

Cutting Carbon : A Price Is Not Enough?

The Hon. Tom Roper
President,
Australian Sustainable Built Environment Council
Board Member, Climate Institute

2nd Australian Summer Study For Energy Efficiency
Brighton Beach, Sydney, 27 February, 2013



Discussion points

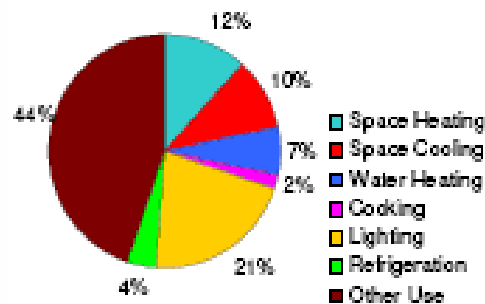
- Mitigation and / or adaptation?
- New build
- Changes for existing buildings
- Best practice
- Design for the future
- Our challenge



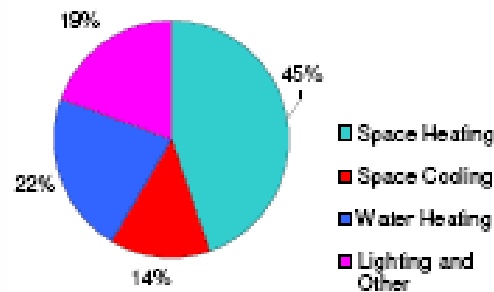
Buildings and greenhouse gases

- The Buildings Sector accounts for 30-40% of global energy use – 10 Gt CO₂ equivalent – and with unchanged policy and practices would grow to 14.3 Gt CO₂ by 2030.

U.S. Commercial Building Energy Use 2005



China Commercial Building Energy Use 2000



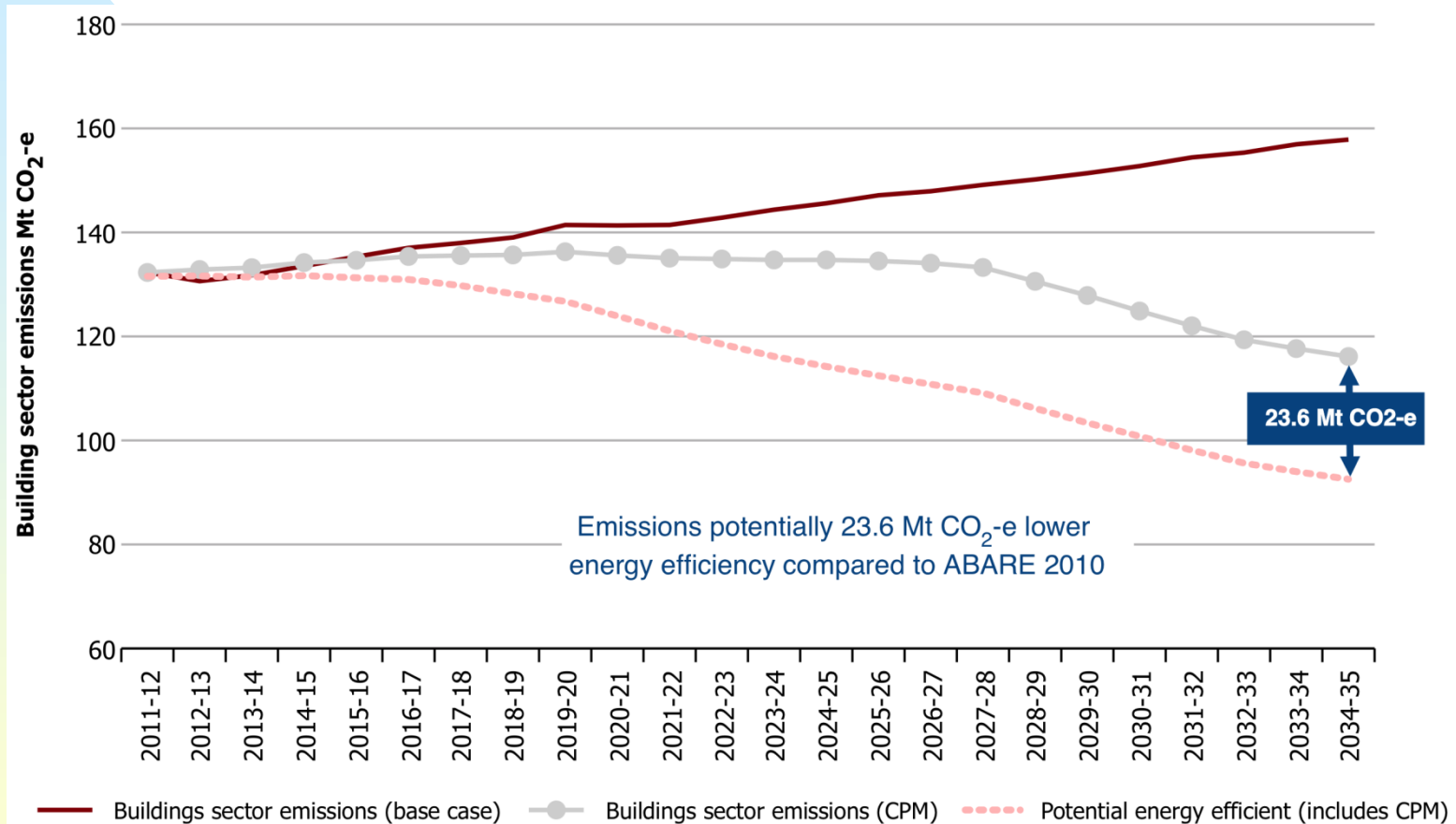
- ASBEC's Second Plank Report found that 23% of Australia's emissions are attributable to the built environment, growing 38% by 2030
- Energy consumption in buildings is a fundamental source of emissions particularly because of our coal fired generation
- A price for carbon will reduce buildings emissions but is not sufficient – complementary measures are essential

National Energy Savings Initiative (NESI)

- The modelling shows that energy efficiency measures could reduce the emissions produced in providing energy for the buildings sector by as much as 23.6 Mt CO₂-e by 2034-35
- A NESI would bring forward the benefits of the CPM. With the CPM alone, building sector emissions fall below 120 Mt CO₂-e for the first time in 2032-33. With energy efficiency, this level is achieved by 2022-23, a decade earlier

NESI Submission: GHG emissions by the building sector (2012 projections)

EMISSIONS BY THE BUILDING SECTOR – ENERGY EFFICIENCY



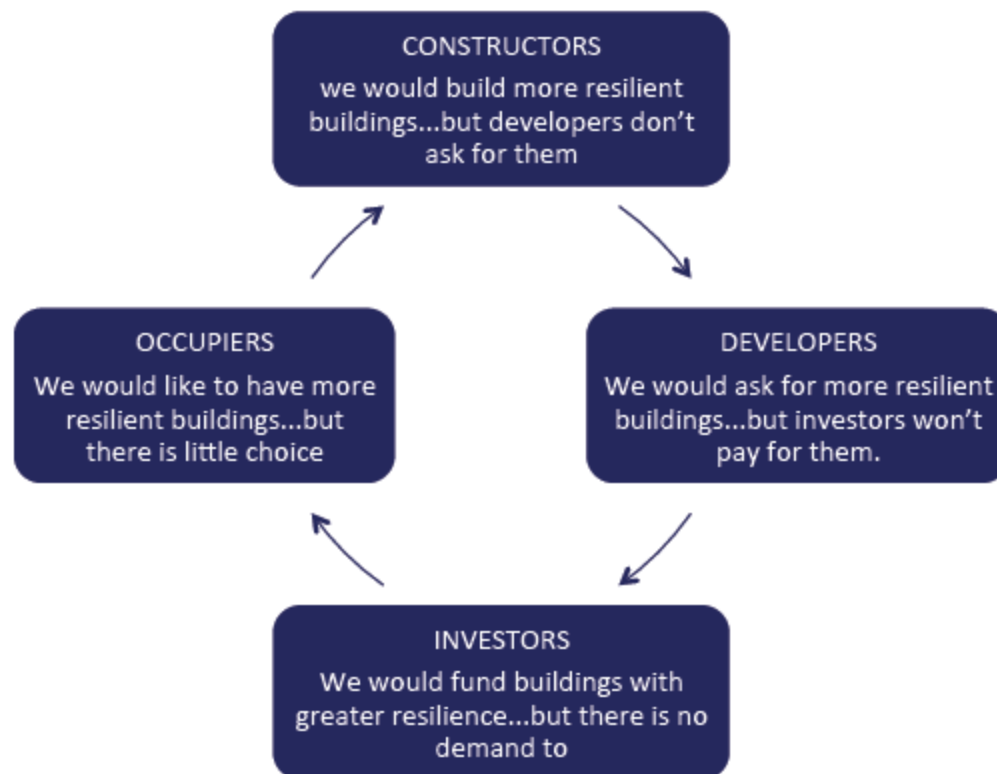
Source: Allen Consulting Group analysis of ABARE (2010) and BREE (2011) and Pears (2007) and Treasury (2011).

Taken from Report to the ASBEC Climate Change Task Group in response to the National Energy Savings Initiative issues paper

Second Plank Policy Recommendations

- Tax incentives for green building retrofits
- National White Certificate Scheme
- Public funding for building retrofits
- Minimum energy performance standards
- Building code improvements

Barriers to adaptation in new buildings – the circle of blame



Environment upgrade agreements

100 George Street, Parramatta

- Increased NABERS rating from 1 star to 4 star within 12 mths
- Reduced energy costs by 50%
- Reduced outgoings by \$96,000/yr
- Building value increased by an estimated \$6 million
- Rent increased by 16% (pre-completion) an expected 25% post-completion



500 Collins Street, Melbourne

- 5 Star Green Star
- Energy savings 52%
- Chilled beams
- Efficient lighting
- Solar hot water
- Water savings
- Recycled construction waste
- Waste wise certification
- Productivity improvements



Source: Google Images

Empire State Building

- A deep retrofit
- 3 year payback
- 38% cut in utility bills
- Savings \$4.4m annually
- 105,000 tonnes CO2 over 15 years
- Retrofit chiller plant
- Refurbish windows
- Purchase green power



Source: Google Images

A 1960's office

- Improve building envelope by upgrading windows
- Increase fabric insulation and air tightness
- Solar shading
- Improve thermal mass
- Automatically controlled mechanical ventilation
- Water chilled beams
- Night cooling



Turning old buildings green

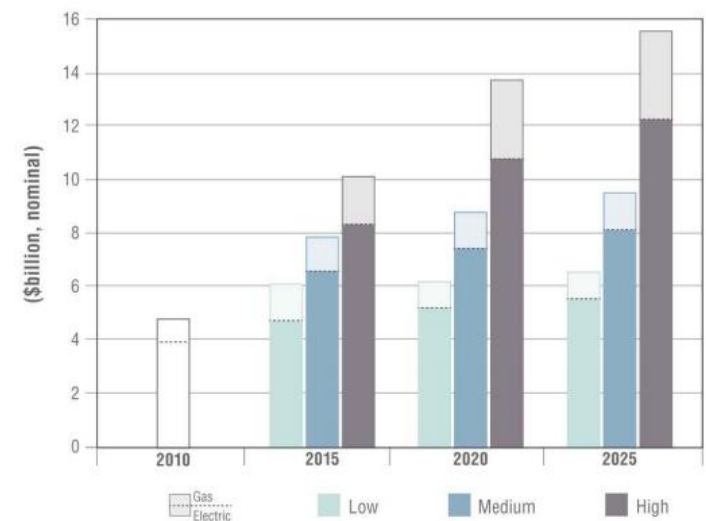
- President Obama's \$4b public/private energy upgrades – paid for by the savings achieved
- State legislation financing energy retrofits financed by property tax surcharges (PACE)
- Ygrene Energy Fund 5 year contract for Miami and Sacramento
- Short term loans from Barclays Capital backed by insurance warranties and bundled into long term bonds



Utility driven energy efficiency programs

- Energy efficiency programs funded by utility customers to reach at least US\$9.5b by 2025
- Almost all states to have customer funded programs
- Most states to have energy efficiency targets – with utility savings goals
- Offset most load growth

Projected Utility Customer Funding for Electric and Gas EE Programs



Riverside County (Ca) HERO Program

- Property owners can finance energy and water efficiency and renewable energy projects through their property taxes
- Council/city bonds underwrite the scheme
- \$100mil for 6000 homeowners
- 17 cities



Leading by example – Brea, California

- Energy savings performance contract – Chevron Energy Solutions
- 14 buildings – high efficiency lighting systems
- 4000 street lamps
- 6 buildings – upgraded heating and cooling
- 1.8 MW of solar panels offsetting CO2
- 40% reduction in energy costs worth \$13 million



Potential Climate Change Impacts on the Built Environment



- Plastic, wood and surface coatings subject to greater degradation
- Increased requirement for solar glare control

- Increased cooling loads (and cooling costs)
- Building envelope at increased risk of cracking / failure
- Soil drying and movement
- Increased thermal discomfort

- Structural loading by pressure forces
- Total building collapse and destruction
- Impact damage from flying debris
- Rain / moisture penetration leading to internal damage



- Total or partial fire damage to building property and contents
- Smoke and water damage to building property and contents
- Health and safety of occupants at risk
- Increased clearing of vegetation around housing, leading to decreased shading by the natural environment and green space

- Water damage to buildings and contents
- Contamination of building interior from sewage, soil and mud
- Undermining and / or destruction of foundations
- Salt spray (coastal) affecting durability of most materials
- Coastal erosion resulting in loss or damage to property

Chicago Climate Action Plan

- “Adding green to urban design 2008” : 21 key actions including roofs, facades, landscaping around buildings
- Thermal radar mapping the city’s hottest spots to prioritise pavement removal, green roofing and tree planting
- 4 million sq. ft of green roofs, planned or completed since 2008
- 9,000 acres of tree canopy added since 1993
- Managing stormwater, including 150 green alleys
- Green permit acceleration



Source: Progress Report First Two Years

Three spheres of government should:

- Set benchmarks to measure their performance in implementing adaptation strategies for their own operations;
- Require consideration of climate change impacts in tender documents;
- Undertake adaptation work within their own facilities;
- Work with private property owners to improve adaptation within properties leased by government, through use of demonstration projects or 'green' lease clauses; and
- Report annually on their performance against adaptation benchmarks

Better access to information and tools

Establish a 'one stop shop' climate change adaption web portal and make it freely available. This will:

- Provide up-to-date information on national climate change data to facilitate adaptation decision making;
- Allow built environment professionals and communities to understand the predicted impacts of climate change for their local areas and to take appropriate action to enhance resilience; and
- Give stakeholders access to information, case studies and tools to help with adaptation

Our challenge

- We can no longer afford business as usual
- No reason for panic nor for complacency
- Buildings offer the largest and fastest cut in CO₂
- Design and build for future climates and retrofit what we have
- Develop strategies to build resilience to current variability and future uncertainties



[Credit: Harry Bruce, Daily Mercury, August 5, 2009]