



**THE UNIVERSITY  
OF QUEENSLAND**  
AUSTRALIA



### **GCI's LIVING BUILDING**

The Global Change Institute works to address the challenges presented by climate change, technological innovation and population change. The institute achieves this through collaborative research across four key themes: clean energy, food systems, healthy oceans, and sustainable water.

A flagship sustainability project for The University of Queensland, the GCI Living Building is uniquely designed to work in harmony with the natural environment, achieving a zero-energy, zero-carbon workplace. The building is a research tool and discussion point for innovative building systems, nationally and internationally.

The GCI building does not use a standard commercial air-conditioning system. For 80 per cent of the year, it relies on natural ventilation – automated louvers keep air flowing throughout the office spaces and into the atrium. In fact, the building uses about 40 per cent less energy than it would need had it had been engineered with standard commercial air-conditioning.

A \$32 million investment in innovative technologies, the GCI Living Building was made possible by a \$15 million donation by UQ alumnus and philanthropist Graeme Wood (founder of wotif.com) – with the balance contributed by UQ.

Staff moved into the building in September 2013.

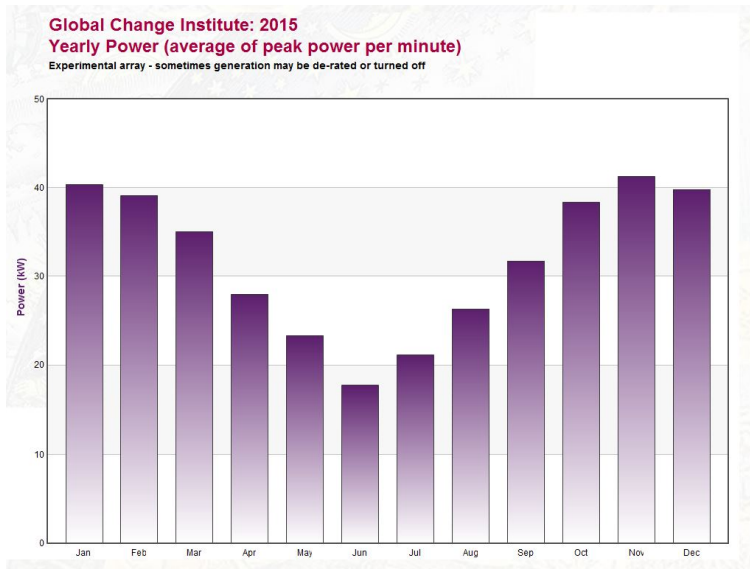
GCI's Living Building has been awarded a '6 Green Star' rating from the Green Building Council of Australia and was recently ranked among the world's 50 most impressive environmentally friendly university buildings. In 2015 the building won seven national/state awards:

- David Oppenheim Award for Sustainable Architecture
- National Award for Interior Architecture – Australian Institute of Architects
- Qld State Awards. G.H.M Addison Award for Interior Architecture
- Qld State Awards. Harry Marks Award for Sustainable Architecture
- Qld State Awards. R.G Suter Award for Educational Architecture
- Commendation for Interior Architecture – Institute of Architects Brisbane Regional Awards
- Commendation for Educational Architecture – Institute of Architects, Brisbane Regional Awards

### **ENERGY**

The GCI building is 100 per cent powered by renewable energy. There are 480 photovoltaic panels on the roofs of GCI and the adjacent heritage building, which are designed to collect 175,000 kWh hours a year. This is the equivalent power consumption of 21 average domestic Australian households (at 8000 kWh hours a year). In 2015, the Global Change Institute's solar array total generated 162,854.58 kWh of clean energy, representing a saving of some 131 tonnes of CO2 emissions or an estimated \$17,000.





**LEFT:** The solar array on the Living Building roof generated 162,854.58 kWh of clean energy in 2015.

**CENTRE:** GCI has more than six tonnes of RedFlow batteries, which allows it to operate its lights and cooling systems for three days.

**BELOW:** The basement of the building conceals a sophisticated pumping system that helps to regular interior temperatures by directing chilled water to cooling systems.

## ENERGY STORAGE

Another feature of the GCI building is its RedFlow batteries, which are designed to last for decades. Using a patented technology created in Brisbane by two UQ Alumni, Redflow batteries require little ongoing maintenance and can be totally discharged without reducing their longevity.

GCI's zinc-bromide RedFlow batteries – with total capacity of 288kWh – are charged by rooftop solar panels, and have enough power to run the building's cooling systems for three days.

## OTHER ENERGY-SAVING FEATURES

Energy harvested from the rooftop solar panel heats water in a basement storage tank to 80 °C. The heated water is used to drive the building's comfort cooling system which activates when the outside temperature reaches 28 °C. The system uses de-humidification and evaporative cooling units to chill fresh air.

During the hottest part of the year, in-slab cooling or hydronic floor panels are flushed with chilled water to cool the building structure. The in-slab cooling and comfort cooling are complemented by motorised, automatically operated external louvres which help to shade the building and protect it from storms.

