Exhibition Place

Enercare Centre

Energy Performance Report

2012 - 2014

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INTRODUCTION

Exhibition Place, as part of the 2014 – 2016 Strategic Plan has set a goal to reduce the impact of our operations and our business on all aspects of the environment. To meet this goal, we recognize the critical importance of improving the efficiency of existing buildings and reducing our energy consumption.

Two of the main steps towards reducing energy consumption are as follows;

- Firstly, ensure we have systems in place to improve efficiency of our energy use.
- Secondly, effectively track energy use to understand existing conditions and trends in order to forecast for the future to improve efficiencies.

This report covers the energy use for Enercare Centre for calendar years 2012, 2013 and 2014.

Enercare Centre was constructed and opened in 1997 and is the largest exhibition centre in Canada and the 6th largest in North America with 599,703 sq. ft of contiguous exhibit floor space. From an energy consumption perspective, the gross floor space of the complex consists of 1,282,820 sq. ft. of new space completed in 1997. This space is joined to 602,240 sq. ft. of heritage space built in 1922.

Since its opening, Exhibition Place has undertaken several initiatives within the Enercare Centre to reduce its energy load. Some of these initiatives include the following:

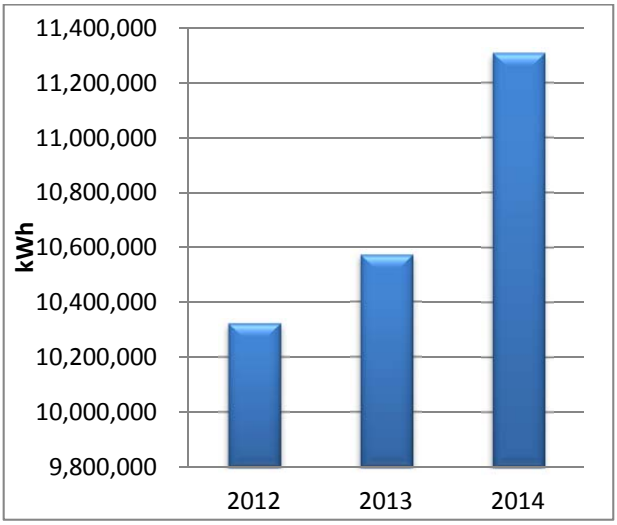
- Energy efficiency retrofits
- Energy policies
- HVAC retrofits
- Water savings programs

In 2014, Enercare Centre achieved LEED Gold EBOM certification and was the first exhibition centre in Canada to achieve this designation.

TOTAL ELECTRICAL CONSUMPTION

Figure 1 compares the total electricity consumption of Enercare Centre over the reporting period 2012, 2013 and 2014.

Figure 1 – Total electricity consumption



Years	% Increase
2012 vs. 2014	9.56%
2013 vs. 2014	7%
2012 vs. 2013	2%

FACTORS CONTRIBUTING TO INCREASES:

- The largest increase in energy consumption is primarily due to a higher rate of construction and maintenance in 2014 compared to previous years and to the colder winter weather temperature as shown in Figure 3.

- The Tri-generation Plant within the Enercare Centre is also enrolled in the demand response program (DR3) of the Ontario Power Authority (OPA). Over the study period, DR3 mainly operated when requested by the OPA but also ran when determined to be financially feasible to Exhibition Place. Under this program, Exhibition Place reduces their energy demand at specific times depending on the need of the Ontario power system. This is done by switching to on-site generation.

    - In 2012, DR3 did not restrict Exhibition Place from running the system on business days. The Tri-generation system was called to run under the program six times and in total ran 35 times and generated 428,586 kWh.
    - In 2013, DR3 was called three times and in total ran five times and generated 37,851kWh.
    - In 2014, the new DR3 program limited as to when the Tri-generation system could run and it was not called to run at all but ran a total of three times and 6,690 kWh was generated.

- Permanent staff relocation from the Queen Elizabeth Building to Enercare Centre in 2014 resulted in increased air conditioning loads, increase lighting, as well as exhaust fan use, due to increase parking garage activity.

MONTHLY ELECTRICAL CONSUMPTION

Figure 2 compares the monthly electricity consumption of Enercare Centre over the reporting period 2012, 2013 and 2014 and Figure 3 shows the comparison of average temperature for the period.

Figure 2: Monthly electrical consumption

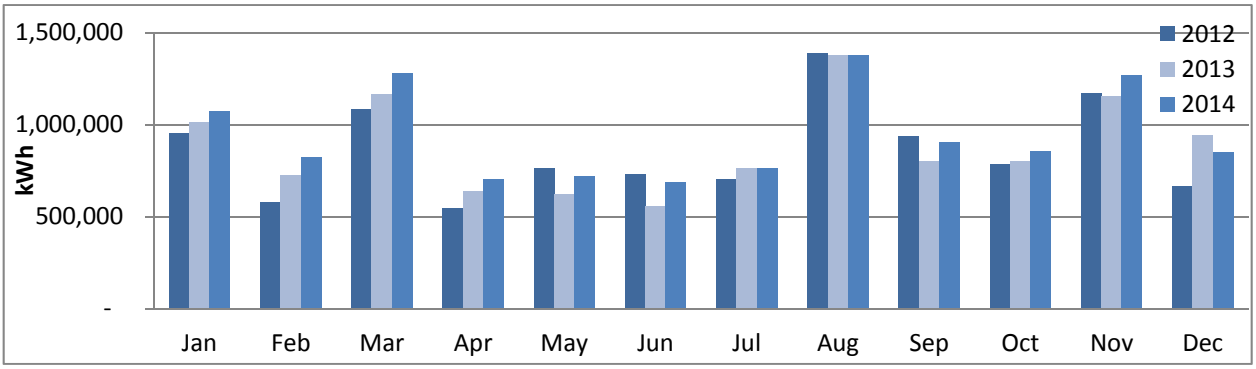


Figure 3 - Comparison of average temperature for 2012, 2013 and 2014

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2012	-1	1	7	8	17	21	25	22	17	11	5	2
2013	-1	-3	1	7	16	19	23	21	17	12	3	-3
2014	-6	-6	-3	7	15	20	21	21	17	12	3	1

FACTORS CONTRIBUTING TO INCREASES:

- Weather temperatures play an important role in the electricity consumption of Enercare Centre. Roof de-icing and snow melting devices are part of Enercare Centre electrical load and consume more electricity in cold weather and during the snow season. Weather temperature in the winter months (January, February and March) were on average 4°C and 7°C colder in 2014 compared to 2013 and 2012 as shown in Figure 3. Accordingly, January, February and March 2014 consumption is higher than 2013 and 2012.

FACTORS CONTRIBUTING TO INCREASES Cont'd:

- Increased show activity within the exhibitions halls also causes increased electricity consumption. The increase in show activity noted below caused an overall increase in consumption of 38473 kWh.
    - The Sex Show was held for the first time in October 2014
    - Print World event was held for the first time at Enercare Centre in November 2014
    - The NCA exam had 2 additional event days

- The increase in energy consumption in 2014 is also due to a higher rate of construction and maintenance in 2014 compared to previous years for the following projects:
    - Washroom renovation
    - Salon Renovation

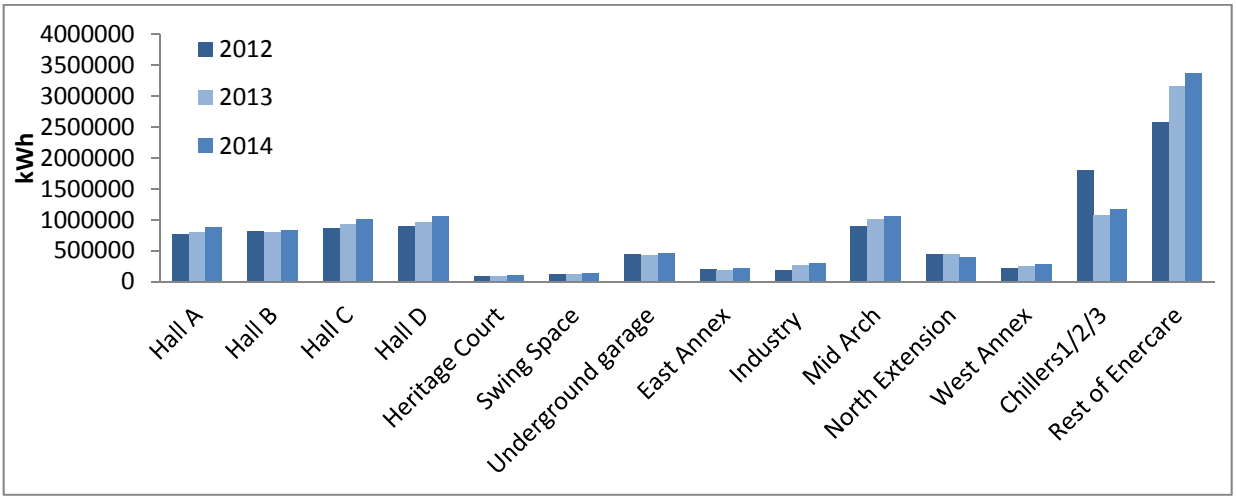
- Certification of the Centre in 2014 for LEED Gold EBOM required increased fresh air be brought to the building to meet LEED standards and this resulted in increased HVAC costs.

- From Mid-September 2012 to Mid-November 2012, the Carma meters were not working and did not record the consumption properly. The consumption is estimated during this period. As a result, the total 2012 electricity consumption shown in Figure 1 is an estimated number only.

ELECTRICAL ENERGY DISTRIBUTION

Figure 4 compares the electricity consumption distribution of Enercare Centre for the reporting period.

Figure 4: Electricity consumption distribution



Note:

- Part of Mid Arch consumption includes the corporate offices of the Royal Agricultural Winter Fair (RAWF) and electricity usage in these offices is not sub metered.
- Part of West Annex consumption is the storage usage for Maple Leaf Sports & Entertainment (MLSE) on the first and second floor which is not sub metered.

FACTORS CONTRIBUTING TO INCREASES:

- The "Rest of Enercare" category is the largest sector of energy used in the Enercare Centre and represents 25% of the total building load in 2012, 30% in 2013 and 30% in 2014. Some of the areas that are not sub metered are:

    - Mechanical rooms
    - Search lights
    - Kitchen
    - One of the concessions
    - Cooling towers
    - Chiller 4
    - Roof De-icing system
    - Roof Snow Melting system
    - Salons and meeting / board rooms used by events and staff

- Because these loads are not separately sub-metered the end use cannot be determined. More studies should be done to specify all the areas/devices that are not sub metered to determine if any conservation measures should be put in place.

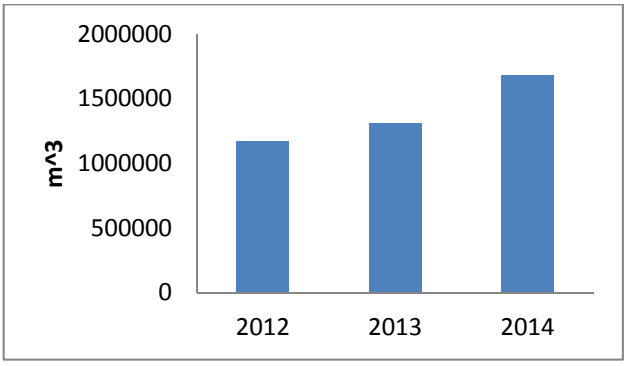
NATURAL GAS CONSUMPTION

Figure 5 compares the total gas consumption of Enercare Centre over the reporting period. The Natural Gas Consumption of the Enercare Centre is tracked monthly by the following five meters:

- Enercare Centre
- North Extension
- Mid Arch
- Industry Building
- East Annex

The entire base heating of the Enercare Centre is provided by Natural Gas with electric fans used to distribute this heat.

Figure 5: Comparison of total gas consumption



Years	% Increase
2014 vs. 2012	44%
2014 vs. 2013	28%
2013 vs. 2012	12%

Figures 6 compare the monthly gas consumption of Mid Arch over the reporting period 2012 – 2014 by Heating Degree Day (HDD).

A heating degree day (HDD) is a way to measure how cold it has been over a 24 hour period. It is determined by calculating the mean daily temperature for the day and subtracting it from a base temperature. Degree days are a good way to keep track of how much demand there has been for energy needed to heat buildings. The colder it is outside, the more degree days (HDD) and the more energy required to heat buildings

Figure 6: Mid Arch meter monthly consumption comparison

Month	2012 (m^3)	2012 HDD	2013 (m^3)	2013 HDD	2014 (m^3)	2014 HDD
Jan	104086	640	93015	589	114907	649
Feb	93998	559	87861	588	114996	677
Mar	29076	365	92522	515	124984	619
Apr	4851	337	53696	334	70257	312
May	0	91	3149	97	20511	117
Jun	0	26	0	26	0	7
Jul	0	0	0	0	0	2
Aug	9396	4	0	1	0	4
Sep	0	94	0	71	0	56
Oct	2673	253	3682	167	2228	203
Nov	42278	446	46151	408	75211	440
Dec	76551	561	92752	637	106754	514
Total	**362909**	**3376**	**472828**	**3432**	**629848**	**3600**

FACTORS CONTRIBUTING TO INCREASES:

- Part of MidArch increase in gas consumption in 2014 was due to the back pressure steam turbine testing. Mid Arch consumption in 2014 was 33% higher than 2013 while gas consumption in the remainder areas of Enercare Centre is 25% higher in 2014 over 2013. Figure 6 compares MidArch gas consumption in 2012, 2013 and 2014.

- The natural gas consumption is heavily dependent on weather and events that require the use of natural gas. The colder it is outside, the more energy is required to heat buildings. Again, as noted in Figure 3, the weather temperature in the winter months of 2014 (January, February, March) was colder by 4C and 7C respectively compared to 2013 and 2012.

- The Mid Arch gas meter shows the gas consumption of the three boilers located in MidArch and also the gas usage of the boiler that heats the corporate offices of the RAWF.

Figure 7 compares the monthly gas consumption of Enercare Centre over the reporting period 2012 – 2014 by Heating Degree Day (HDD).

Figure 7: Enercare Centre meter monthly consumption comparison by HDD

Month	2012 (m^3)	2012 HDD	2013 (m^3)	2013 HDD	2014 (m^3)	2014 HDD
Jan	193747	640	144747	589	181342	649
Feb	82661	559	126514	588	188611	677
Mar	99859	365	122628	515	226357	619
Apr	54296	337	50052	334	82759	312
May	32995	91	16414	97	15571	117
Jun	15893	26	2195	26	3723	7
Jul	3685	0	3812	0	2198	2
Aug	17554	4	3724	1	4547	4
Sep	23028	94	16201	71	11117	56
Oct	55338	253	63680	167	25851	203
Nov	136505	446	127190	408	175440	440
Dec	82701	561	152625	637	124073	514
Total	**798264**	**3376**	**829589**	**3432**	**1041589**	**3600**

FACTORS CONTRIBUTING TO INCREASES:

- As shown above, heating degree days over the winter months of January, February and March for 2014 were 15% higher than in 2013. For the same period, the Natural Gas use in the Enercare Centre was 51% higher than in 2013. The annual natural gas consumption in 2014 was 26% higher than 2013.

DISTRICT ENERGY SYSTEM

The District Energy System (DES) is a thermal energy distribution system for multiple buildings and consists of a heating and cooling central plant within the Enercare Centre and a thermal network of pipes connecting groups of buildings.

Through the Air Handling Units in the Enercare Centre, the DES provides cooling by supplying chilled water to Enercare Centre, Allstream Centre, Ricoh Coliseum and Hotel X. In 2014, of the total produced by the DES, 224,615 Ton-Hour of chilled water was provided by the DES to Enercare Centre. There is no data recorded for the years 2012 or 2013. The Air Handling Units use electrical power and all the electricity consumed to make the chilled water and transport it across the grounds for the DES is recorded under the Enercare data.

In addition, the DES provides heating and domestic hot water for Enercare Centre and also provides heating for the Allstream Centre ballroom and the building make up air. There is no data recorded for the years 2012, 2013 or 2014 for the consumption during these years, however, the baseline consumption is averaged at 111,200 m^3. While partially supplying Allstream Centre, all gas consumption for the DES and all cost of that consumption is recorded under the Enercare Centre and reported in Figure 5.

GREENHOUSE GASES

The City of Toronto has established aggressive targets to reduce Greenhouse Gas (GHG) emissions as set out in Figure 8 below. The primary greenhouse gases are carbon dioxide (CO2), sulphur oxides (SOx), nitrous oxide (NOx), water vapor, methane and ozone. As an agency of the City of Toronto, Exhibition Place both tracks its GHG emissions and aims to reduce them to help meet the City target.

Figure 8 -The City of Toronto's Emission Reduction Targets

	Air Quality Contaminants (2004 Baseline)	Greenhouse Gases (1990 Baseline)
2012	20%	6%
2020	--	30%
2050	--	80%

The City of Toronto has developed a greenhouse gas and air quality inventory program that has the primary purpose of tracking the progress of the City Community and the City Government (the latter as a subset of the City Community) towards achieving its adopted greenhouse gas and air quality emission reduction targets outlined above. The targets set by the City are absolute targets rather than relative targets, meaning they are independent of population growth or decline, economic growth or decline, or weather variability (e.g., hot summers that lead to more electricity consumption for air conditioning, and cold winters that lead to more natural gas consumption for space heating). The targets apply equally to the City Community and the City Government alike, but progress toward achieving the targets is cumulative. If a sector within the City Community overachieves it may be offset by a sector that underachieves, and vice versa. Equally, if a Division or agency of City Government overachieves it will offset those that do not.

Greenhouse gas emissions in CO2, NOx and SOx from electricity and gas use in the Enercare Centre is shown in Figure 9 and the total greenhouse gas emissions is shown in Figure 10.

Figure 9 - Green House Gas Emissions

Year	Electricity			Gas		
	Co2	NOx	SOx	Co2	NOx	SOx
	kg	kg	kg	kg	kg	kg
2012	367,194	524	95	2,355,911	1878	0.0188
2013	381,314	544	98	2,637,003	2102	0.0210
2014	398,210	568	103	3,381,970	2696	0.0270

Figure 10 -Total Green House Gas Emissions

	Co2	NOx	SOx
Year	kg	kg	kg
2012	2,723,105	2402	95
2013	3,018,317	2646	98
2014	3,780,180	3264	103

HYDRO EXEPENSE

The total hydro consumption is shown in Figure 4 and consists of Enercare, East Annex, MidArch, Industry, North Extension, West Annex and all electricity consumption for DES.

The total hydro cost for the consumption noted above is shown in Figure 11.

Figure 11 - Hydro cost

Year	Total Consumption [kWh]	Average Rate per Kwh $	Total Hydro Expense $
2014	11,312,031	0.1106	1,251,111
2013	10,573,590	0.1096	1,158,865
2012	10,325,199	0.1067	1,101,699

GAS EXPENSES

The total Natural Gas Consumption is tracked by five meters monthly: Enercare Centre, North Extension, Mid Arch, Industry Building, and East Annex.

Enercare gas meter shows the consumption of the kitchen, Trigen and Enercare Centre. It also includes gas usage of District Energy System (DES) located on the third floor of Enercare Centre that provides heating for Enercare Centre and part of Allstream Centre, as well as domestic hot water for Enercare Centre.

The Mid Arch gas meter shows the gas consumption of the three boilers located in MidArch and also the gas usage of the boiler used to heat the corporate offices for the RAWF.

Total gas consumption is shown in Figure 5 and the cost of that consumption is shown in Figure 12.

Figure 12: Gas Cost

Year	M3	Average Rate/M3	$
2014	1,685,087	0.273	460,029
2013	1,313,903	0.233	306,139
2012	1,173,847	0.210	246,508

FUTURE DIRECTIONS

Increasing the efficiency of existing electrical systems and energy consumption are key steps towards Exhibition Place's energy reduction goal. The following projects are targeted for 2015 to help us meet this goal.

- Replace existing lighting in the Halls in the Enercare Centre with higher energy efficiency lighting.
- Complete the automation of the rapid roll-up doors
- Upgrade existing District Energy System to add additional boiler and to provide heating and cooling to the new hotel.