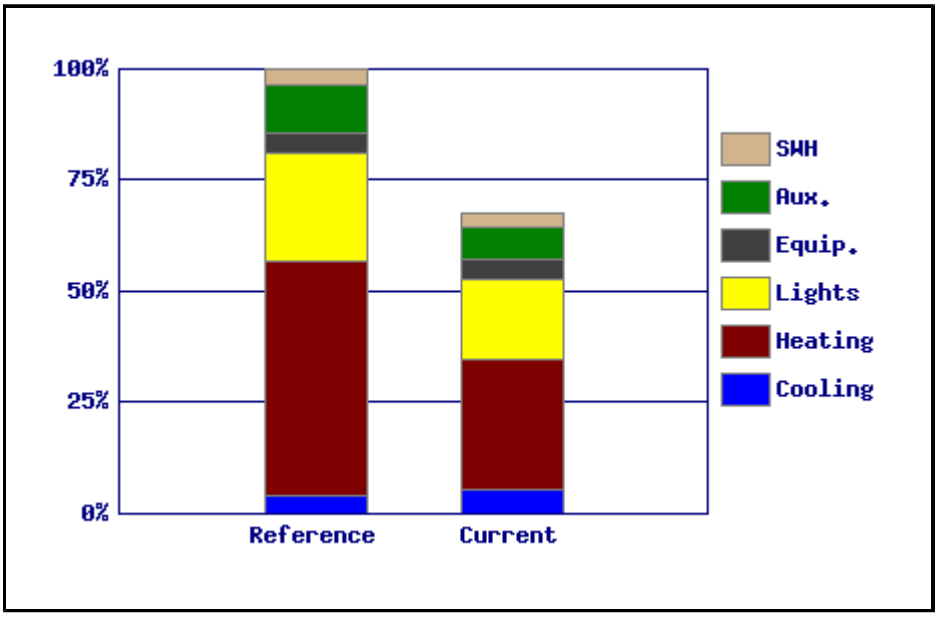
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**2 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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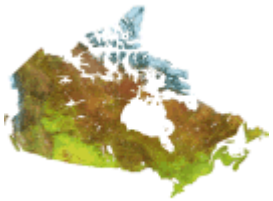
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

021-129

Building Profile Summary

Proposed Building:	Office, Large, 2170 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.083	2.48 m²°C/W
Gross exterior wall area:	1256	1256 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.439	5.68
Gross exterior roof area:	1853	1853 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	94 %
Minimum outside air:	1.73	1.73 l/s/m²
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 Building	Your Design
Average lighting density:	18	6.23 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	9,454	
Your Design	2,934	
Energy Savings	**6,520**	**69.0%**

Annual Energy Cost Savings **$48,487.99**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$76,759.40	
Your Design	$28,271.41	
Regulated Energy Cost Savings**	**$48,487.99**	**(63.2%)**

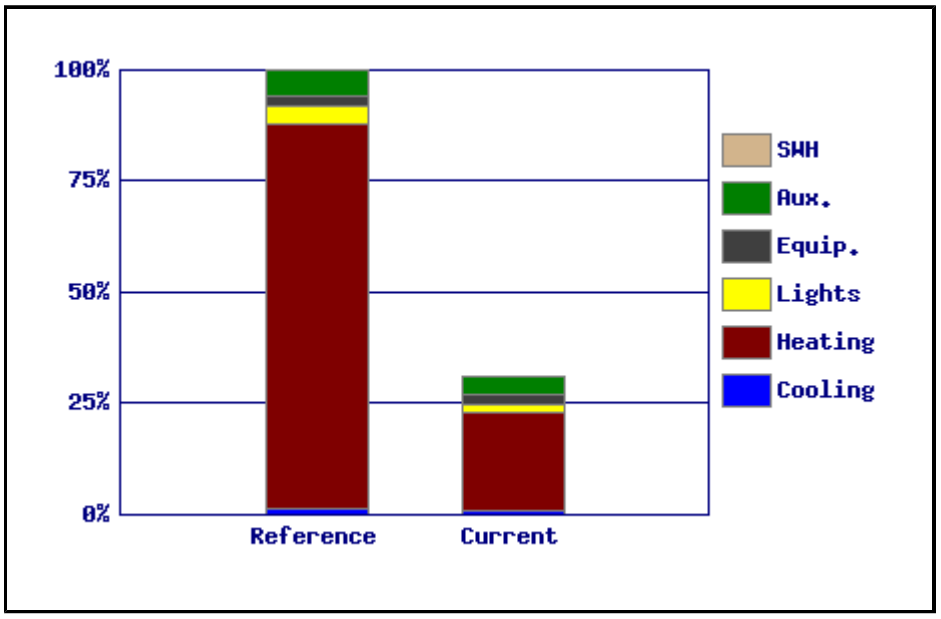
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **9 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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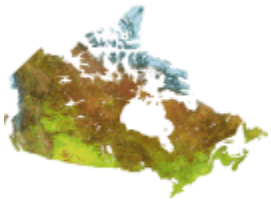
Web Screening Tool Summaries

Office of Energy Efficiency



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

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022-129 (Corrected)
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Building Profile Summary

Proposed Building:	Office, Large, 2170 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.083	2.48 m²°C/W
Gross exterior wall area:	1256	1256 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.439	5.68
Gross exterior roof area:	1853	1853 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	94 %
Minimum outside air:	2.27	2.27 l/s/m²
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 Building	Your Design
Average lighting density:	18	6.23 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	10,883	
Your Design	3,456	
Energy Savings	**7,427**	**68.2%**
Annual Energy Cost Savings		**$53,975.10**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$85,596.24	
Your Design	$31,621.14	
Regulated Energy Cost Savings**	**$53,975.10**	**(63.1%)**

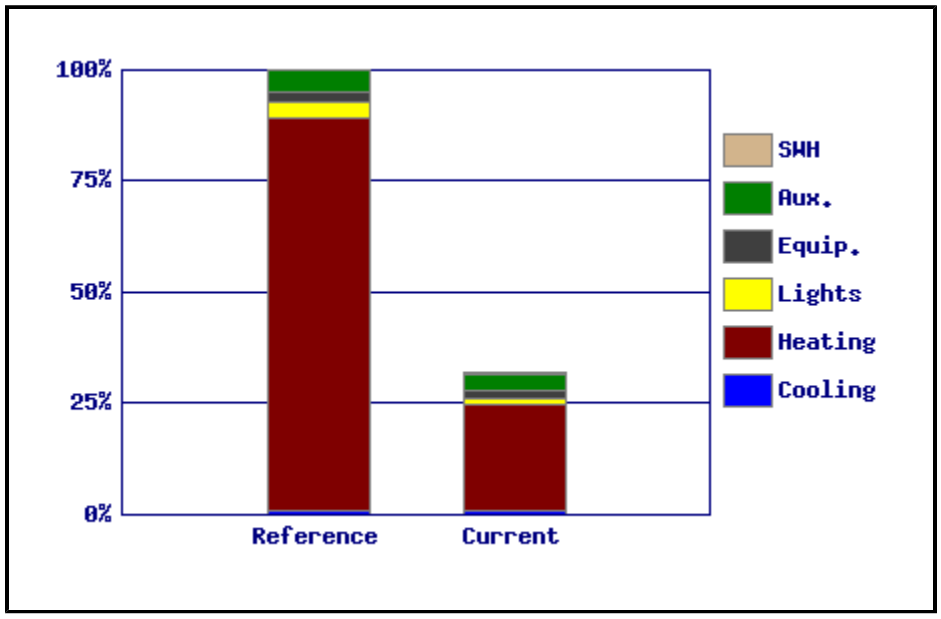
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**9 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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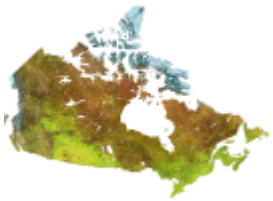
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

023-129

Building Profile Summary

Proposed Building:	Office, Small, 268 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	4 m²°C/W
Gross exterior wall area:	366	366 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	6.52
Gross exterior roof area:	307	307 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	92 %
Minimum outside air:	0.42	0.42 l/s/m²
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 Building	Your Design
Average lighting density:	18	15.3 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	531	
Your Design	394	
Energy Savings	**138**	**25.9%**

Annual Energy Cost Savings **$113.21**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$8,778.93	
Your Design	$8,665.72	
Regulated Energy Cost Savings**	**$113.21**	**(1.3%)**

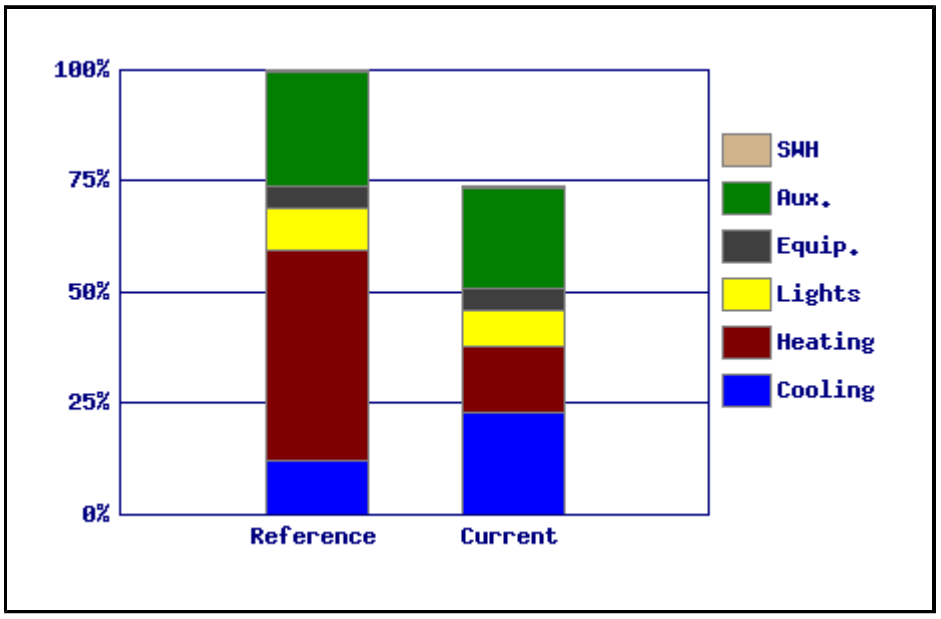
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **0 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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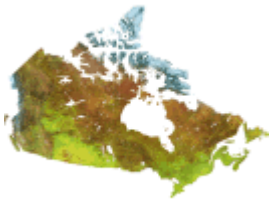
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

024-129

Building Profile Summary

Proposed Building:	Hotel, 8432 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	3.67 m²°C/W
Gross exterior wall area:	3695	3695 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	4.52
Gross exterior roof area:	2236	2236 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	94.5 %
Minimum outside air:	0.62	0.62 l/s/m²
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 Building	Your Design
Average lighting density:	17.1	8.2 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	8,627	
Your Design	5,795	
Energy Savings	**2,833**	**32.8%**
Annual Energy Cost Savings		**$45,317.97**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$131,509.90	
Your Design	$86,191.93	
Regulated Energy Cost Savings**	**$45,317.97**	**(34.5%)**

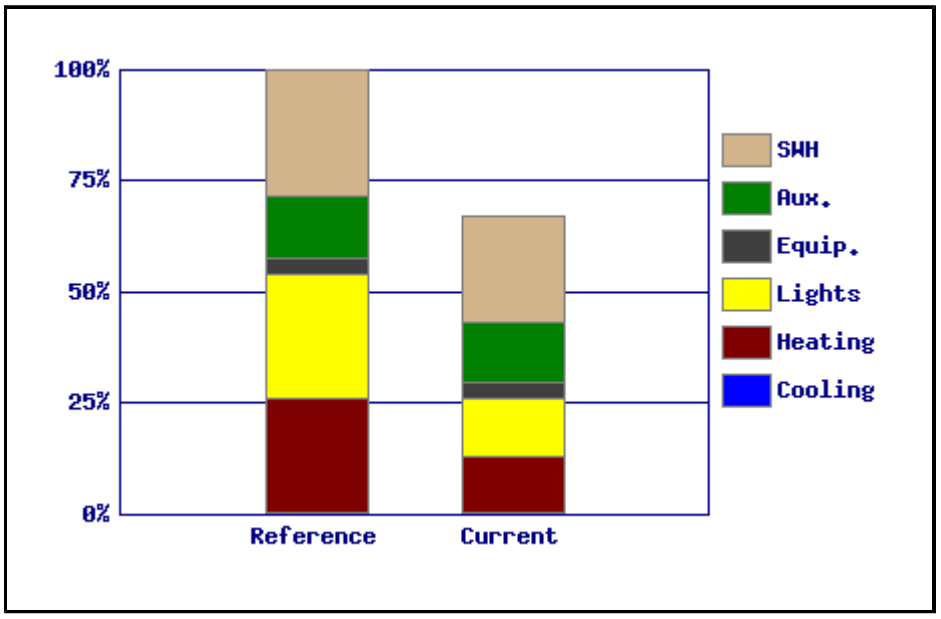
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**3 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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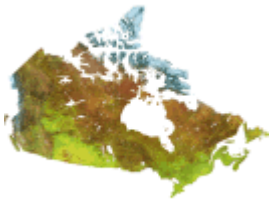
Web Screening Tool Summaries



Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

025-129

Building Profile Summary

Proposed Building:	Office, Large, 4536 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	2.083	2.05 m²°C/W
Gross exterior wall area:	1781	1781 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.439	4.63
Gross exterior roof area:	2151	2151 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	91 %
Minimum outside air:	0.77	0.77 l/s/m²
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 Building	Your Design
Average lighting density:	18	12.09 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	8,471	
Your Design	4,701	
Energy Savings	**3,770**	**44.5%**
Annual Energy Cost Savings		**$42,780.13**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$112,637.09	
Your Design	$69,856.96	
Regulated Energy Cost Savings**	**$42,780.13**	**(38.0%)**

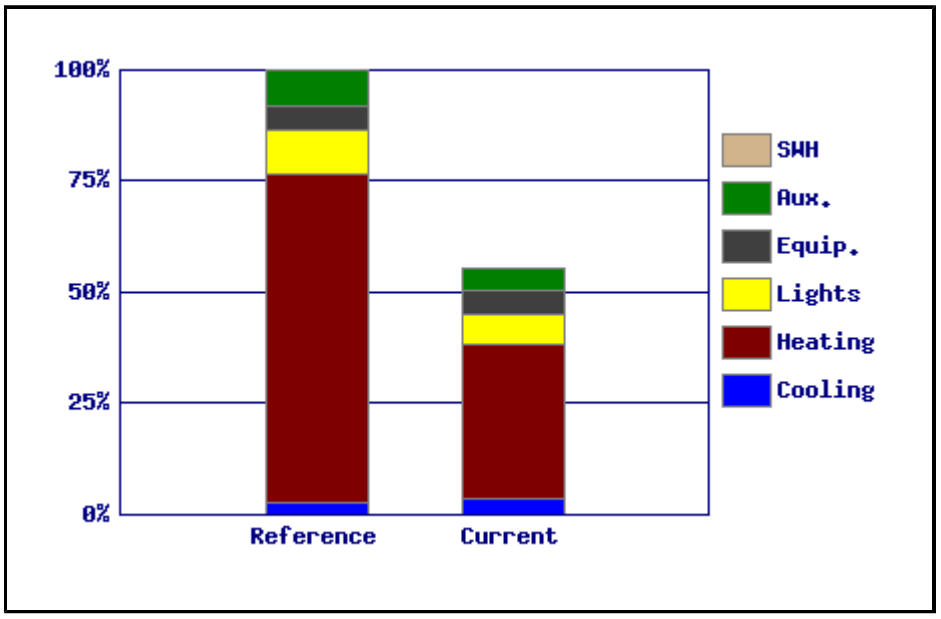
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **4 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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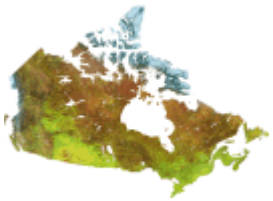


Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

026-129

Building Profile Summary

Proposed Building:	Extended Care, 2447 m²
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/m²°C
Window shading coefficient:	0.736	0.736
Overall wall RSI-value:	1.818	3.2 m²°C/W
Gross exterior wall area:	925	925 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.128	3.75
Gross exterior roof area:	2425	2425 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	79 %
Minimum outside air:	1.62	1.62 l/s/m²
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 Building	Your Design
Average lighting density:	16.6	9.33 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	5,797	
Your Design	4,487	
Energy Savings	**1,310**	**22.6%**
Annual Energy Cost Savings		**$15,521.00**

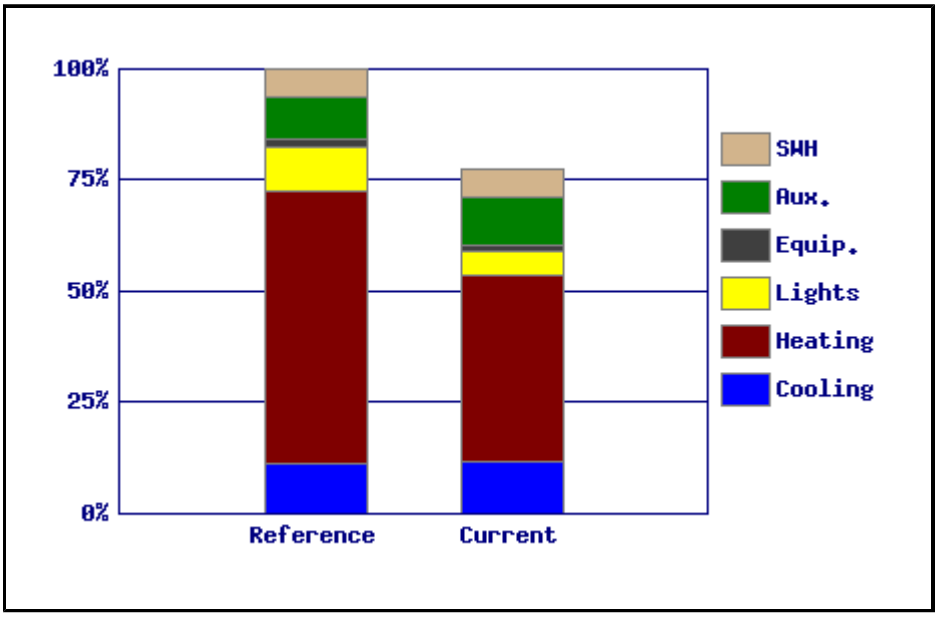
LEED® Canada Energy & Atmosphere (EA)

Does not qualify (EA Prerequisite 2 is not satisfied)

Emissions Savings

Carbon Dioxide (CO_2)	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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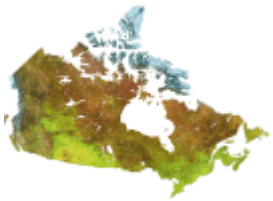


Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

027-129

Building Profile Summary

Proposed Building:	Office, Small, 6331 m²
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/m²°C
Window shading coefficient:	0.736	0.35
Overall wall RSI-value:	2.083	3.33 m²°C/W
Gross exterior wall area:	3003	3003 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.439	3.77
Gross exterior roof area:	4412	4412 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	80 %
Minimum outside air:	0.81	0.81 l/s/m²
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 Building	Your Design
Average lighting density:	18	9.1 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	8,550	
Your Design	4,497	
Energy Savings	**4,053**	**47.4%**

Annual Energy Cost Savings **$102,921.15**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$189,618.38	
Your Design	$86,697.23	
Regulated Energy Cost Savings**	**$102,921.15**	**(54.3%)**

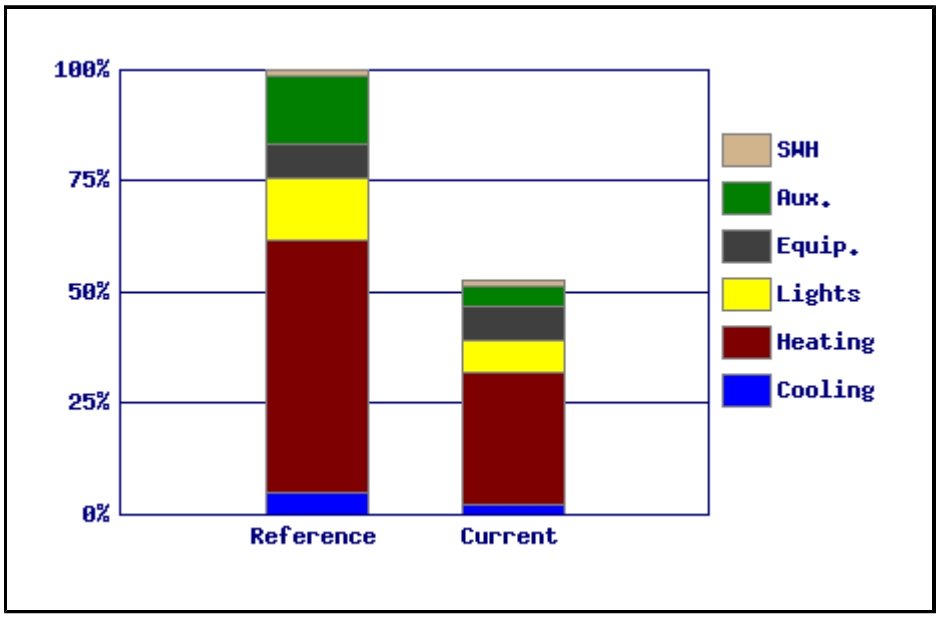
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1 **7 points**

Emissions Savings

Carbon Dioxide (CO_2) 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

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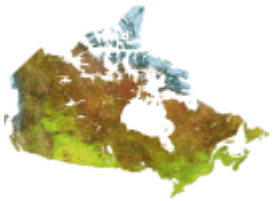


Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

028-129

Building Profile Summary

Proposed Building:	School, 6253 m²
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/m²°C
Window shading coefficient:	0.736	0.36
Overall wall RSI-value:	2.083	1.95 m²°C/W
Gross exterior wall area:	2716	2716 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.439	3.47
Gross exterior roof area:	4757	4757 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	81 %
Minimum outside air:	1.23	1.23 l/s/m²
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 Building	Your Design
Average lighting density:	19.1	10.23 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Process Loads

	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)

Web Screening Tool Summaries

Reference Building	8,354	
Your Design	3,630	
Energy Savings	**4,724**	**56.5%**
Annual Energy Cost Savings		**$59,822.32**

LEED® Canada Energy & Atmosphere (EA)

Reference Building	$117,516.72	
Your Design	$57,694.40	
Regulated Energy Cost Savings**	**$59,822.32**	**(50.9%)**

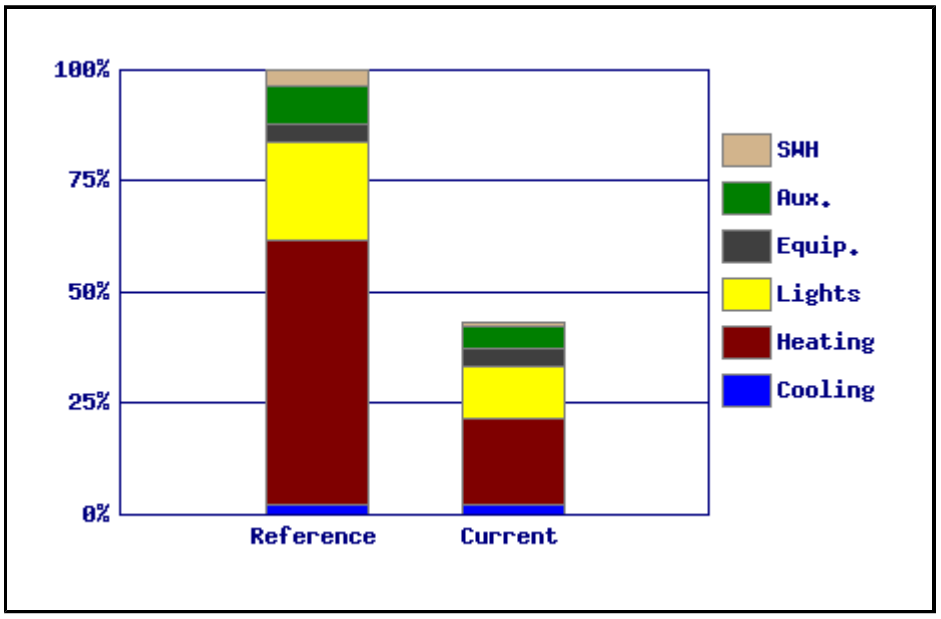
****Regulated energy costs exclude plug loads (equipment) for LEED.**

LEED Canada EA Credit 1	**6 points**

Emissions Savings

Carbon Dioxide (CO_2)	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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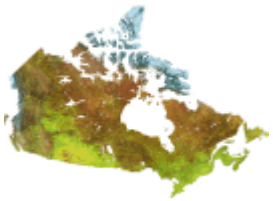


Screening Tool For New Building Design

Screening Tool Summary

Project Description

Your Project Description:

029-129

Building Profile Summary

Proposed Building:	Multi-Unit Residential, 32632 m²
Location:	Edmonton (B), Alberta
Heating System:	Fossil Fed Fan Coils

Utility Rates

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

$ 0.080 per kWh	$ 16.445 per GJ
$ 3.000 per kW	$ 0 per litre oil/propane

Building Shell

	Reference Building	Your Design
Average window-to-wall-area ratio:	19.5	19.5 %
Overall window USI-value:	3.2	2.05 W/m²°C
Window shading coefficient:	0.736	0.34
Overall wall RSI-value:	2.083	3.15 m²°C/W
Gross exterior wall area:	12864	12864 m²
Roof type:	All other	All other
Overall roof RSI-value:	2.439	6.19
Gross exterior roof area:	9521	9521 m²

Mechanical System

Web Screening Tool Summaries

	Reference Building	Your Design
Heating efficiency:	80	84 %
Minimum outside air:	0.49	0.49 l/s/m²
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 Building	Your Design
Average lighting density:	10	5.68 W/m²
Lighting controls (select if applicable and enter floor area):		
None		0 %
None		0 %

Parkade lighting

	Reference Building	Your Design
Parkade floor area:	0	0 m²
Average lighting density:	3.2	3.2 W/m²
Percent of lighting load with occupancy sensor control:	0	0 %

Process Loads

	Reference Building	Your Design
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	
Energy Savings	**13,411**	**39.3%**

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

LEED® Canada Energy & Atmosphere (EA)

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

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

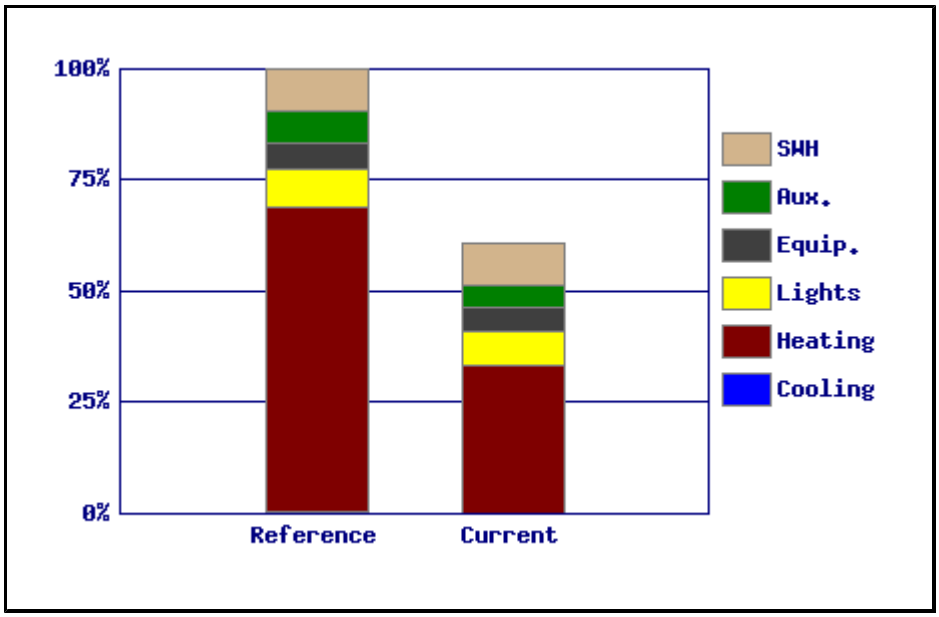
LEED Canada EA Credit 1 **4 points**

Emissions Savings

Carbon Dioxide (CO_2) 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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