RP2006

# INTEGRATED DESIGN, TECHNOLOGY AND BEHAVIOUR IN LOW CARBON PRECINCTS

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## Research Question

Examine the potential for reduced energy and carbon emissions through integrated design, technology and behaviour applied to two precinct-scale case studies: the Airport and Greater Curtin.

***How can energy usage in precinct scale buildings be influenced from the initial design stage?***

***What role does the behaviour of residents, workers and travellers in the precinct play in energy efficiency?***

***What design, education and technical systems can be put in place from the beginning of a precinct project to encourage energy efficient behaviour?***

Figure 1: Perth Airport Terminal. (Source: Perth Airport)

## Methodology

Action research involved in two case studies:

1. Perth Airport

   Expanding the Airport's on-site energy options to reduce reliance on grid-based electricity. Incorporate options into the design of non-aviation buildings.

2. Greater Curtin

   Creating a City of Innovation in a precinct with education, residential, office, retail and transport facilities. Key aims are self-sufficiency, maximising energy efficiency and energy education.

Activities:

- Literature reviews on energy efficiency in the built environment and persuasive sustainability.
- Stakeholder workshops where integrated design, technology and behaviour are being planned.
- Working sessions with key partners to inform developments.
- Evaluation of similar precinct innovations to observe how the integrated design, technology and behaviour are working.

**Research in progress: completion in November 2018**

Figure 4: Solar PV design options (Source: http://news.rutgers.edu/sites/medrel/files/plone-img/image_preview/rutgers-board-of-gov-20110405--SolarLot.JPG).

## Precinct scale integrated design, technology & behaviour use options influence energy demand profiles

Figure 2: Perth Airport (Source: http://www.thefifthestate.com.au/wp-content/uploads/2014/02/perth-airport-660x600.jpg)

Figure 3: Greater Curtin (Source: Perth Airport Master Plan 2014).

## Anticipated impacts

*Informing legislation and policy development* of both governments and stakeholder's future developments. This includes building codes; planning requirements and governance arrangements between owners and tenants of buildings.

*Support the development of new buildings and precincts* by providing case studies for how energy efficient design, technologies and behaviours can be integrated into the development from the initial stages.

*Creation of a governance model* for businesses to integrate energy efficiency into the built environment with consultation from all internal stakeholders and researchers.

*Carbon savings* of 80% for Perth Airport and 54% for Greater Curtin.