

# URBANDALE CENTRE FOR HOME ENERGY RESEARCH

Faculty of Engineering and Design

July 2015

## The Facility

Carleton University in Ottawa, Ontario, is expanding its research in modern sustainable residential design. The Centre for Home Energy Research (CHEeR) house will make use of solar thermal energy, seasonal thermal storage, and provide a test bed for various innovative concepts with the aim of reducing the overall energy demands. Single-family detached is the dominant form of housing in the residential sector which contributes to 17% of Canada's total energy end use. As such, the research conducted on this fully equipped research house will be invaluable in finding ways to reduce energy consumption in the residential sector. The CHEeR house is a full-scale, single-family detached house built on university campus by Urbandale Construction to meet the 2012 R2000 standard set to be complete by end of summer 2015.

## The Research

Like many new houses and condos, the CHEeR house has very large windows which will cause overheating and high air-conditioning loads unless the solar gains are controlled. A solution, led by professors Ian Beausoleil-Morrison and Liam O'Brien, uses advanced window blind controls to control blinds that optimize energy use, peak loads, occupant comfort, and views to the outside is being developed. While automatic controls can improve building performance, most current algorithms are reactive; thus they control blinds when it's too late and the space had already warmed up. A novel approach is to use predictive controls, such that the controller incorporates knowledge of weather forecasts to optimally set blind positions.



Above: CHEeR house under construction exterior

Right: CHEeR house under construction interior

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## Industry Partnerships

Industry-research collaboration provides companies with unique knowledge, expertise and educational resources while increasing brand awareness. Your donation makes a direct contribution to developing innovation and change in the fields of residential construction and energy efficiency. Many industry partners have already generously contributed to the CHEER house through

INDUSTRY BENEFITS	
Access to blind optimization research	<input checked="" type="checkbox"/>
Access to visit the research site	<input checked="" type="checkbox"/>
Logo on research house website	<input checked="" type="checkbox"/>
Acknowledgment on research papers and presentations	<input checked="" type="checkbox"/>
Posters mounted inside the research house (not accessible by public)	<input checked="" type="checkbox"/>

We are committed to providing industry partners with the best possible return on their valued investment. It is therefore our pleasure to work closely with your company to meet your specific needs and requests. Please do not hesitate to contact us with any ideas that you may have to create more value for your company.

### CONTACT

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## How To Contribute

The CHEER team is now seeking equipment donation or loans for blinds, motors, actuators and installation hardware to conduct the research.

### Roller or Venetian Blinds:

- ▶ 0% light transmittance (black out)
- ▶ Very light and reflective colour not to absorb or emit solar radiation
- ▶ Sturdy, durable material
- ▶ Guide rails for smooth operation and to prevent light transmittance

### Motors & Control:

- ▶ Intelligent DC motors (capable of RS-485 communication)
- ▶ Alternatively, dumb DC motor, with RS-485 capable control/actuator board

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### Dimensions:

- ▶ **Window opening dimension type 1:**  
H: 26-1/4"  
W: 42-1/2"  
D: 4-5/8"  
Quantity: 2
- ▶ **Window opening dimension type 2:**  
H: 71-3/8"  
W: 42-1/2"  
D: 4-5/8"  
Quantity: 11