

## **BROCK UNIVERSITY - 2011 Energy Consumption and Green House Gas Emissions**

This report provides a brief background and summary of the requirements relating to Ontario regulation 397/11 - Energy Conservation and Demand Management Plans. Reporting on energy consumption and greenhouse gas emissions is required for all broader public sector (BPS) organizations, including hospitals, municipalities, universities, colleges, school boards and municipal service boards (for water and sewage treatment and pumping operations) to:

- Report on their annual energy use and greenhouse gas (GHG) emissions in designated buildings/facilities for their 2011 energy consumption by July 1, 2013, and then annually thereafter.
- Develop and implement a Five-year energy conservation and demand management plans (CDM) plans by July 1, 2014.

### **Background**

On January 1st, 2012 the Energy Conservation and Demand Management Plans Regulation (O.Reg. 397/11) came into effect. In 2013, public agencies are required to prepare and publish a summary of their 2011 energy consumption and greenhouse gas emissions. The regulation requires public agencies to report their energy usage and Greenhouse Gas emissions on an annual basis and also develop a Five Year Energy Conservation and Demand Management (ECDM) Plan by July 1, 2014.

### **Reporting**

As required by regulation 397/11, the initial baseline consists of 2011 energy consumption and GHG emissions information. Table 1 below provides a summary of the campus energy usage and greenhouse gases from January 2011 to December 2011 that were included in the Energy Consumption and GHG Emissions template that was completed for the Ministry of Energy. The table outlines the electricity as well as natural gas consumption for each site and the total consumption for Brock University. It also breaks down the GHG emissions for each campus, as well as the energy intensity with the average intensity per area (square meters).

The requirements include:

- By July 1, 2013 public agencies are required to submit Energy Consumption and GHG Emissions template using 2011 data
- Public agencies are required to submit a Five Year Energy Conservation and Demand Management (CDM) Plan with detailed costs and estimated savings for all proposed Energy Conservation Measures, updated energy consumption and GHG Emissions (for 2012), identification of benchmark facilities, and optionally to report on previous energy conservation initiatives. Completed ECDM Plans are due July 1, 2014 and every five years thereafter.

## Brock's Cogeneration Plant

The concept behind co-generation is to use natural gas as a fuel source, and convert it to electricity and useful heat. Both heat and electricity must be captured and used efficiently to make the system economically viable. Brock's 6.4 MW natural gas-fired generating plant produces power for a large percentage of the university's needs. Each of these eight 1150 HP internal combustion engines produces 820 Kilowatts of electricity at 4160 volts turning a generator that produces electricity that is for campus power for lighting and equipment operation, building ventilation systems, operation of cafeterias, etc. As the generators produce power, for every 1 Kilowatt of electricity produced approximately 1.3 Kilowatts of heat is also generated for a total of up to 8.3 MW of heat. The recovered heat from the cogeneration engines is used to heat many campus buildings during winter, produce domestic hot water for most campus buildings. In the summer time, the recovered heat is converted by a Lithium Bromide Absorption Chiller to produce chilled water which is used for campus air conditioning systems.

Power, heat and cooling from the cogeneration plant is fed to a majority of the Main Campus buildings. The Cairns Family Health Bioscience Complex is provided with its own power, heating and cooling systems. Stand-alone heating and cooling systems are also provided for Plaza Building, Kenmore Center, Lowenberger and Earp Residences. On the satellite campuses, the buildings are provided with separate power feed, and each building has their own heating and cooling systems.

Energy Consumption and Greenhouse Gas Emissions Reporting - for 2011													
Confirm consecutive 12-month period (month-year to month-year)		Jan-2011 to Dec-2011											
Type of Public Agency (Sector):	Post-Secondary Educational Institution <i>Please fill in the mandatory fields indicated in red, in addition to submitting</i>												
Agency Sub-sector:	University												
Organization Name:	Brock University												
Operation Name	Operation Type	Address	City	Postal Code	Total Floor Area of the Indoor Space in which Operation is Conducted	Average # Hours Per	Energy Type and Amount Purchased and Consumed			Total			
							Electricity	Natural Gas	GHG Emissions (Kg)	Intensity (ekWh/sqft)			
Main Campus - cogen	Classrooms and related facilities	500 Glenridge Ave	St Catharines	L2S 3A1	51,514	Square meters	168		11,576,128	Cubic meter	21,686,140	221.9	
Main Campus - balance of campus purchased power	Classrooms and related facilities	500 Glenridge Ave	St Catharines	L2S 3A1	136,574	Square meters	168	2,822,598	kWh	1,411,179	Cubic meter	2,893,621	12.1
Main Campus CFHBRC	Laboratories	500 Glenridge Ave	St Catharines	L2S 3A1	16,388	Square meters	168	37,845	kWh	590,299	Cubic meter	1,119,063	35.8
Main Campus - John Decew School (BRIC)	Classrooms and related facilities	130 Lockhart Drive	St Catharines	L2S 3A1	1,604	Square meters	50	107,075	kWh	22,886	Cubic meter	51,835	20.3
East Campus - International Complex	Classrooms and related facilities	4 Norman Road	St Catharines	L2S 3A1	4,280	Square meters	90	597,924	kWh	48,480	Cubic meter	139,492	24.2
East Campus-East Academic 1	Classrooms and related facilities	460 St David's Road	St Catharines	L2S 3A1	675	Square meters	50	74,218	kWh	8,583	Cubic meter	22,165	22.8
East Campus-East Academic 2	Classrooms and related facilities	460 St David's Road	St Catharines	L2S 3A1	675	Square meters	50	103,189	kWh	11,545	Cubic meter	30,052	31.1
East Campus-East Academic 3	Classrooms and related facilities	460 St David's Road	St Catharines	L2S 3A1	675	Square meters	50	64,473	kWh	9,907	Cubic meter	23,888	23.4
East Campus - Quarryview	Student residences	5 Norman Road	St Catharines	L2T 4E4	10,773	Square meters	168	650,000	kWh	356,957	Cubic meter	726,873	38.3
East Campus - 573 Glenridge	Classrooms and related facilities	573 Glenridge Ave	St Catharines	L2S 3A1	2,979	Square meters	70	529,843	kWh	29,024	Cubic meter	97,261	26.1
Hamilton Campus	Classrooms and related facilities	1842 King Street east	Hamilton	L8E 1V7	6,728	Square meters	70	904,651	kWh	271,977	Cubic meter	586,579	52.4
Schmon Parkway (CPDC & ITS)	Administrative offices and related facilities	3350 Schmon Parkway	Thorold	L2S 3A1	565	Square meters	55	53,069	kWh	6,091	Cubic meter	16,225	20.3
Rodman Hall	Classrooms and related facilities	109 St Paul Cres	St Catharines	L2S 1M3	2,044	Square meters	71	101,917	kWh	29,615	Cubic meter	64,144	18.9
<b>TOTAL</b>					<b>235,474</b>	<b>Square meters</b>		<b>6,052,602</b>	<b>kWh</b>	<b>14,372,671</b>	<b>Cubic meter</b>	<b>27,657,568</b>	<b>117.4549</b>