



PERFORMANCE DATA APR 2014 / MAR 2015

The Centre for Interactive Research on Sustainability (CIRS) has an ongoing monitoring process to document and analyze the building's resource consumption through a state-of-the-art building management system (BMS) and a network of close to 3,000 sensors.

The performance monitoring data improves understanding of the building sub-systems, supports the implementation of continuous optimization protocols and substantiates research projects.

This report presents the data acquired between April 2014 and March 2015.

From fall 2014 to spring 2015 the heating system of the Earth, Ocean and Atmospheric Sciences (EOS) building was renovated and connected to the new Academic District Energy System. This more efficient hot water heating system will replace UBC's aging steam heating infrastructure. Deficiencies found in the EOS/CIRS heat exchange system were also corrected at that time.

As a consequence, the heat exchange system supplying heat to the EOS building was not operational during the period covered by this report and was not able to contribute to the reduction of the CIRS operational GHG emissions.

GREEN HOUSE GAS EMISSIONS

The total green house gas emissions for the period of April 2014 and March 2015 was 6.75 tCO₂e. In this year the total emissions were not net positive in terms of operational energy due to the EOS/CIRS heat exchange system renovation.

	Energy Use (MWh)	GHG Emissions (kg of CO ₂ e)
Electricity from the grid	689	6,886
PV panels	14	-141
EOS/CIRS exchange (Heat sent to EOS)	N/A	N/A
TOTAL	705	6,745

The conversion factors considered for the GHG emissions calculation were the values defined by the British Columbia Ministry of Environment for natural gas and electricity produced by BC Hydro in the 2014 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions.

The calculation also considered an 84% efficiency of the new UBC hot water system.

ELECTRICITY USE

The measured annual energy consumed from the electrical utility provider between April 2014 and March 2015 for CIRS is 689 MWh.

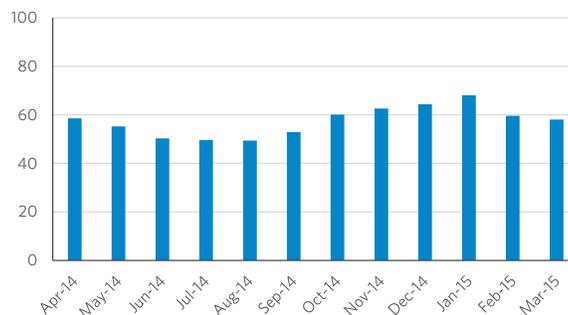
Without considering the reductions in energy gained through the exchange of excess heat with the EOS building, this results in a building EUI of 121 kWh/m².

PHOTOVOLTAIC PANELS

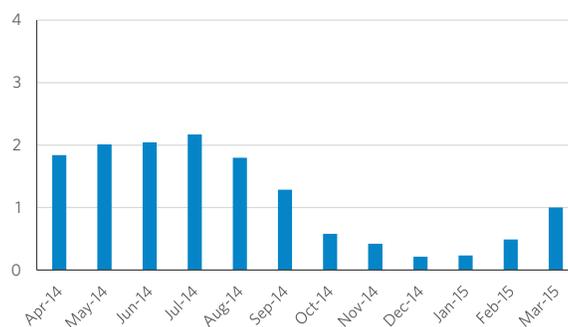
The measured annual energy produced by the photovoltaic panels in the building between April 2014 and March 2015 was 14 MWh, which represents 2% of the total utility electrical consumption.

The production peak happened in July 2013 with a total of 2.17 MWh and December 2013 had the lowest value of 0.21 MWh.

Electrical utility meter (MWh)



Photovoltaic Panels (MWh)

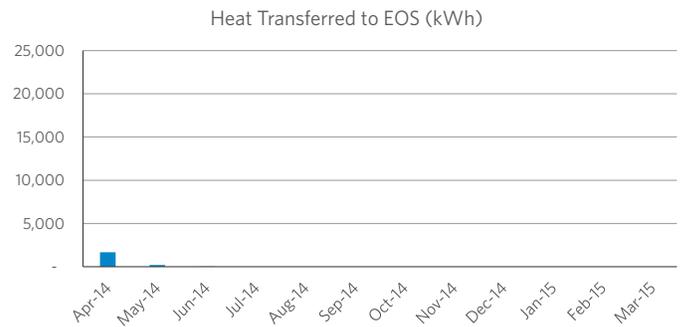
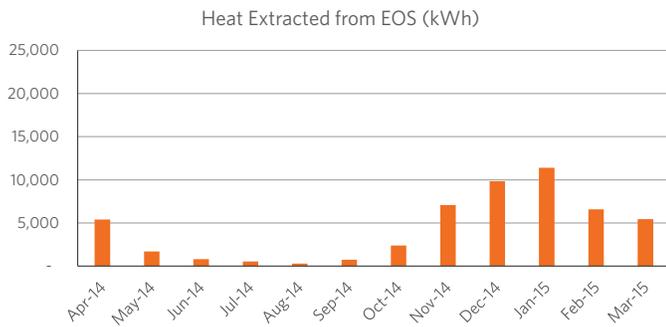


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EOS/CIRS HEAT EXCHANGE

The measured annual heat extracted from exhaust ventilation of the EOS building is 52 MWh and the measured annual heat transferred to EOS from CIRS is 2 MWh. The heat sent to EOS displaces the use of natural gas, reducing the campus-wide emissions of GHGs.

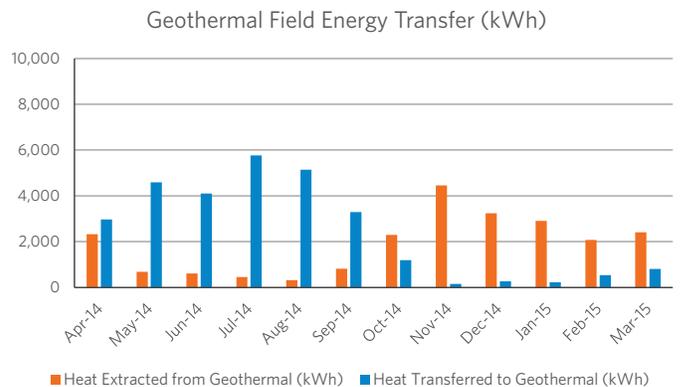
Due to the EOS building heating system renovation, the heat exchange between EOS and CIRS was only partially operational during the period covered by this report. Heat was able to be extracted from EOS for use at CIRS, however the amount of heat transferred to EOS was not significant for most of the year.



GEOHERMAL FIELD

Between April 2014 - March 2015, the measured total heating energy extracted from the geothermal field at CIRS was 22,579 kWh. During the same time period the heat transferred to the geothermal field, the cooling energy, was 29,044 kWh.

This thermal energy transfer between the building and the ground provided heat during the winter and cooled the building in the summer.



WATER USE

Between April 2014 and March 2015, the measured total water use for CIRS was 1,285,500 Litres. This demand was met by the municipal water supply due to regulatory and operational issues that have thus far prevented the use of the rainwater and reclaimed water systems. A recommissioning project for the water systems has been undertaken as of June 2015 with targeted completion on the summer of 2016.

