Delivering Zero Emission Homes to Australia

Michael Ambrose
Alternative Energy for Coastal Cities Forum 2009
27 May 2009

CSIRO.
Delivering Zero Emission Homes to Australia

Residential energy use

Energy end use for Australia - 2007

Energy consumption in petajoules (PJ) followed by % share of total


Residential GHG Emissions

Total Emissions = 576Mt CO₂-e
Residential Sector = 54.5Mt CO₂-e

Source: Department of Climate Change 2008, National Inventory by Economic Sector 2006, Department of Climate Change, Canberra
**Key actions**

- Improve energy efficiency of new homes
  - Increase Star Rating to 7.5 – 8 Stars
  - Double glazed windows mandatory in temperate/cool climates
  - Improved sealing of homes (aim for 0.5 air changes/hour)
- Improve appliance and fittings efficiency
  - Energy efficient lighting mandatory (no incandescent/halogens)
  - Efficient hot water systems mandatory (solar or heat pump)
  - Improved appliance star rating (TV, WM, DW, oven/stove, etc)
- Energy monitoring and control
  - In house smart meters and monitoring providing real time feedback to occupants on use and ability to control appliances
- Decentralised renewable energy generation
  - House based and/or community based systems (PV, wind, etc)
  - Cogeneration options for higher density residential areas

**AusZEH Demonstration House**

- Laurimar Estate, Doreen
  - About 30kms from CBD
  - 240m² (including garage)
  - 8.2 Star rating
  - 6kW PV array
  - Low energy lights, appliances, etc
  - Full monitoring and control system
  - Water efficient systems (tank, greywater, etc)
CSIRO. Delivering Zero Emission Homes to Australia

ZEH scenarios for Sydney

<table>
<thead>
<tr>
<th>House scenario comparison</th>
<th>% Energy Demand Reduction</th>
<th>% CO2 Emission Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average to Best</td>
<td>58%</td>
<td>49%</td>
</tr>
<tr>
<td>Best to Future</td>
<td>25%</td>
<td>19%</td>
</tr>
<tr>
<td>Average to Future</td>
<td>71%</td>
<td>56%</td>
</tr>
</tbody>
</table>

Total: 18,779 kWh (7,908 kg CO₂)

Decision support tools and guide

- **DST1 (house level)**
a tool for selecting and assessing the technological and economic viability of alternative solutions for achieving a ZEH under a specific set of demand parameters.

- **DST 2 (neighbourhood level)**
predicting the uptake and impact over time of ZEH concepts and technologies under alternative policy instruments, incentive schemes and regulatory settings.

- **Best Practice Guide**
technical guidelines as a possible companion/supplement to the building code

Conclusions

- Energy consumption and GHG emissions from the residential sector are significant and are rising
- To achieve the government’s modest GHG targets, radical changes in the sector will be required
- A combination of energy efficiency improvements to houses and appliances, monitoring and control and decentralised renewable energy generation will be required
- Governments at all levels will need to drive the changes through demonstration, incentives, legislation and regulations
- Solutions are available today that are practical and affordable
Thank you