

# Cost Effective Retrofitting Of Your Existing Garden To Make It More Sustainable



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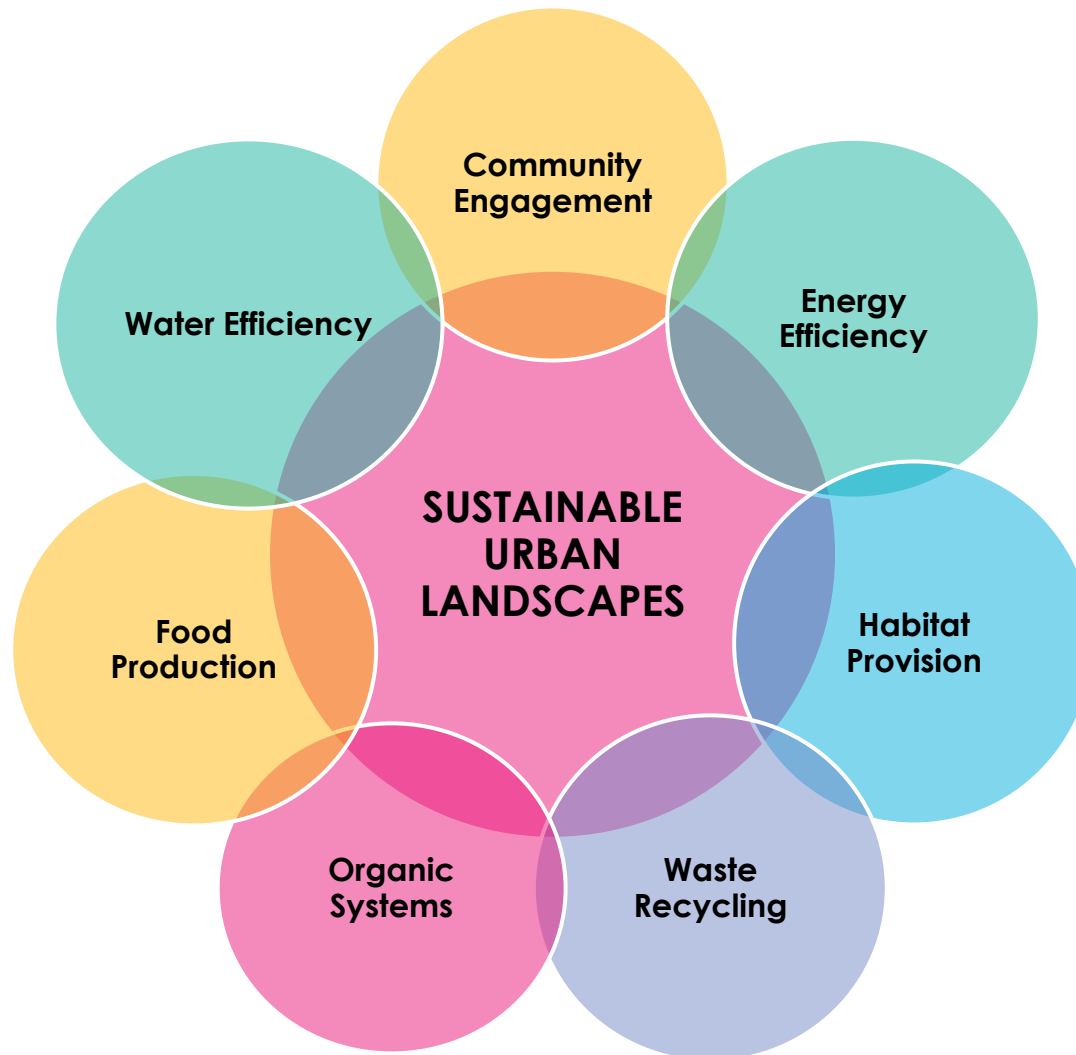


**WESTERN POWER PERTH SOLAR CITY'S  
Eco Home Open – High Wycombe  
Sunday 20 May 2012**

**JOSH BYRNE**

# SUSTAINABLE URBAN LANDSCAPES

## An Integrated Approach



# Energy Efficiency



- Landscape to improve thermal performance of buildings
- Increase green space for urban cooling
- Reduce transport through local food production and on-site food production

# Materials Impact



- Source impact & environmental footprint
- Embodied energy
- Lifecycle assessment



# Create Habitat



- Incorporate native plants
- Increase leaf litter
- Create refuges
- Create nesting sites
- Suitable water features

# Organic Waste Recycling



- Composting
- Vermiculture
- Fermenting
- Poultry

# Grow Food



- Vegetables & herbs
- Fruit trees & vines
- Poultry
- Aquaculture

# Organic Systems



- Diversity & balance
- IPM & systems approach to landscape design and development
- Tolerance



# Water Efficiency



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- Water Sensitive Design
- Plant Selection
- Soil Conditioning
- Efficient Irrigation
- Alternative sources

# DEVELOPMENT OF 'WATER-WISE' GARDENING PRACTICES



## POSITIVE

- Increase in soil conditioning
- Awareness in design for improved microclimate
- Promoting low water use plants – particularly natives
- Improvements in irrigation efficiency & alt. sources



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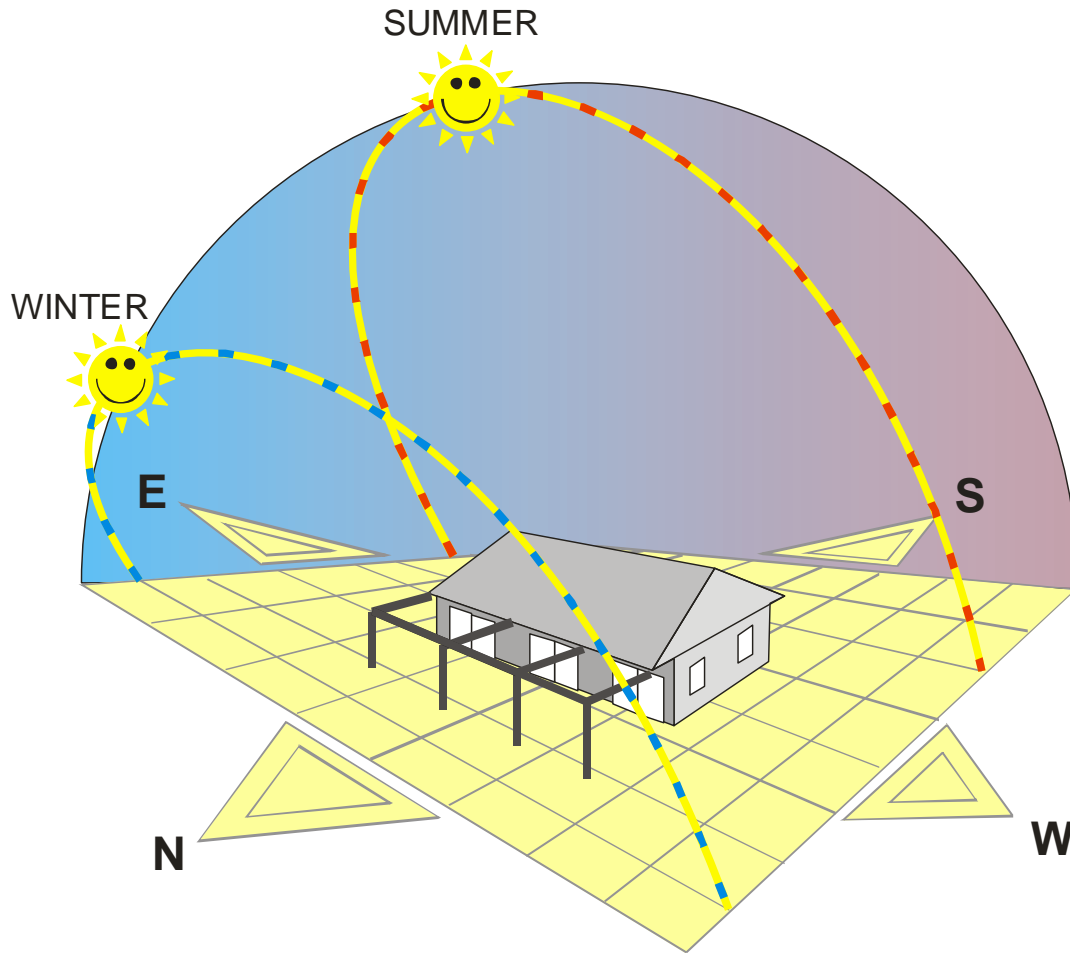
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## NEGATIVE

- Reduced green life
- Increased hard surfaces
- Introduction of artificial plants

# CLIMATE SENSIBLE DESIGN



Winter – 35 degrees

Spring / Autumn – 68 degrees

Summer – 81 degrees

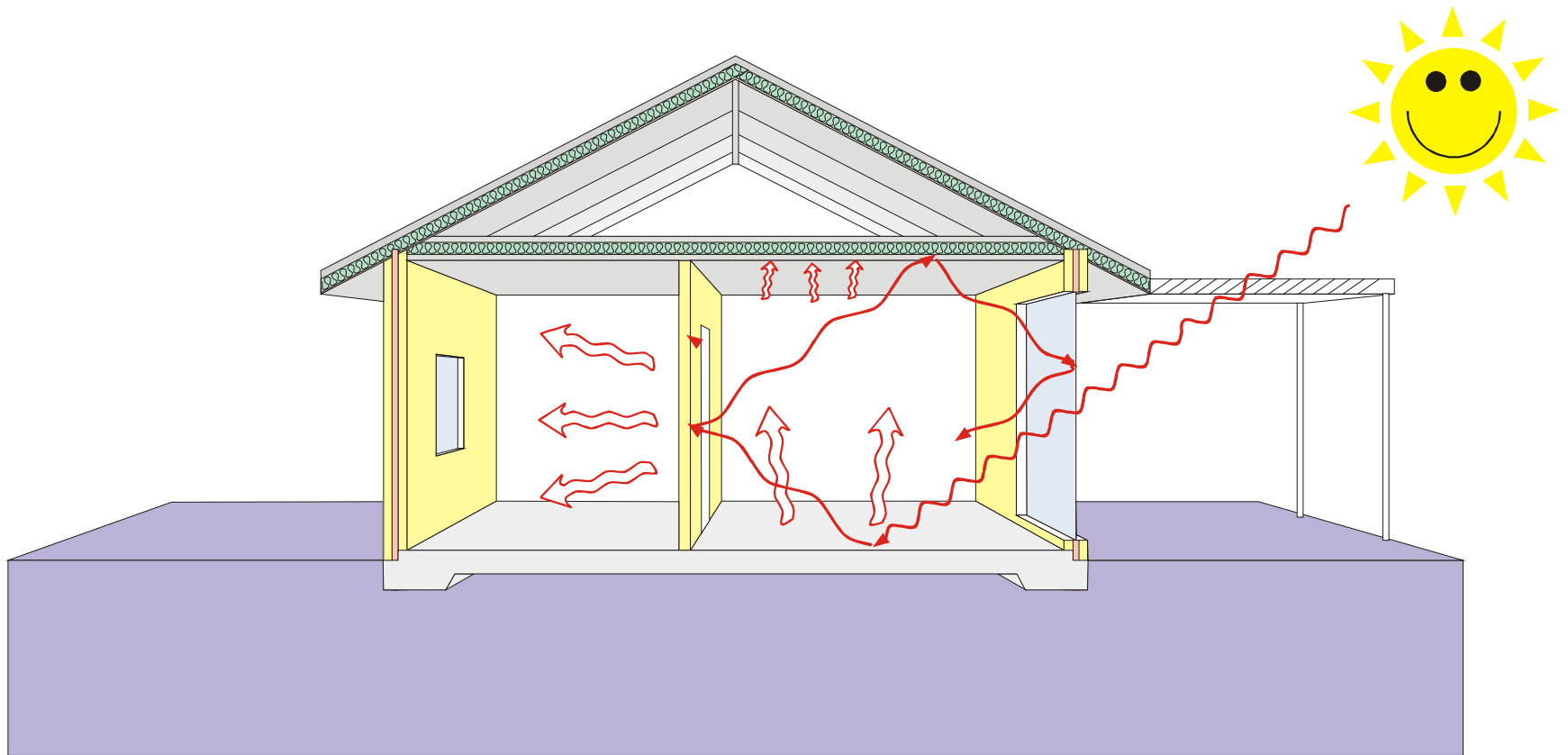


# Winter Solar Gain



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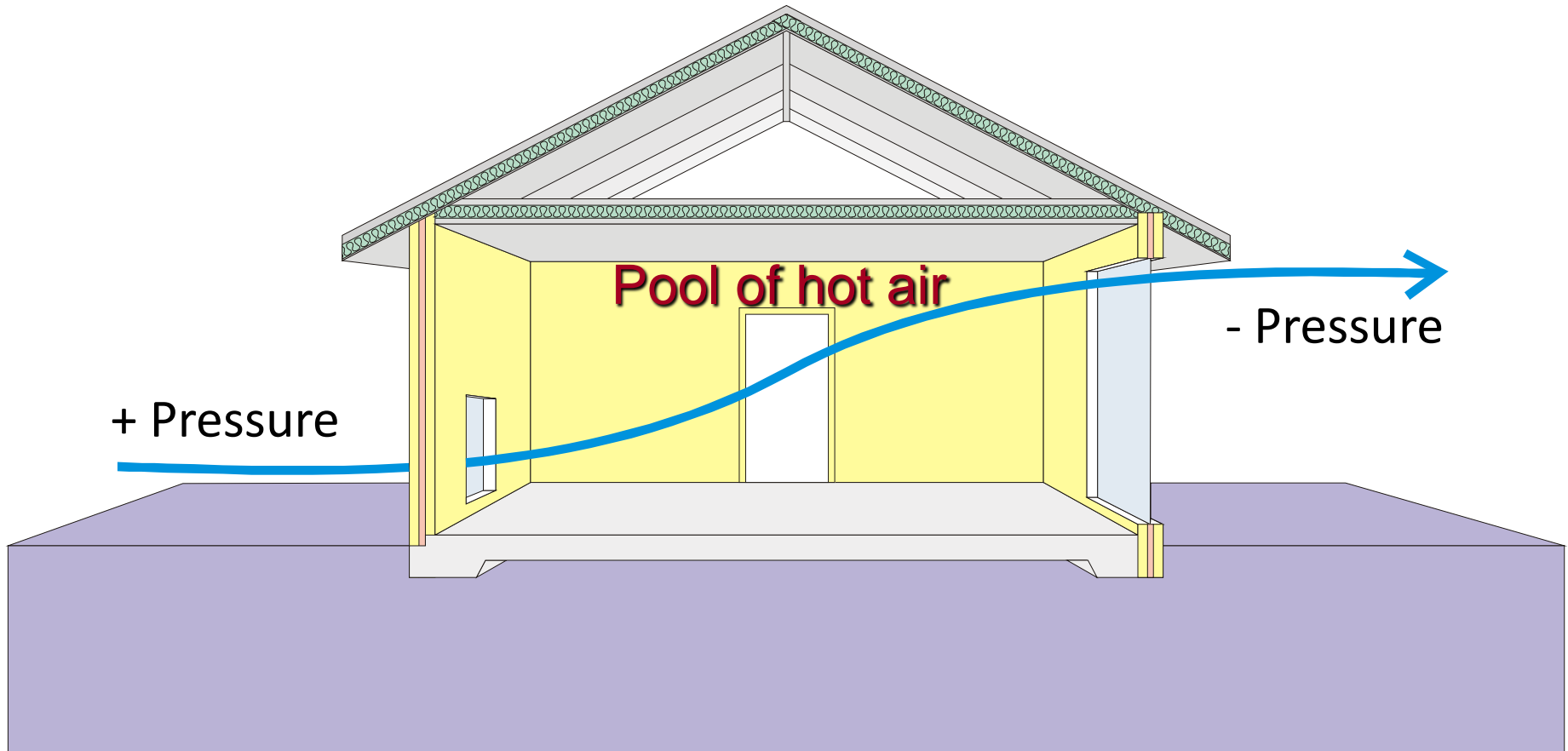
# Cooling Breeze



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- Moving air from high to low pressure

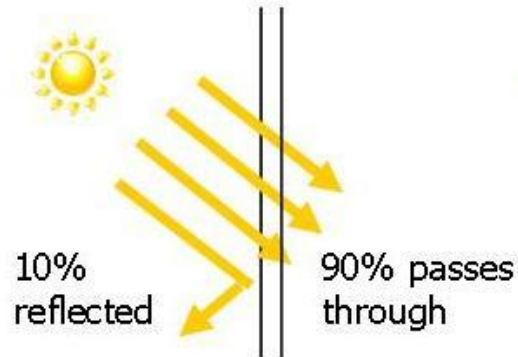


# Thermal Protection of Walls & Windows

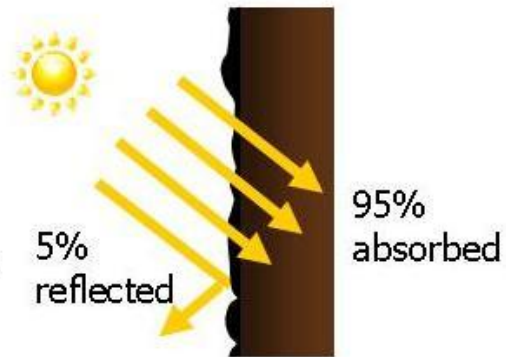


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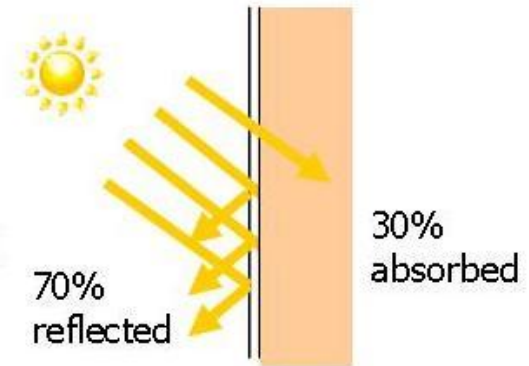
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Single glazed glass



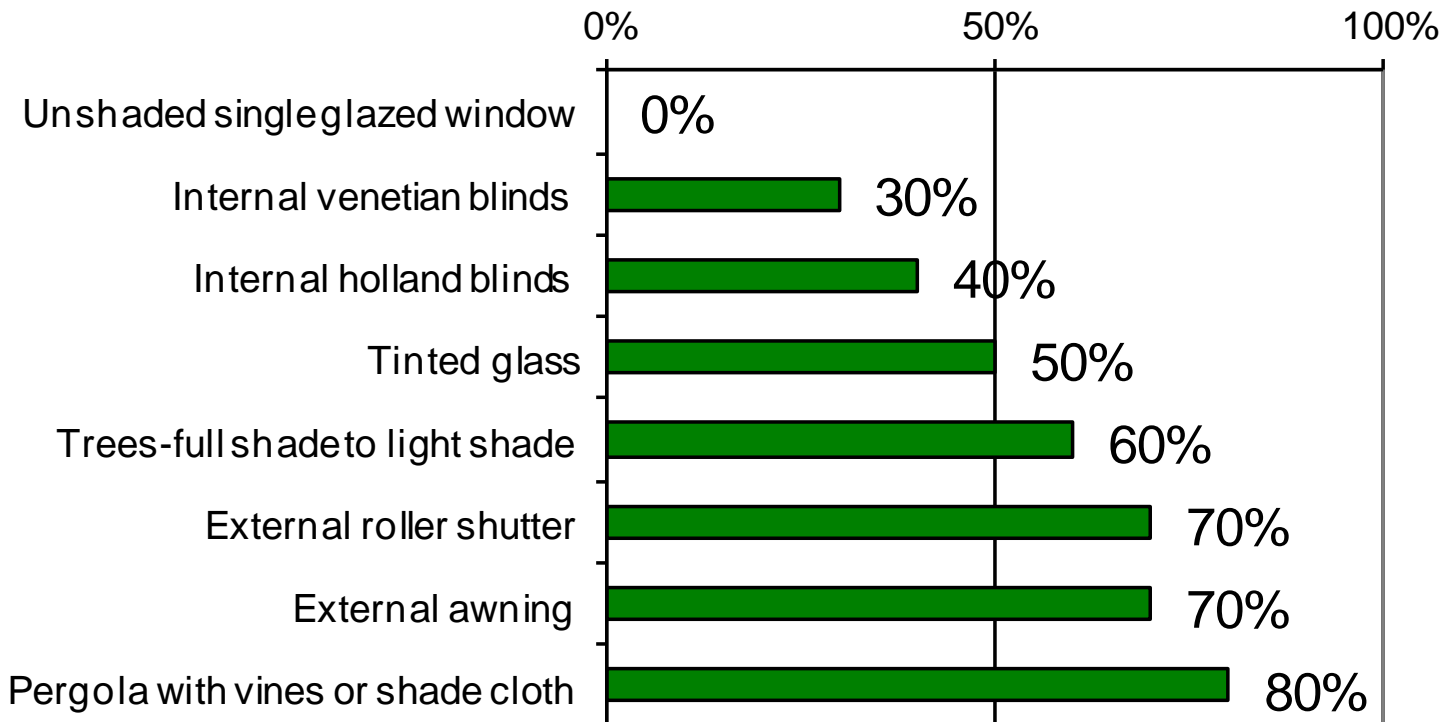
Rough dark surface



Smooth light surface

# Window Protection

## Amount of heat blocked compared to unshaded glass



Source: Your Home Technical Manual, DEH (2005)



# CASE STUDY – RETROFIT



- 1960's brick & tile
- 600m<sup>2</sup> block
- Poor orientation
  - Hot in summer
  - Cold in winter
- Poorly insulated
- Draughty
- 6 units per day

# Window Awnings



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# Pergola - Eaves



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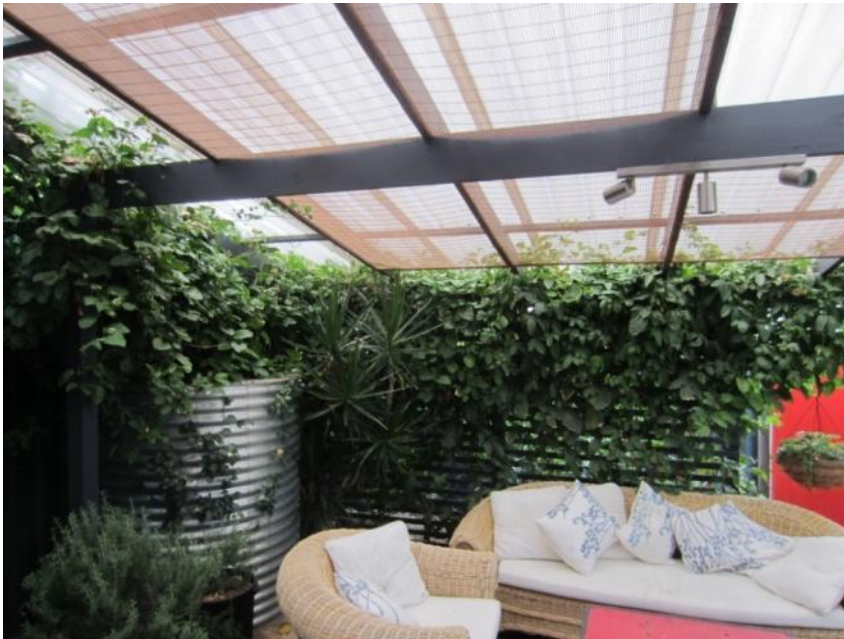


# Pergola – Shading



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# Wall Shading



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# Other Strategies - Deciduous Vines



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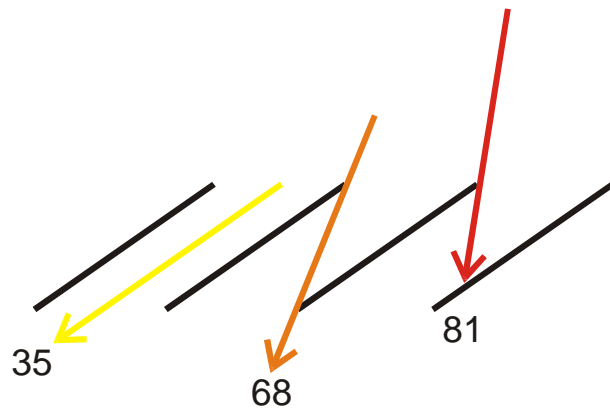
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Winter, Spring / Autumn  
& Summer sun angles



# Other Strategies - Shade Sails



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# Internal: Heavy Curtains



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# Internal: Door & Window Seals



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# Internal: Active Heating



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# Internal: Active Cooling



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# Internal: Active Cooling



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# Internal: Water Heating



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# Internal: Efficient Use of Hot Water



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# Solar Hot Water



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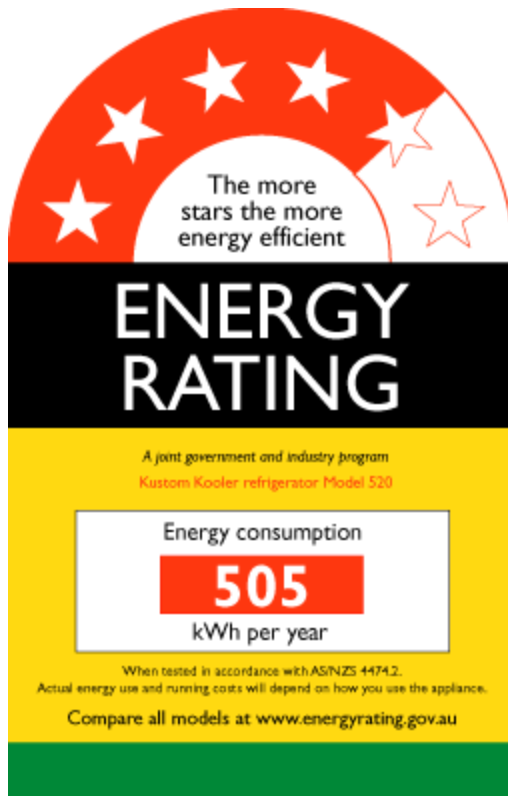


# Internal: Appliances



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# Clothes Drying



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# Internal: Standby Power & Monitoring



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# Internal: Lighting



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# Solar Power



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# Native Plants



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# Dryland Planting



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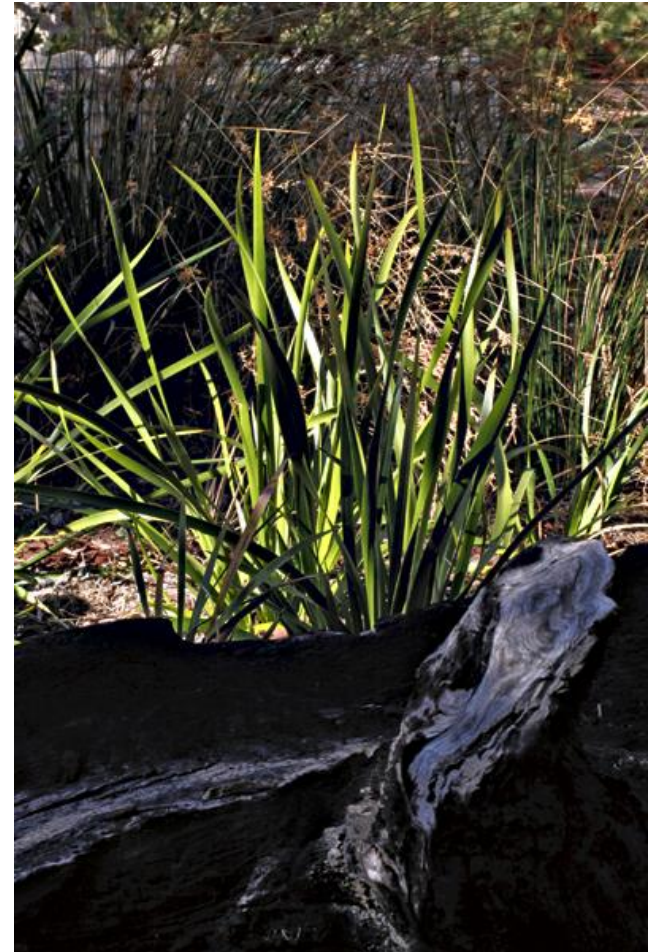


# Habitat Features



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# Materials Reuse



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# Greywater Reuse



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# Efficient Irrigation



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# Rainwater Harvesting



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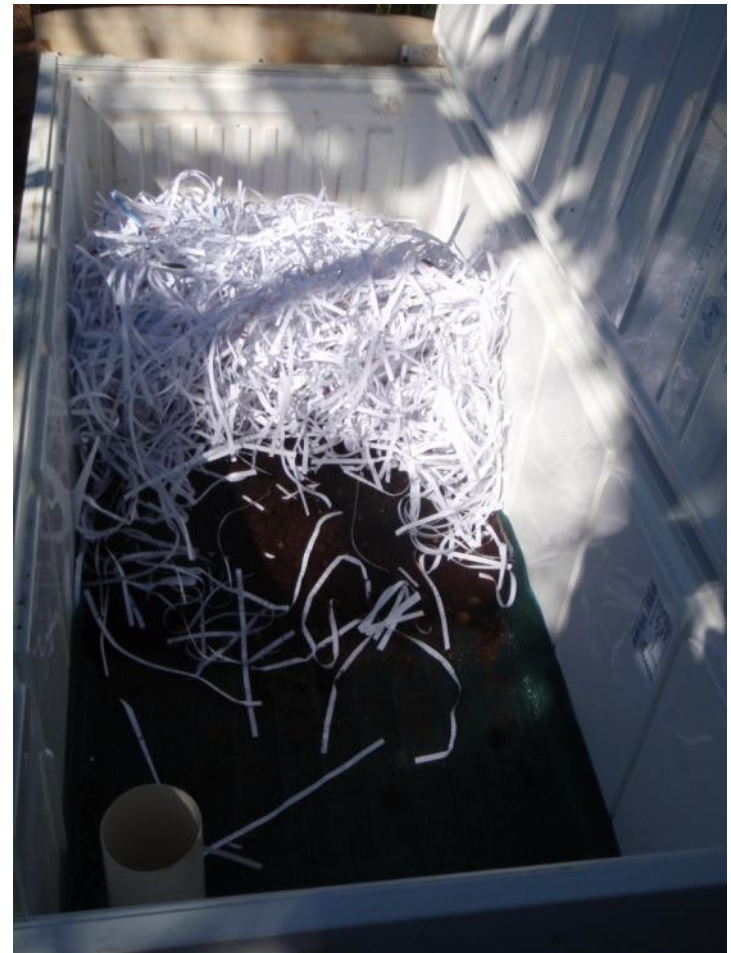


# Home Composting & Worm Farm



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# Local Food Production



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# Natural Play Spaces



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## FREE ACTIONS

Action	CO2e/ \$ saved pa
Standby	640kg/\$120
Heat/cool settings	50kg/\$10
Water heat setting	220kg/\$110
Cold wash clothes	128kg/\$22
Line dry clothes	300kg/\$55
Turn off 2 <sup>nd</sup> fridge	271kg/\$50
Fridge setting	25kg/\$5
Compost/recycle	150kg
Waterwise garden	115kg/\$75
<b>TOTAL</b>	<b>1,900kg/ \$450</b>

## Actions

### LOW COST ACTIONS

Action	CO2e/ \$ saved pa
CF Globes	750kg/\$120
Waterwise shower	273kg/\$50
100% Green Power	5000kg/ \$-ve
Fix leaking tap	3kg/\$2
<b>TOTAL</b>	<b>6,000kg/ \$162</b>

## INVESTMENT

Action	CO2e/ \$ saved pa
Top up roof insulation	250kg/\$50 - \$100
Waterwise wash machine	30kg/\$25
Shade EW windows	480kg/\$85
SHW System	2457kg/\$400
1.5kW PV system	2000kg/\$900
Rainwater tank	101kg/68
Greywater	124kg/84
<b>TOTAL</b>	<b>5,200kg/ \$1,600</b>



# QUESTIONS



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