Global Change Institute Innovative Thinking to Transform the Role of Buildings

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> ***Mark Roehrs*** *leads the Architecture team of HASSELL Brisbane. He has led the delivery of significant science and education projects in the last 20 years and is highly regarded by science and education clients for his ability to innovatively brief and design projects with a particular interest in collaborative and interactive research workplaces and the potential for co-location and sharing. Mark has been involved in numerous tertiary education projects in recent years including the Creative Industries Precinct for Queensland University of Technology, the Collaborative Futures Project for the University of the Sunshine Coast, and for University of Queensland, the Global Change Institute and Advanced Engineering Building.*

The Global Change Institute makes a significant shift from thinking of buildings as consumers of resources to being contributors to the regeneration of the environment.

This building will be Zero Energy, Zero Carbon and Zero Water.

The Global Change Institute is the flagship sustainability project for the University of Queensland, an exemplar to sustainable best practice and the "front-door" for the university's initiatives in sustainable education and research. The building itself is established as a research tool for sustainable subtropical building systems and the understanding of comfort conditions in a naturally ventilated sub-tropical environment.

It aims to be in natural ventilation mode for 88% of the year and consume only 40% of the energy of the GBC benchmark education project. Powered by solar energy it will provide an innovative comfort conditioning strategy in closed ventilation modes.

The building will be the first structural use of Geopolymer concrete, a low carbon concrete product.

The Living Building Challenge has been used as the sustainability framework and this project will be one of the first in Australia to seek certification under this system. This system provides a comprehensive sustainable approach in which all energy and water must be harvested, the building must be rooted in its place and adapted to climate and site and it must be pollution free. Importantly it also values equity, inspiration, education and beauty as key components of a sustainable response.

The following initiatives indicate the comprehensive range of sustainable responses engaged in this transformational project.

SITE
Brownfield site
Adding to an historic building
Bush tucker garden
Bio-retention basin
Campus sustainability walk
Extending campus pedestrian linkages
No addition of cars to the campus

WATER
Rainwater storage- scale jumping to capture adjacent heritage building (60,000 litre storage for showers, greenwall and comfort conditioner cooling cycle)

Blackwater treatment supplies water for toilet flushing
Rainwater overflows contained in bio-retention basin

NET ZERO ENERGY
100% renewable energy with photovoltaic power + battery storage
40% energy use of benchmark GBC education building
Free energy thermal conditioning in mixed modes
Motorised operable sun-shading and louvred facade
Thermal chimney
Thermal labyrinth
Displacement air and individual workstation controlled air
Hydronic cooling of thermal mass
Optimal natural lighting
LED lighting

HEALTHY ENVIRONMENT
Natural ventilation
High airflow rates
Individual air control at workstations
Once through air for all but extreme heat days
Green-wall
Materiality and natural light
CO2 Monitoring
Humidity Monitoring
Motion Sensors

ZERO CARBON
Once off carbon offset for construction with planting at UQ owned property
Carbon neutral in operation
100% net annual renewable energy
Geopolymer structural precast concrete
Extending and adaptively reusing an existing building including scale jumping for roof use for water collection and photo-voltaics
Recycled timber
Natural stone
No PVC
Recyclable materials
Recycled materials
Responsible industry

EQUITY
Towards a paper free environment
Open plan collaborative environments
Collaborative learning environments

INSPIRATION AND EDUCATION
Building as a research tool for sub-tropical building performance research
GCI as exemplar and centre of public education for UQ sustainability agenda
UQ 1.2MW solar array control centre
A new public room for the university
Beautiful and inspiring spaces
Green Office Program – 75% paper use reduction
Activity based office and learning environments
Cyclist facilities
Art Installation and rich materiality
Interactive real-time building performance monitoring