Sustainability in Housing:
Perceptions of Real Estate Agents, Building Professionals & Householders
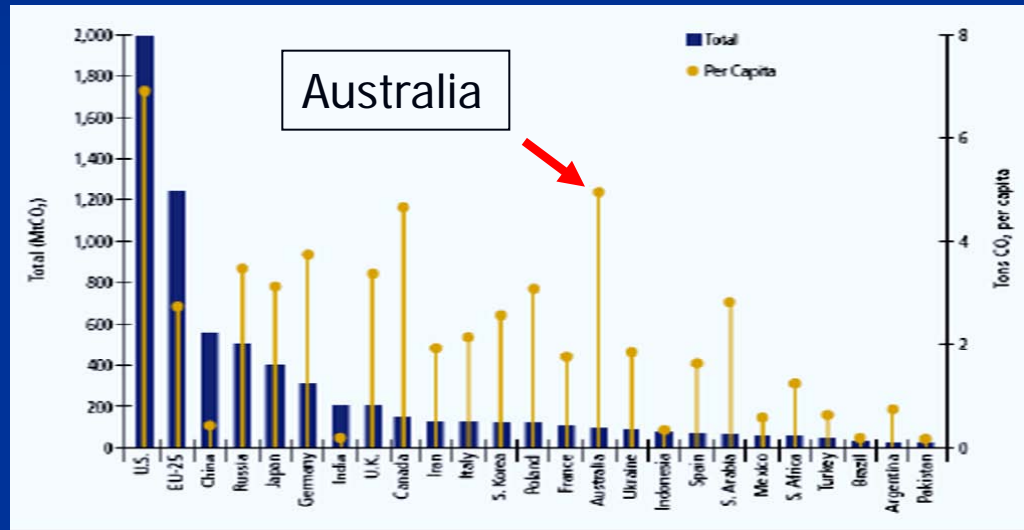
Bond, Pacifici, & Newman

# Sustainability in the Built Environment

➢ **Australia produces the *highest GHG emissions* per unit of GDP in the world!**

➢ **Buildings account for around 25-30%**

➢ **Improving energy efficiency of buildings is the *quickest & most cost effective* way of reducing GHG emissions**

GHG emissions & energy use in homes

Greenhouse gas emissions from home energy use (Baseline Energy Estimates, 2008)
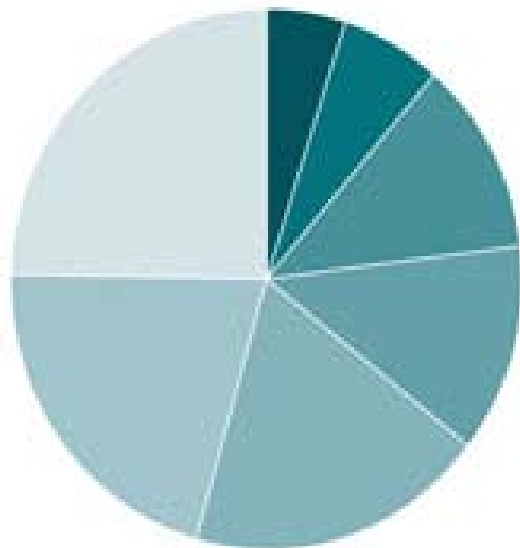
Cooking 5%
Standby 5%
Lighting 11%
Refrigeration 12%
Heating and cooling 20%
Other appliances 24%
Water heating 23%

Home energy use (Baseline Energy Estimates, 2008)
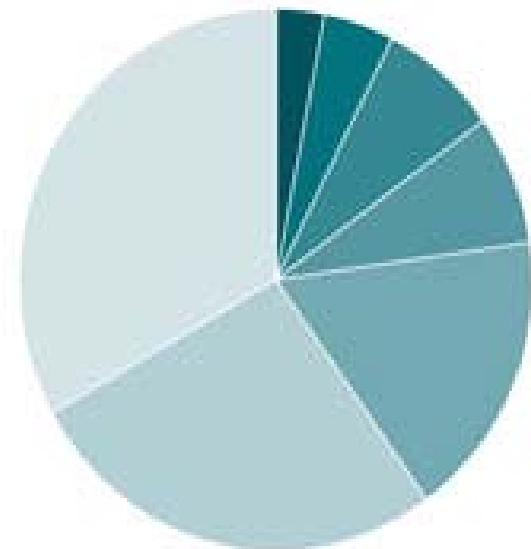
Standby 3%
Cooking 4%
Lighting 7%
Refrigeration 7%
Other appliances 16%
Water heating 25%
Heating and cooling 38%

Source: Australian Greenhouse Office 2008

National Strategy on Energy Efficiency 2009-2020

- ⇑ *stringency of energy efficient requirements in the Building Code of Australia from 2010*

- *Phase in* **mandatory disclosure** *of energy efficiency*

Homes: BCA 6* minimum by 2011   •**Hot-water systems & lighting:** new efficiency requirements
Incentives, rebates, grants: e.g. Green Loan program (on hold), water tanks, PV, Solar HW

Literature Review

Barriers to uptake of renewable energy in homes:

- Upfront capital costs of EE measures

- Lack of consumer information when buying

- Split incentives between builders (cheap to build, expensive to run) & the householders

Survey reported by ABS (2006) showed:

- Adoption of energy conserving behaviours is greatest where it is:
    - Convenient
    - Does not require a lot of time
    - Does not require a lot of money

Research Aims

Identify knowledge of, & attitudes towards, sustainability in the residential housing market by major stakeholders:

Building professionals

Householders

Real estate agents

Identify drivers & barriers to greening the housing market

Encourage behaviour change &
Increase uptake of sustainability practices
To: Reduce GHGe

Methodology:

- **Survey respondents nation wide:**
  1. **Building professionals (postal & online)**
     - **390 - Master Builders Association**
     - **Response: 18%**
  2. **Householders (postal only)**
     - **1250 – 5 Largest cities by population**
     - **Response: 6.8%**

- **Survey real estate agents in Perth**
  3. **163 invited licensee agents to attend educational workshop on sustainability in housing by CUSP Institute**
     - **Response: 11 agents able to attend (5.6%)**

1. Results – Building Professionals

71% have seen an increase in demand for more energy efficient sustainable homes

- **Reasons given:**
  - **Cost savings**
  - **Increased awareness of climate change**
  - **Govt. rebates & incentives**
  - **Droughts (water shortages)**

1. Results - BPs

Proportion of developments that incorporate specific features cont:

1. **Passive solar**
   - **most cost effective, "common sense"**
2. **Rainwater tanks**
   - **rebates**
3. **Solar water**
   - **high sunshine hours, rebates**

Less demanded:

- **Double glazing (38%, 1-10% of time)**
- **Grey water system (36%, 1-10% of time)**
- **PV panels (33%, 1-10% of time)**
   - **Too expensive**

1 Results – BP : Preferred features

Rank	New homes	Retrofitting existing homes
1	Passive Solar Design	Connected to Gas
2	Connected to Gas	Solar Water Heating
3	Rain Water Tank	Rain Water Tank
4	Solar Water Heating	Photo Voltaic Panels
5	Double Glazing	Grey Water System
6	Grey Water System	Double Glazing
7	Photo Voltaic Panels	Others
8	Others	

Survey Results

Preferred options from client perspective cont:

- **Rankings related to cost (incl. availability of rebates)**

- **Double glazing considered too expensive & not necessary in a warm climate**

- **Grey water too expensive & issues getting council approval**

Most successful features cont.

Most commonly listed:

- **Passive Solar Design**
- **High R-value insulation**
- **High performance &/or double glazing**
- **Solar hot water**

General responses:

- **Design stage is key to energy efficiency**
- **BUT: speculative developers look to max profits by min costs & good design may sell, but in terms of aesthetics not EE**

Willingness to Pay for Green

Cost Premium	Valid Percent (%)
Pay No More	12.5
1-5% more	35.7
6-10% more	30.4

Benefits of Green Buildings

Rank	Financial and Non-Financial Benefit
1	Cost savings e.g. >$1000p.a.+
2	Increased property value
3	"Doing the right thing"
4	Healthy indoor air quality
5	Decreased obsolescence

Most Significant Barriers

Rank	Barriers
1	Unwillingness to pay additional cost
2	Lack of developer awareness
3	High cost/ low benefit
4	Lack of owner/ occupier awareness
5	Poor access to information
6	Low consumer demand
7	Limited availability to new technology
8	Unreliable/ unproven technology
9	Others

Building Use Vs Design

- **20% said green homes not been used in a way they are designed to be used**

- **37% unsure**

- **NOTE:**

Despite green design, if a home is not used correctly, then desired outcome of reduced carbon emissions from buildings will be thwarted!

→ **Householder survey to find out behaviour & motivations**

2. Results: Householders

Motivation to reduce personal climate change emissions:

- **49% moderately motivated**
- **32% highly motivated**

Household size:

- **43.5% have 2 persons**
- **20% have 3 persons**

National average: 2.6 persons/ household

- **This trend to *smaller household sizes & larger homes* presents a barrier to reducing impacts on the environment**

Likelihood of adopting no/low cost behaviours that reduce GHG emissions

Actions	Already doing	Likely/Highly likely	Unlikely to adopt
Turn off all my appliances at the wall	40%	**30%**	**23%**
Insulate hot water pipes	40%	21%	**19%**
Avoid halogen down-lights or replace with LED/compact fluorescent globes	44%	**29%**	7.4%
Turn lights off when not in the room	**89.4%**	8%	1%
Use a warmer blanket while sleeping rather than warming the whole room	**88%**	8.3%	1%
Dress appropriately rather than cooling/warming the whole room	**86%**	12%	1%
Replace 10 of the most used light bulbs with LED or CFLs	58%	**31.4%**	5%
Use the washing machine or dishwasher only when full	**82.4%**	12%	3.5%
Dry clothes on a clothesline rather than in an electric clothes dryer	**85%**	10.6%	1%
Install timers on appliances to turn them off when not in use	10.6%	16.5%	**38%**

No/Low Cost Actions

- **The actions they were most likely to take:**
  - **Replacing most used light bulbs with LED or CFLs**
  - **Turning off all appliances at the wall**
  - **Avoiding halogen down-lights**
- **The actions they were least likely to take:**
  - **Installing timers on appliances to turn them off when not in use**
  - **Insulating hot water pipes**
- **Reasons for not taking action:**
  - **Inconvenience**
  - **Forgot**
  - **Too lazy**

Likelihood of adopting low/medium cost behaviours

Actions	Already doing	Likely/Highly likely	Unlikely to adopt
Have an energy audit/ assessment completed on my home	13%	11%	**48%**
Install ceiling fans to reduce use of or need for air conditioning	51%	8%	31%
Install a 1kW or larger PV system on the roof	12%	11%	**57%**
Install a 5 Star instant gas; heat pump; or solar hot water heater	**38%**	13%	32%
Install or top up insulation in ceilings	63%	**18%**	11%
Replace single flush toilet with water-saving dual system	**82%**	11%	5%
Externally shade any exposed western or eastern windows	**62%**	13%	11%
Install double glazing to windows	2%	5%	**69%**
Switch household power supply to "Green Power" (100% renewable energy)	11%	**18%**	**53%**
Install a "Smart Meter"	10%	13%	**53%**

Low/medium Cost Actions

- **The most common actions already taken:**
  - **Replacing single flush toilet with dual flush**
  - **Installing or topping-up ceiling insulation**
  - **Externally Shading exposed West or East windows**

N.B.

- **42% of heat escapes through the roof**
  - » **Installing insulation is one of the *more cost-effective ways* of reducing energy consumption**
- **But: uptake of insulation rebates slow**

Low/medium Cost Actions

The actions they were least likely to take:

- **Installing double glazing**
- **Installing a photovoltaic system**
- **Switching to "Green Power"**
- **Installing a smart meter**

Reasons for not taking action:

- **Cost was the major reason not to act**

Benefits & motivations for acting

1. **Cost savings** > **$1000 p.a. were considered the most important**

   2. **"Doing the right thing"**

   3. **Achieving healthy indoor air quality**

   4. **Increased property value**

   5. **Decreased obsolescence**

3. Results: Real estate agents

Motivation to reduce personal climate change emissions:

- **78% moderately or highly motivated**

Agents role to inform buyers/sellers:
> 50% of agents _are not convinced_ that it is their role to inform buyers/sellers about sustainable house design

- **This attitude changed: in a follow-up phone survey after education workshop:**
> 50% of the agents _now felt that it is their role_ to inform buyers/renters about sustainable house design

Features that contribute to sustainability in homes

Features	Yes	No
Good insulation	100% (9)	0
Large eves	100% (9)	0
A low flow showerhead	100% (9)	0
Access to public transport	100% (9)	0
A modern air-conditioner	89% (8)	11% (1)
Low voltage down-lights	44% (4)	56% (5)
West facing windows	22% (2)	78% (7)
Plenty of lawn area	22% (2)	78% (7)

Willingness to Pay for Green

Cost Premium	Valid Percent (%)
Pay No More	11
1-5% more	33.5
6-10% more	22
11-15% more	33

Benefits of Green Buildings

Rank	Financial and Non-Financial Benefit
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Most Significant Barriers

Rank	Barriers
1	Lack of developer awareness
2	High cost Vs low perceived benefit
3	Unwillingness to pay additional cost
4	Lack of owner/occupier awareness
5	Poor access to information
6	Unreliable/unproven technology
7	Limited availability to new technology
8	Low consumer demand
9	Perceived detriment to aesthetics

Summary & Conclusions

All three stakeholder groups were consistent in their responses

Barriers to energy efficiency in homes are:

- **Larger homes & smaller households**
- **Costs & long payback periods of sustainable features**
- **Lack of developer & RE agent awareness**

Summary & Conclusions

Barriers to energy efficiency cont:

- **Lack of consumer information about benefits & savings of EE features**
- **Green buildings not used in a way that maximizes the energy, as designed**

- **Common reasons people are not acting in more sustainable ways:**
  - **Forgot**
  - **Inconvenient**
  - **Laziness**

Recommendations

To substantially reduce CO2 emissions from the building sector, the right mix is needed of:

- **Appropriate government regulation**

- **Greater use of energy saving technologies**

- **Behavioural change**