



## PERFORMANCE DATA APR 2013 / MAR 2014

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.

The process of analyzing the data acquired through the monitoring system is itself under continuous improvement to provide more detailed analysis and increase the accuracy of the resulting data.

This report presents the data acquired between April 2013 and March 2014.

During this period, in the months of February and March 2014, there was a communication problem between the water meters and the BMS which made it impossible to determine the usage for the individual months. Therefore, the data presented is the combined water consumption for those two months.

## GREEN HOUSE GAS EMISSIONS

The total green house gas emissions for the period of April 2013 and March 2014 was -2.22 tCO<sub>2</sub>e, which demonstrates that the building is net positive in terms of operational emissions.

	Energy Use (MWh)	GHG Emissions (kg of CO <sub>2</sub> e)
Electricity from the grid	787	11,014
PV panels	17	-238
EOS/CIRS exchange (Heat sent to EOS)	57	-12,761
<b>TOTAL</b>	<b>877</b>	<b>-2,221</b>

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 2013 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions.

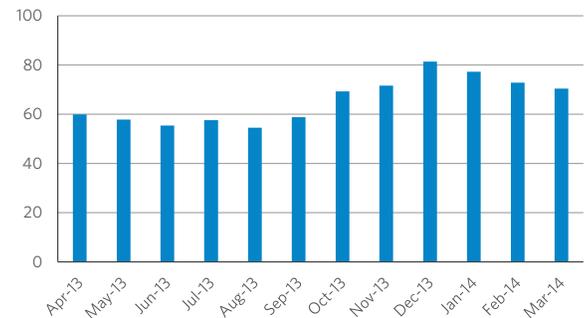
The calculation also considered an 80% efficiency of the UBC steam system.

## ELECTRICITY USE

The measured annual energy consumed from the electrical utility provider between April 2013 and March 2014 for CIRS is 787 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 139 kWh/m<sup>2</sup>.

Electrical Utility Meter (MWh)

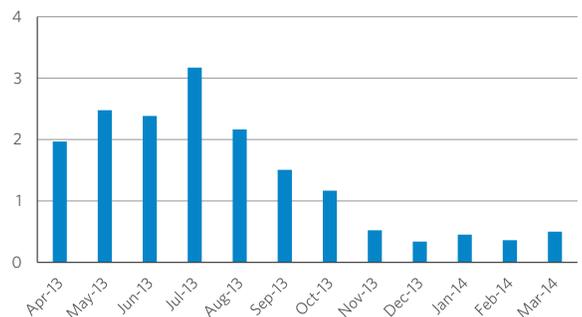


## PHOTOVOLTAIC PANELS

The measured annual energy produced by the photovoltaic panels in the building between April 2013 and March 2014 was 17 MWh, which represents 2% of the total utility electrical consumption.

The production peak happened in July 2013 with a total of 3.17 MWh and December 2013 had the lowest value of 0.34 MWh.

Photovoltaic Panels (MWh)



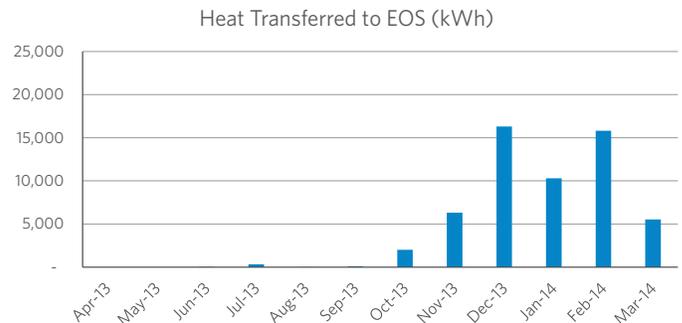
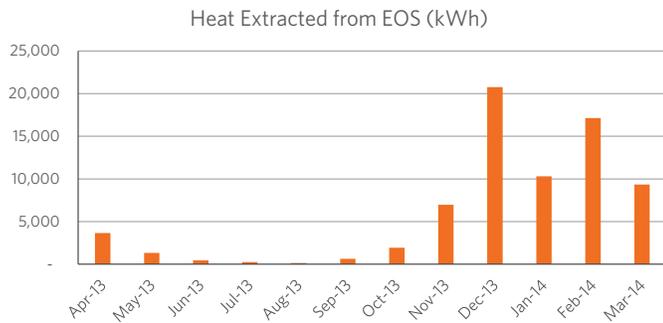
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## EOS/CIRS HEAT EXCHANGE

The measured annual heat extracted from exhaust ventilation of the EOS building is 73 MWh and the measured annual heat transferred to EOS from CIRS is 56 MWh. The heat sent to EOS displaces the use of natural gas, reducing the campus-wide emissions of GHGs.

These numbers present a significant difference from the ones presented in the 2012 - 2013 report.

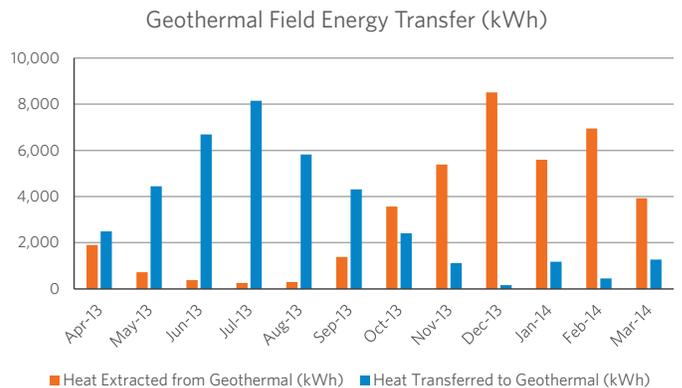
The energy meters fail to account for the transit time in the heat exchange loop leading to a slightly exaggerated amount of total heat from the system. This measurement error was not recognized in previous reports and has been corrected in the current analysis.



## GEO THERMAL FIELD

Between April 2013 and March 2014, the measured total heating energy extracted from the geothermal field at CIRS was 38,874 kWh. During the same time period the heat transferred to the geothermal field, the cooling energy, was 38,460 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 2013 and March 2014, the measured total water use for CIRS was 1,678,400 Litres. This demand was met by the municipal water supply due to regulatory and operational issues that have prevented the use of 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.

