Support for energy efficiency

Presentation to a Public Forum:

Emissions trading in Australia – allocation challenges

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Retrofitting existing buildings: the challenge

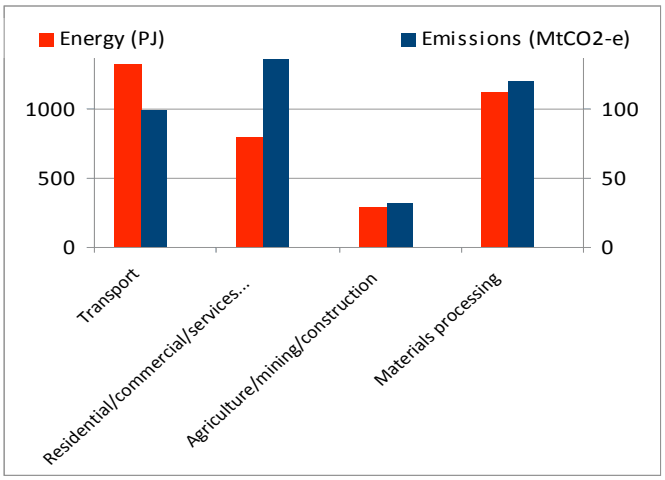
Buildings and what happens inside them:

- As a share of total final energy:
  Residential 11.3%, Commercial 6.6%
- As a share of electricity consumption:
  Residential 29%, Commercial 21%

Hence,

- As a share of Scope 1 and Scope 2 energy combustion emissions:
  Residential 18.0%, Commercial 12.8%
  (c.f. Transport 22.1%)

End use energy and emissions by major economic sector: a slightly different presentation



Some numbers on buildings

- Residential (2006 Census):

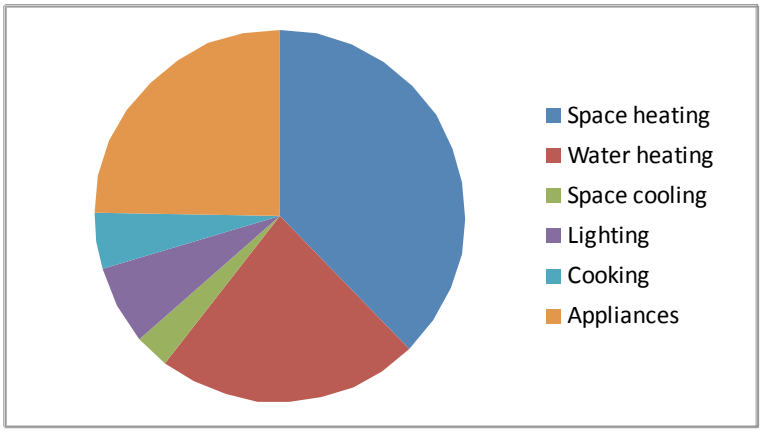
Separate and town houses	6.1 M
Apartments etc.	0.9 M
Other	0.08 M
Total	7.1 M

New build ~ 2% of stock per annum, or less

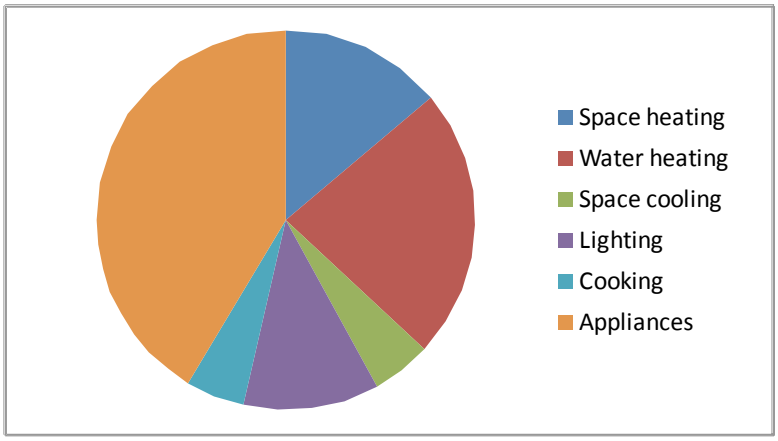
- Commercial and light industrial
  No useful comprehensive data

What energy is used for in residential buildings

Source: Energy Efficient Strategies (2008)

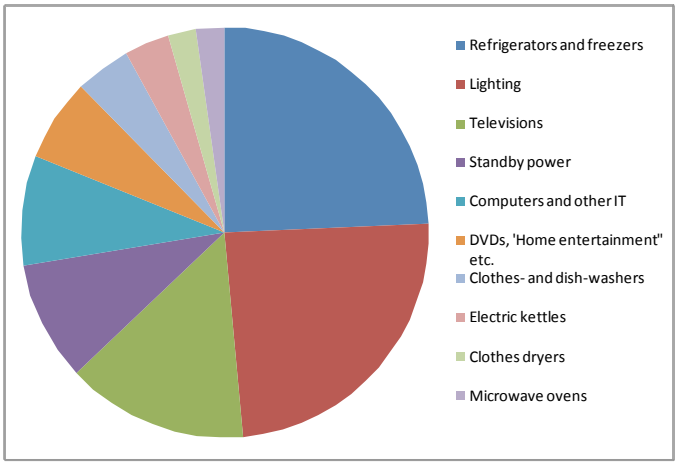


And what this means in terms of emissions



More detail on residential electric appliances

Source: Energy Efficient Strategies (2008)



What energy is used for in commercial buildings

- Astonishingly, there are no reliable, comprehensive data on this.
- We can be confident that heating, ventilation and air conditioning (HVAC) is the largest use – possibly half the total.
- Other important uses are:
  - lighting
  - office equipment, and
  - in premises where food is kept, refrigeration.

Points to guide policy design for housing

- Building envelope (heating and cooling)
  40% of energy, 19% of emissions
- "Plumbed in" equipment (hot water, cooking, lighting)
  35% of energy, 40% of emissions

- Require investment in fixtures which should be guided by expert advice, via energy audit
  - "Moveable" appliances
    25% of energy, 41% of emissions
- Primarily influenced by technical performance standards and labelling, influencing consumer choice

Some points bearing on social policy

- Dwellings have long lives and occupants pass through different lifestyles.
- 24 hour occupancy will require more energy consumption and will benefit more from higher efficiency.
- 24 hour occupancy is typically associated with lower household incomes.
- "Fuel poverty", with negative effects on physical health, exists in Australia.

Some lessons from experience

- The “factor of four” relationship, is caused by:
  - performance of the building envelope
  - performance and numbers of appliances and equipment
  - behavioural choices of household members
- Every combination of dwelling + household is different.
- Occupant behaviour is at least as important as inherent technical performance in determining energy consumption.
- A price signal + written leaflets will not be sufficient to achieve optimal performance.
- Consumption reductions of 20% are readily achievable in most houses, with motivation and advice, but very little physical investment.

Some implications for program design

- Good technical performance (inherent energy efficiency) is a necessary but not sufficient condition for achieving efficient performance.
- A dwelling and its contents make up a complex machine, requiring skilled operation to get optimal performance.
- Most energy users in do not have, do not want and do not need energy expertise, but they do need to know how to operate the machine.
- Imparting this knowledge requires face to face interaction in the house.
- But if it takes too long, the energy auditor will become an unwelcome guest.

Program design issues for tenant households

- All tenants can potentially benefit from behaviour change advice.
- Low cost upgrades to building envelope performance and lighting can also be a big help, especially in cooler climates.
- Financial incentives for landlords coupled with mandatory minimum energy performance could be a useful approach.
- Imparting energy use behavioural advice to disadvantaged households requires enrgy auditors with special social skills.

Some crucial longer term issues

- Many new technologies will require more sophisticated skills, and the old trade classifications are rapidly becoming obsolete
- Lack of tradespeople with adequate skills is already a problem
- In the short to medium term, this lack could become the largest impediment to the rapid adoption of higher efficiency, lower emissions energy using techniques and equipment
- Market intermediaries (retailers, tradespeople) play a crucial role

On the back of an envelope ……

Total number of households = 7.1 million

If an audit costs $250, total cost of providing an audit to every household = $1,800 million

which could be spread over several years

A reminder

- The residential, commercial, services and light manufacturing industry sectors of the economy account for:
  - 58% of final electricity use
  - 35% of direct and indirect greenhouse emissions from energy combustion
  - 47% of emissions excluding transport
  - Most of employment and GDP in the economy