



[www.csiro.au](http://www.csiro.au)

# Flowerdale Community Expo

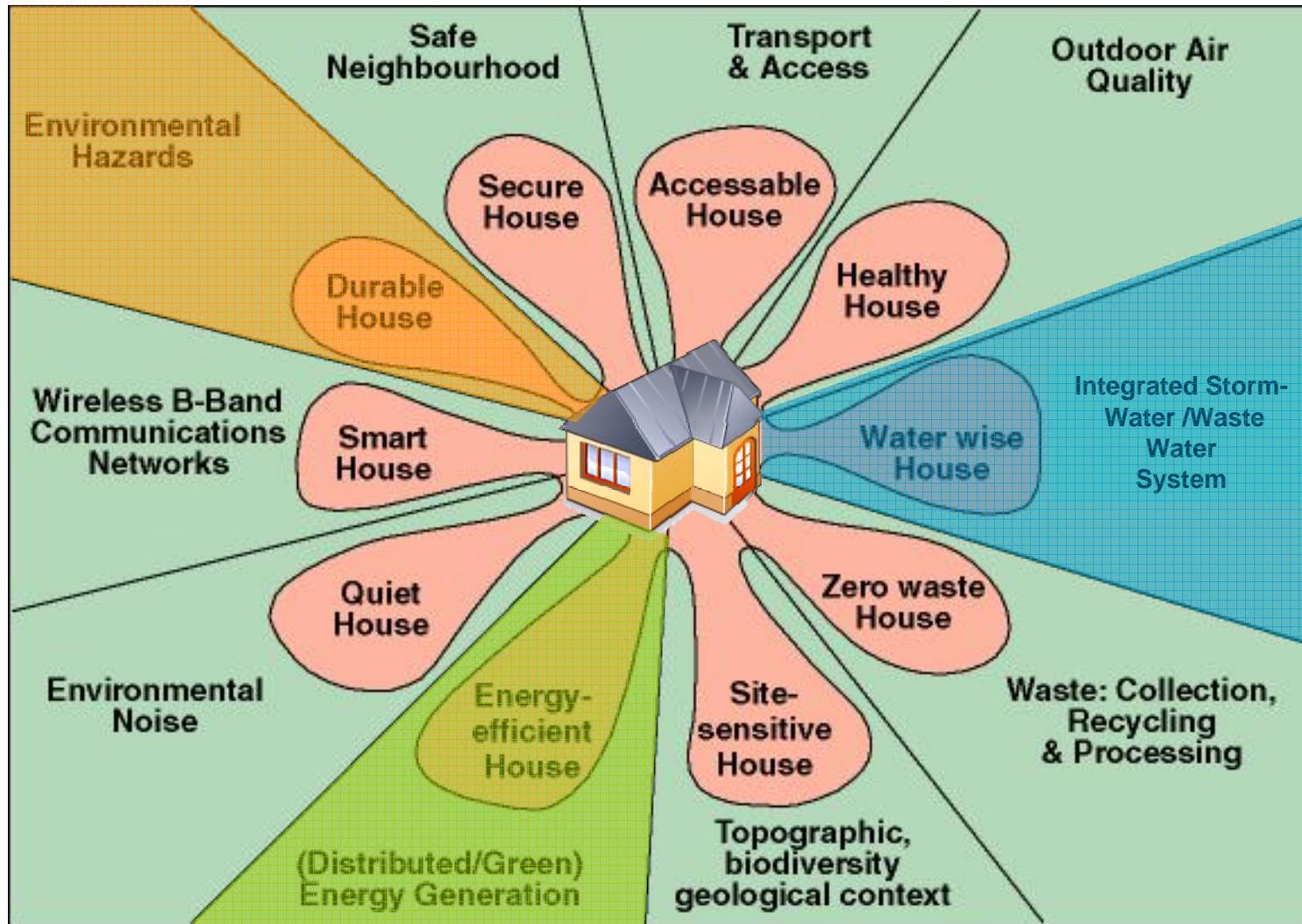
Climate Adaptation National Research Flagship

**Michael Ambrose**  
2 April 2009

National Research  
**FLAGSHIPS**  
Climate Adaptation



# What is Sustainable Design?



# Sustainable design and CSIRO

## Previous work

- Developed the NatHERS/AccuRate energy efficiency software used in the Building Code of Australia regulations
- Testing of building materials to assess their performance
- Developed the “Your Development” guide for creating sustainable neighbourhoods
- Creating assessment processes to determine the sustainability of our homes and communities
- Currently constructing the first zero emission home for the mainstream housing market

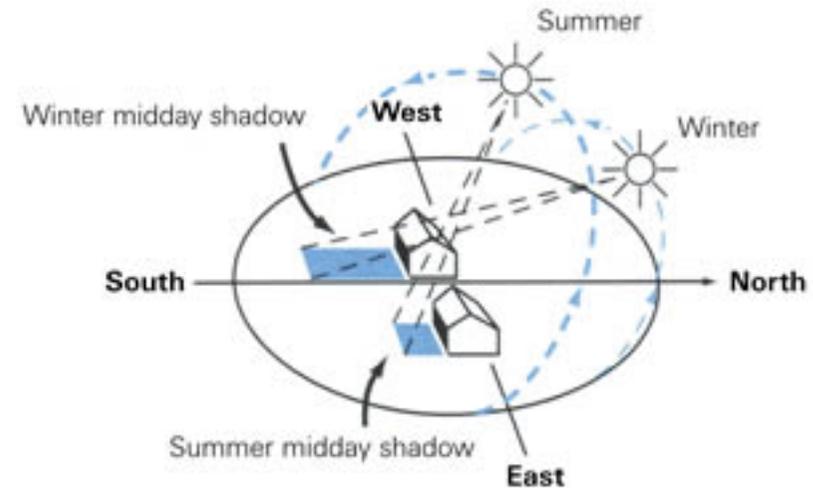
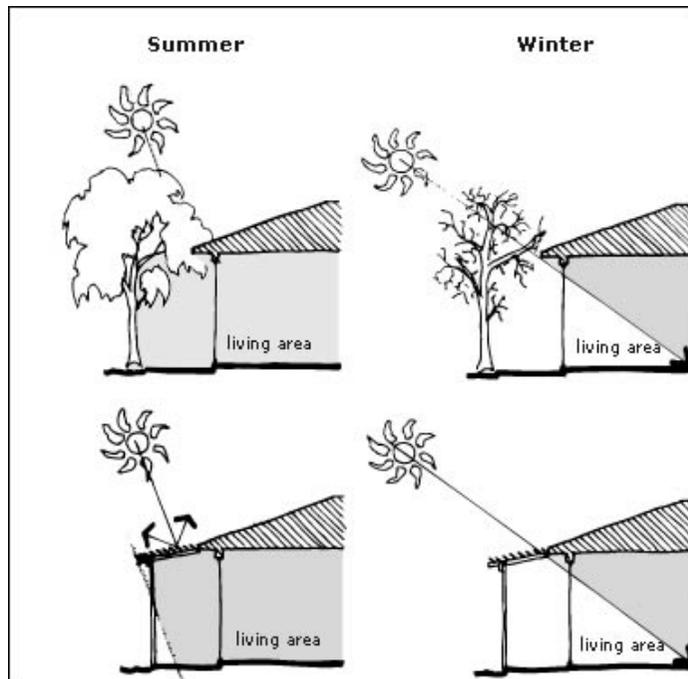
# Energy Efficient Design – Passive Design

## Passive Design Principles

- ✓ Design for climate
- ✓ Orientation
- ✓ Shading
- ✓ Passive solar heating
- ✓ Passive cooling
- ✓ Insulation
- ✓ Thermal Mass
- ✓ Glazing

# Orientation and shading

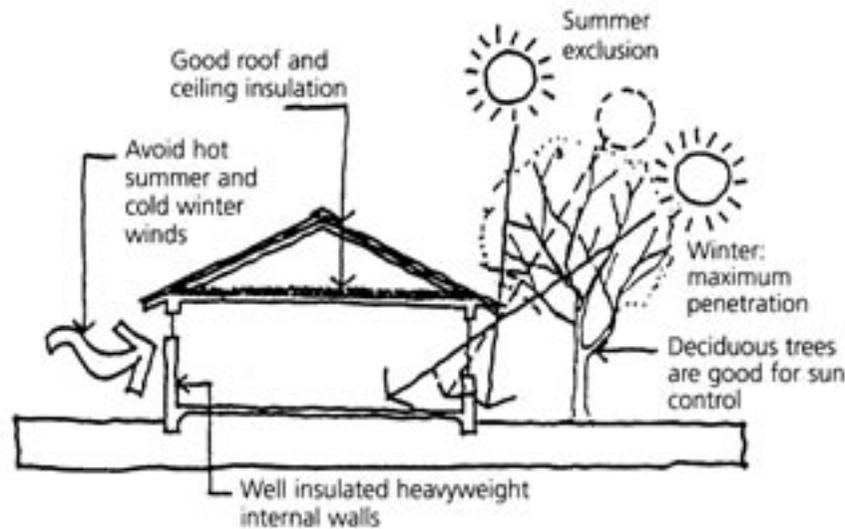
- Living spaces to the north
- Bedroom/utility spaces to the south
- Minimise west facing glazing
- Capture cooling summer breezes



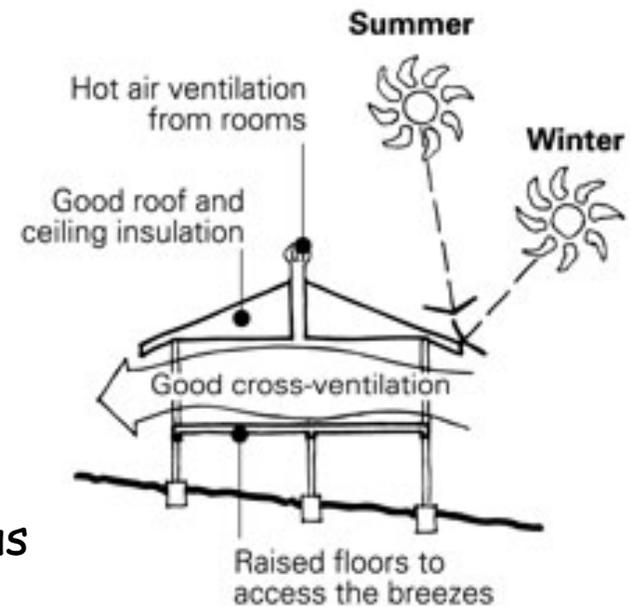
- Exclude summer sun
- Admit winter sun
- Shading devices
  - Eaves
  - Louvers and shutters
  - Awnings and blinds
  - Trees

# Passive heating and cooling

38% of energy consumed in a house is due to heating and cooling



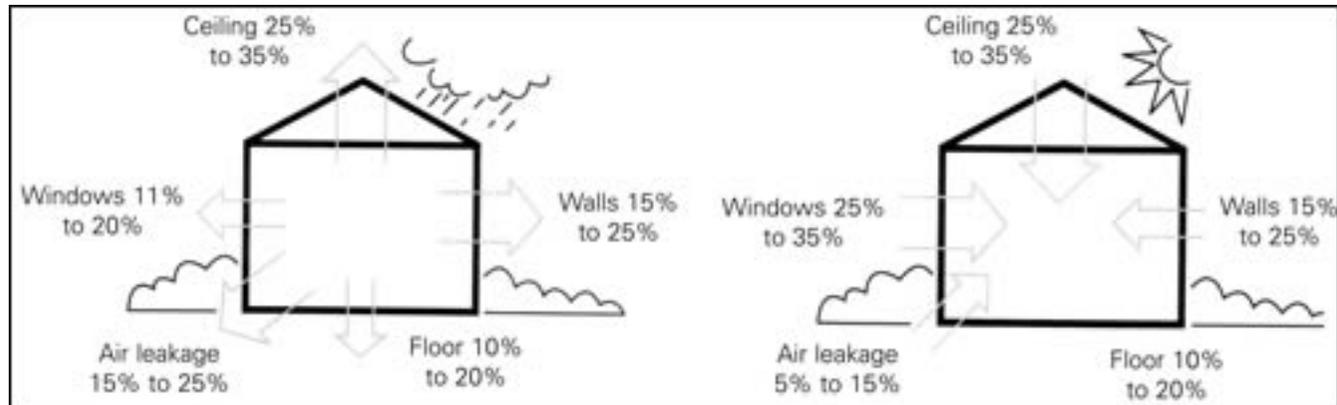
Passive Heating - keep summer sun out and allow winter sun in



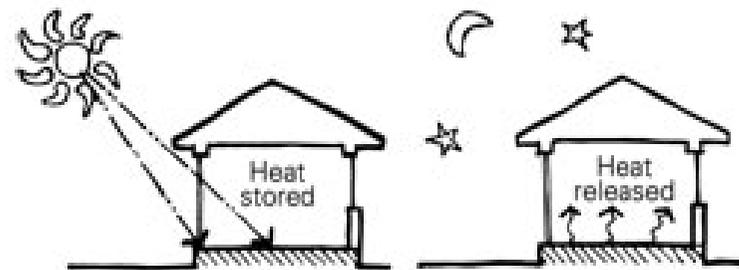
All Australian climates require some degree of cooling

Understand your regional climate and how various features (topographic and man made) influence the microclimate of your site.

# Insulation and thermal mass



- Higher the R value the better the thermal performance
- Insulate under roof, ceiling, walls and suspended floors
- Thermal mass located inside the insulated building envelope
- Leave thermal mass exposed
- Locate in north facing rooms



# Renewable energy

- **Solar**
  - Photovoltaic (PV) modules
  - Solar Thermal
- **Wind turbines**
  - Commercial
  - Community
  - Domestic
- **Biomass**
- **Mini Hydro**
- **Cogeneration plants**



## Sustainable Ecosystems

Michael Ambrose  
Environmental Scientist

Phone: 03 9252 6200  
Email: [michael.ambrose@csiro.au](mailto:michael.ambrose@csiro.au)  
Web: [www.cse.csiro.au](http://www.cse.csiro.au)

[www.csiro.au](http://www.csiro.au)

# Thank you

### Contact Us

**Phone:** 1300 363 400 or +61 3 9545 2176  
**Email:** [Enquiries@csiro.au](mailto:Enquiries@csiro.au) **Web:** [www.csiro.au](http://www.csiro.au)

National Research  
**FLAGSHIPS**  
Climate Adaptation

