

# Green buildings that work



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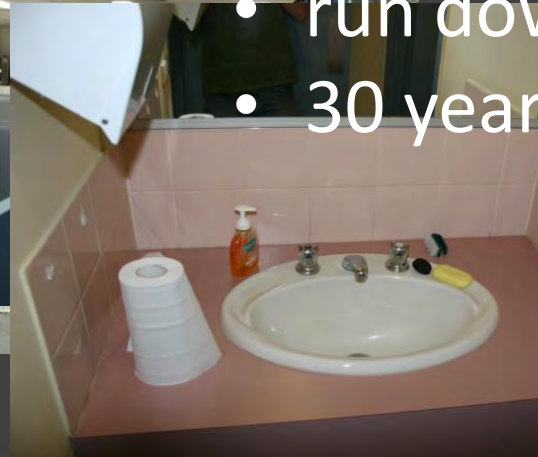
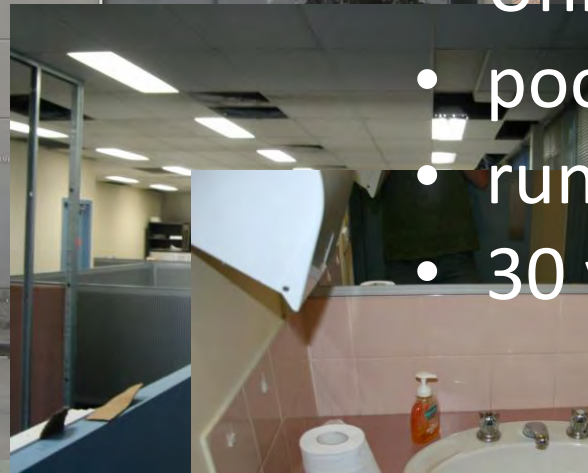
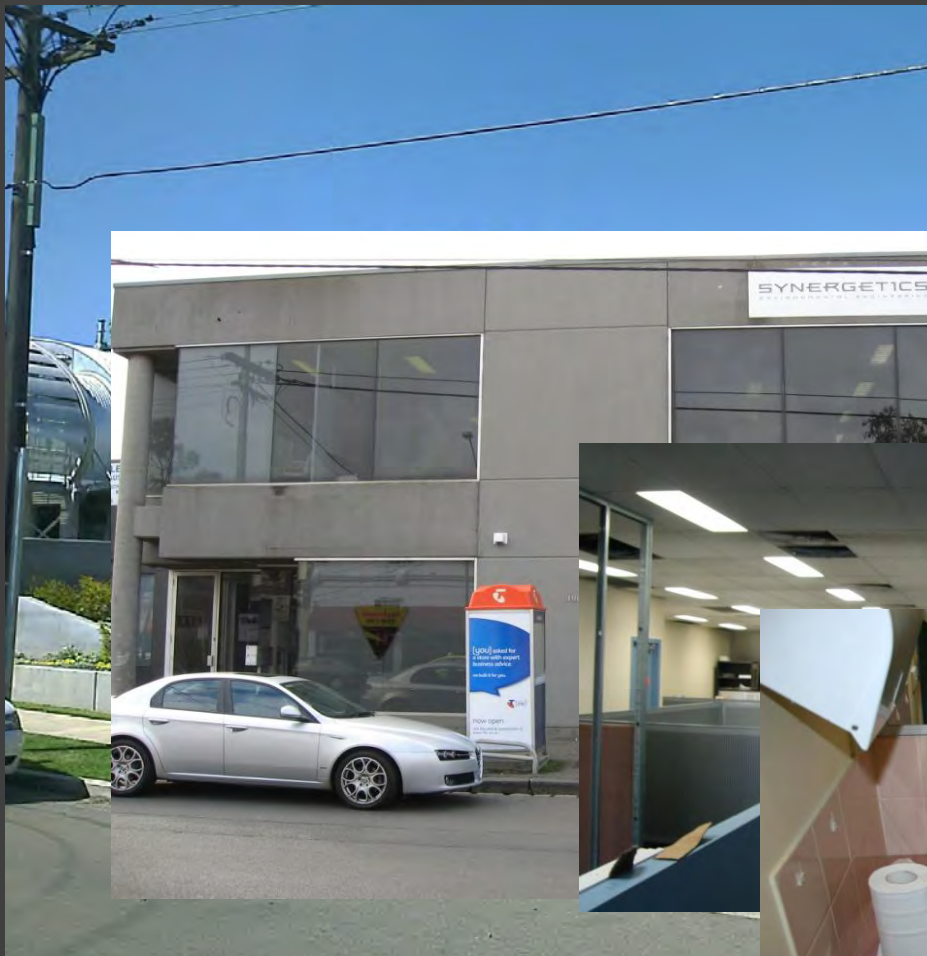
Synergetics Environmental Engineering

2 May 2012

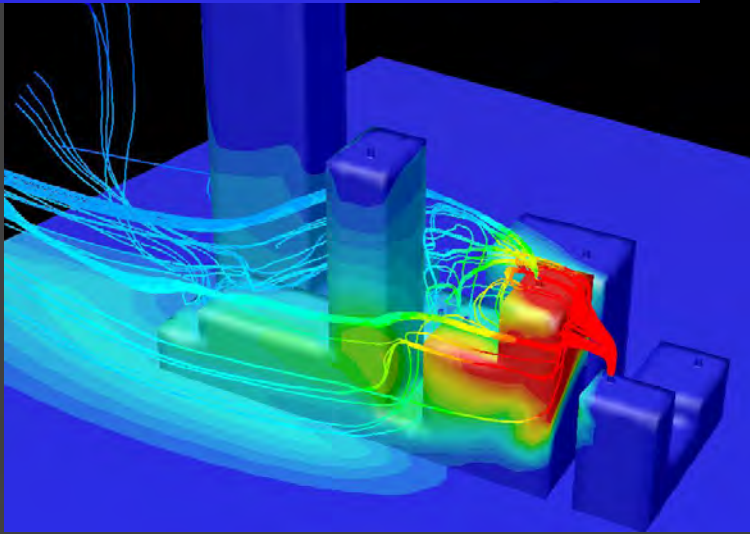
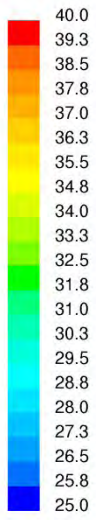
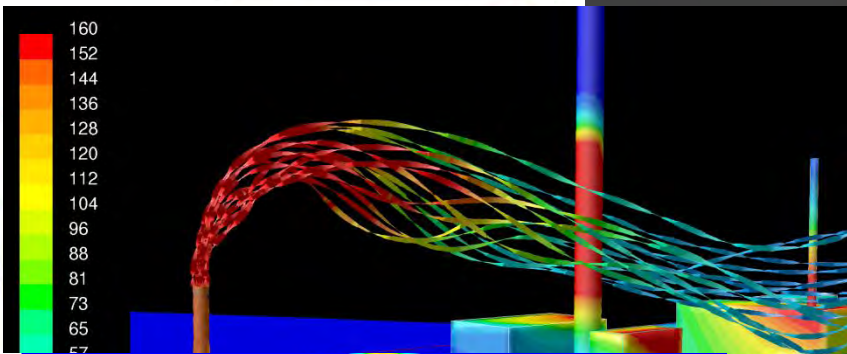
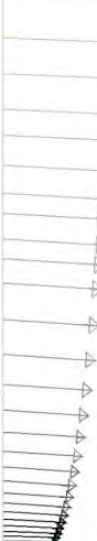
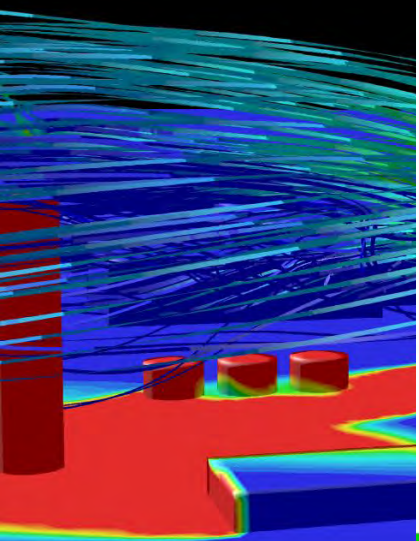
# What we dreamed of

## What we had

- Uninsulated tilt slab
- poor quality fittings
- run down
- 30 year old



# What we knew – emissions modeling



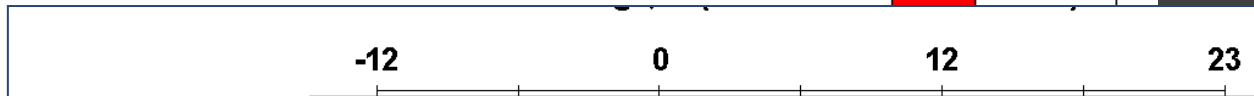
Contours of temp-c

May 06, 2008  
FLUENT 6.1 (3d, segregated, rke)

# Where we started – Building computer modeling

PROJ1- ANNUAL ENERGY USE

Reference Case Low Energy Case

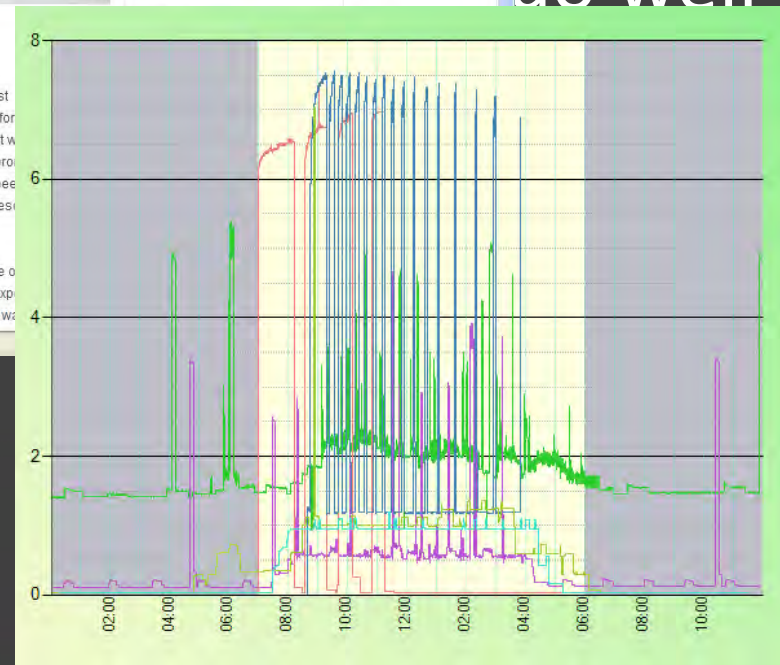


- Insulation
- Duct Leakage
- Daylight
- Air Leakage Control
- Glazing
- High Efficiency HVAC
- Energy Efficient Lighting
- Shading
- HVAC Controls
- Economizer Controls
- Passive Solar Heating
- Thermal Mass

# BMS and learning portal

The screenshot shows the homepage of 'theGreenSpaces', a website for green offices for small business. The header includes the logo and a navigation menu with 'Home', 'The Concept', 'Features', 'Contact Us', and 'Our Footprint'. A search bar is located on the right. The main content area features a large image of a modern office interior. To the left, there are sections for 'Our Partners' (listing Environment Partners, Integrated Automation, and Synergetics) and 'Program Participants' (listing City Switch and 1200 Buildings). To the right, there are sections for 'Featured Businesses' (listing Environment Partners website and The Green Training Co website) and 'Quotable Quotes'. A central text block reads 'Welcome to the Green Spaces' dated Saturday, 01 March 2008 00:00, followed by a photo of a group of people and a paragraph describing the Green Spaces as a collaborative environment. Below this, it mentions the founder Dave Collins and the Synergetics team.

do well



# Virtual double glazing

- Upstairs office, downstairs office, board room and foyer are all independently ventilated
- each area can be independently and efficiently temperature controlled.



# Computers use trend

- Desktop computers 50 to 400W
- Laptops consuming 25 to 50W
- Micro PCs use only 7 to 10W!



# Low waste - Reuse of building materials

- Building materials used in the renovation were re-used from the pre-existing office space.
- Glass, frames and doors were re-used where possible.
- Excess building material was left in the laneway for supervised removal.





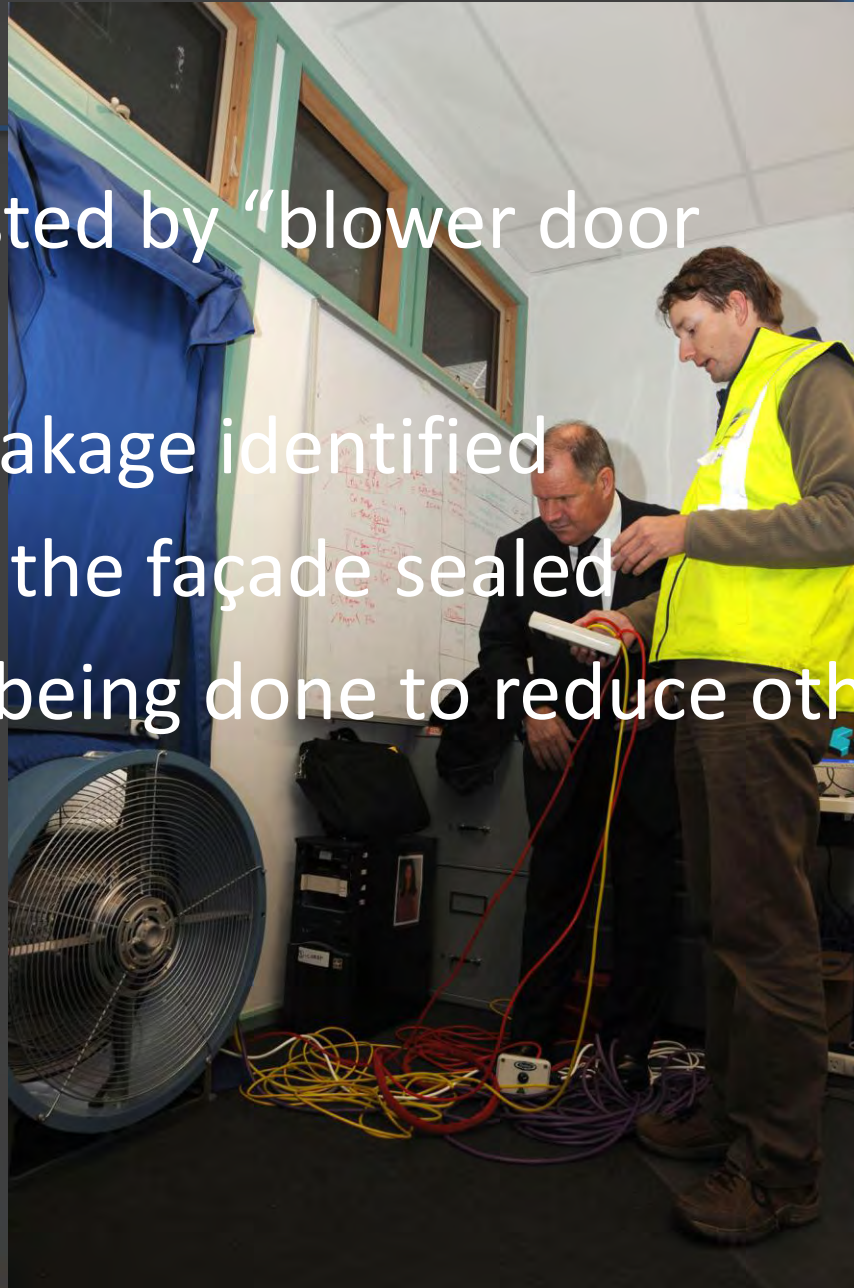
# Low power appliances

- Remanufactured low power consumption Fuji Xerox Printers
- Second-hand fridges
- High efficiency dishwashers



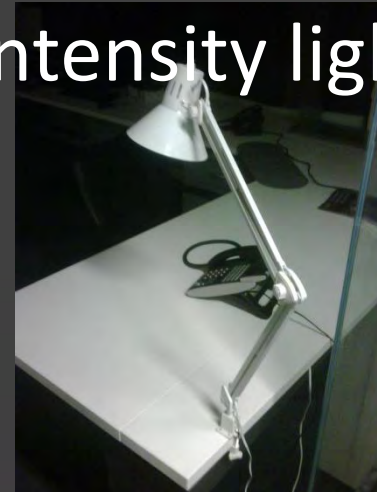
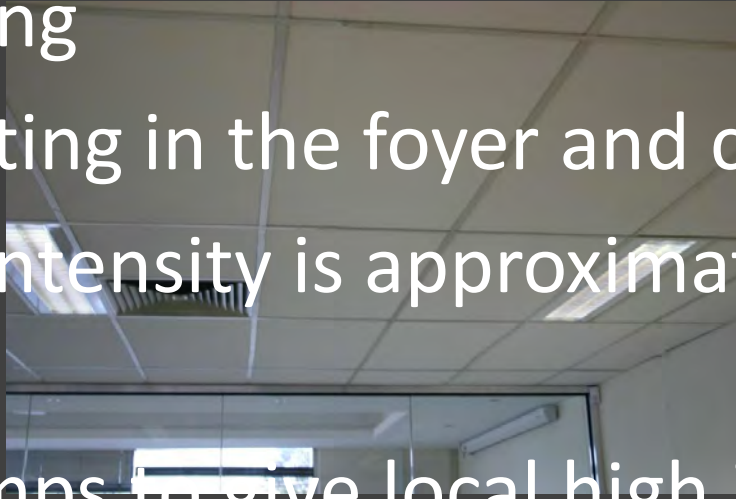
# Air leakage

- Building was tested by “blower door technology”
- Sources of air leakage identified
- Obvious gaps in the façade sealed
- Further work is being done to reduce other leakage paths.



# Energy efficient lighting

- Energy saving T5 fluorescent lighting replacing T8 lighting
- LED lighting in the foyer and conference room
- Energy intensity is approximately half the original
- Desk lamps to give local high intensity lighting



# Sustainable transport

- Public transport and bikes are encouraged.
- Bike racks.
- Several bikes are available for tenant use.

showers.

- Electric car and bike.
- Three-phase charging outlet



# Renewable energy

- 23kW photovoltaic (PV) array, providing approximately 150% of average total building power



# Concluding comments

- Continued reductions in power consumption
- Create “positive energy building” offsets!
  - embodied energy
  - “The Green Spaces” commute
  - Airline travel!
- Virtually all one and two storey buildings can be GHG neutral
  - Computer model to identify the low hanging fruit
  - PV cells on unshaded roof
  - Create a positive culture
- Dr Dave Collins - [davec@synergetics.net.au](mailto:davec@synergetics.net.au)