

Project 1.1

Understanding the Performance of Existing Office Buildings to Inform Energy Reduction Initiatives



RESEARCH PROGRAM 1: GREENING THE BUILT ENVIRONMENT

Efforts to reduce carbon emissions in the buildings sector have been focused on encouraging green design, construction, and building operation; however, the business case is not very compelling if considering the energy cost savings alone. In recent years green building has been driven by a sense that it will improve the productivity of occupants, something with even greater economic returns. However reducing energy demand in existing commercial buildings in a holistic way that supports an ongoing productive workplace is not yet well understood, and involves a set of complex and interdependent factors. The focus of this project is to provide a low complexity guiding framework to assist efforts to understand such factors and support efforts to undertake upgrades to existing office buildings.

The framework is being developed in 5 key areas to form the 'Energy Performance Nexus', namely:

- The buildings' energy-related design elements,
- The building occupants' experience,
- The indoor environment conditions,
- The scope of tenancy agreements (including leasing arrangements), and
- The building management systems.

In collaboration with project partners, the research team from Curtin University and Queensland University of Technology (QUT) are focusing on assessing a range of case studies and undertaking direct data collection, across the five nodes of the 'Energy Performance Nexus'. The investigations build on other studies associated with the performance of green commercial buildings to provide an in-depth level of enquiry, to investigate the inherent complexity of greening commercial buildings and to create a platform for further performance improvement.

The final report for the project will focus on outlining the findings across each of the five nodes of the 'Energy Performance Nexus' and exploring how an understanding of their interactions will provide value to industry and government. This will include: the comprehensive data collection methodologies; outlining specific findings from the data collection; summaries of case study analysis; and making a series of recommendations to industry and government.

Project partners include: Queensland Department of Public Works, Western Australia Department of Finance, Parsons Brinckerhoff, and John Holland, with in-kind support from the Green Building Council of Australia, QED Environmental Services, and HFM Asset Management.

Project Outputs for 2011

Stakeholder Engagement

A series of stakeholder meetings were held along with three stakeholder workshops involving over 50 participants, in Perth, Brisbane, and Townsville. The workshops were facilitated using the 'Community Social Learning' methodology designed by Emeritus Professor Valerie Brown, ANU. Participants were asked to imagine their ideal green commercial building and then consider the enablers and disablers to achieving this vision. Participants then identified what could occur to enhance the enablers, and reduce the disablers, that were relevant to the research project. Key findings included the basis for considering a wider scope than just energy performance and building management to include indoor environment quality, occupant experience, and tenant agreements.

Development of a New Model

Based on the findings of the literature review and stakeholder engagement a new model was developed to consider the performance of green commercial buildings, namely 'The Energy Performance Nexus'. This model provides a sound structure for a low cost, low complexity multivariate consideration of the complexity involved in understanding the performance of green buildings. The model has included the development of data collection and assessment methodologies for each of the five areas: energy performance of green design elements, indoor environmental quality, occupant experience (based on occupant survey), tenant/leasing agreements, and building management.



Professor Peter Newman
PhD DipES&T BSc(Hons) FTSE
Program Leader, Curtin University



Charlie Hargroves
BE (Civil)
Project Manager, Curtin University
E: c.hargroves@sbenrc.com.au



Dr Cheryl Desha
BE (Env), PhD
Project Leader, Queensland University of Technology
E: cheryl.desha@qut.edu.au

