

## Climate Change Adaptation

Adaptation is about **preparing** for climate change, or **building our resilience** to impacts

This presentation will outline issues and opportunities facing the community within the built environment and provide an overview of the activities underway at DECC....



### A message from the people of Arizona

- Don't ask stupid questions and
- Why wouldn't you just start work on what you already know?



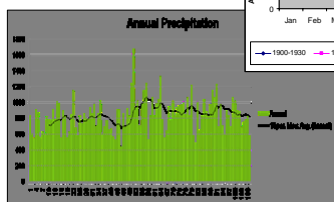
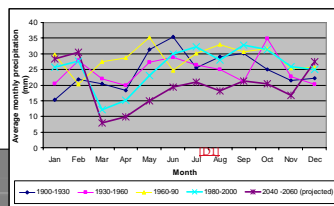
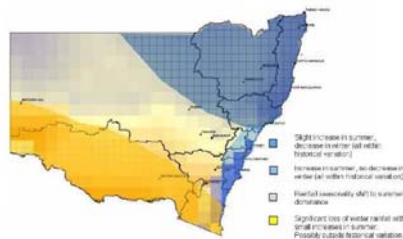
## Climate Impacts the Built Environment

- Considerations include commissioning, design, construction and operation of buildings, roads, utilities and other infrastructure.
- Requires policies for new developments, but also for retrofitting of existing buildings and infrastructure.
- Adaptation options must, of necessity, take account of mitigation, in order to ensure that adaptation responses do not increase carbon dioxide emissions
  - Eg. reliance on mechanical air-con = maladaptation
- Critically, built environment is designed for the long-term (minimum 50 years) so it must take into account projected impacts of climate change for NSW to 2050 and beyond....

## NSW Projected Impacts to 2050

### Rainfall

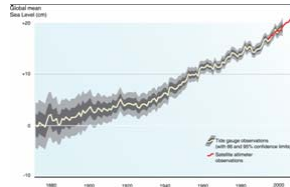
- Switch to summer dominance
- Loss of reliable winter rainfall in South and South-west
- Reduced run-off in parts of the state



## NSW Projected Impacts to 2050

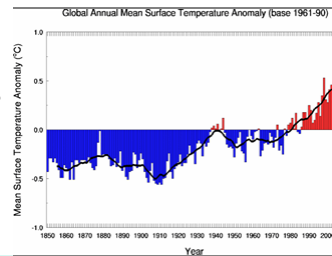
### Sea level

- 0.4m by 2050
- 0.9 by 2100
- Last significant coastal storm: 1974
  - Translates 1m shoreline transition for every 1cm sea level rise on sandy shores



### Temperature

- Average temperature rise up to 2 degrees
- Will lead to increased fire weather, drought, reduced river inflows



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## Sydney Climate Impact Profile

- By 2050, the climate is virtually certain to be hotter with a likely increase in summer rainfall and a decrease in winter rainfall. (noting rainfall in coastal regions is difficult to simulate)
- Sea level is virtually certain to keep rising.
- Changes in rainfall are likely to increase sediment shedding from the hinterland, potentially causing changes to stream channels including bank erosion.
- Sea level rise, coupled with increased flooding, is virtually certain to pose an increased risk to property and infrastructure. Developments near estuary entrances and coastal floodplains are most vulnerable. Sea level rise is virtually certain to alter estuarine and coastal lowland ecosystems.
- Seasonal drying is likely to degrade freshwater wetlands and higher temperatures are likely to change or contract many ecosystems
- Altered fire regimes have the potential to cause major changes in ecosystems.

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## Sydney Climate Impact Profile

### **Incidence of riverine flooding likely to increase**

- Vulnerability and exposure to riverine flooding varies significantly with location, but is expected to increase with changing community profiles out to 2050 due to density of development and to any increase in exposure to flood producing storm events.

### **Incidence of flash flooding likely to increase**

- Flash flooding results from storms of relatively short duration and high intensity, with water both rising and flowing quickly.
- Current incidence is variable depending on location, but the risk is expected to increase with changing community profiles in urban areas out to 2050.



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## Extreme Events Profile: Sydney

### **Frequency and intensity of heatwaves to increase**

- Heatwaves have historically accounted for more deaths in Australia than any other natural hazard.
- Extreme heatwaves have the potential to cause a significant number of human casualties, particularly among the elderly and young.
- In the Sydney Central/Coast Region, the frequency of heatwaves has historically been higher in the west of the region.
- In the period 1979-2008, the experienced 14 heatwave events in Sydney and 29 in Richmond.



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## Extreme Events Profile: Sydney

### Potential Increase in Lightning Frequency

- Lightning strikes are more frequent in the western suburbs and about the ranges, and while they are summer dominant, they can occur at any time of year.
- Some studies have suggested a 5 to 6% change in global lightning frequency for every 1 degree of global temperature change.

### Potential increase in hail days

- Current average is ten hail producing thunderstorms per year. An estimated increase of six hail days per year is projected out to 2070.



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## Impacts ⇒ Vulnerability of Built Environment

### NSW East Coast storm: 8 June 2007

Cost - \$1,350 million

### South-east hailstorm: 14 April 1999

Cost - \$1,700 million

### Turrumurra hailstorm: 21 January 1991

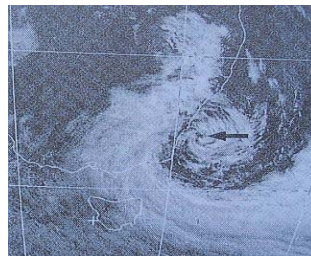
Cost - \$226 million

### Bushfires in Sydney (also Canberra, Wollongong and Dubbo)

21 December 2001 to 15 January 2002 650,000 hectares burned, 121 houses destroyed and 340 more damaged, Cost - \$68.79 million

### Hawkesbury and Georges River floods

5 August 1986 10,000 affected, a flood peak of 11.3m at Windsor Bridge, Cost - \$53 million



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## Adapting to expected impacts

- Adaptation strategies are best done through a “bottom up” process that engages all stakeholders – all levels of govt, business, community
- If we act early, we can reduce future exposures

### **The role of Government in relation to built environment**

- Build knowledge of impacts and share information so that priorities, based on vulnerability and risk, are identified
- Sustainably manage public assets (road, rail, port, poles and wires etc...)
- Identify and manage risks to the safety and security of community (ie appropriate standards, co-ord emergency response, etc)
- Support key sectors to develop their own risk strategies



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## DECC Adaptation Initiatives

With respect to building resilience of built environment DECC is:

- Developing Tools
- Providing Guidance
- Forging Partnerships
- Offering Assistance

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## DECC Initiatives

### Developing tools

- Climate risk vulnerability assessment
  - DECC is supporting the Australian Green Infrastructure Council (AGIC) develop a climate vulnerability component of an infrastructure sustainability rating scheme, to assess future risks of tunnels, railways and bridges, cycle and pedestrian pathways, water supply and treatment infrastructure, and ports and marinas.
  - Devising methodologies for Integrated Vulnerability/Risk assessments
- South East Regional Vulnerability Assessment
  - A multi-sector assessment to provide a basis for regional adaptation strategy

## DECC Initiatives

### Guidance for community

- Science and research
  - State-wide Climate Impacts profile
  - 13 regional projections on NSW Climate Extremes
  - East Coast Climate Change Initiative
- Draft Sea level rise policy statement
- Reviewing Coastal management and flooding programs
- Working with the Department of Planning and Local Government to see where the planning system can be improved to address the impacts of climate change

## DECC Initiatives

### Partnerships

- State Emergency Management Committee
- MOU with LGSA on the “ways” and the “hows” of climate change response. Local government plays lead role in implementing planning and development systems.
- Developing a community level pilot that addresses adaptive responses to energy, water, transport and land-use planning, to demonstrate how an improved urban streetscape can create ownership amongst diverse stakeholders to reduce emissions.

## DECC Initiatives

### Assistance for Action

- The Climate Change Fund provides more than \$700 million, including more than \$300 million for energy efficiency and renewables
- Community awareness
  - black balloons energy efficiency campaign
- Green Skills Program
  - \$20 million over 4 years for Energy Efficiency Training key trades and professions
- Green Business Program
  - \$30 million over 5 years for energy and water savings projects Register at [ccf@environment.nsw.gov.au](mailto:ccf@environment.nsw.gov.au)

## Key Messages

- We have to do our share of emission reduction **but** we also have to prepare for climate change we cannot avoid.
- The NSW Government is committed to:
  - Communicating the best science at regional level
  - New or changed policies based on the science as it becomes clear enough
  - Practical support for communities, local councils and business.