



# **Kyoto, Australia, and climate policy**

**Dr Peter Christoff  
University of Melbourne**



# United Nations Framework Convention on Climate Change (UNFCCC)

## Article 2

The ultimate objective of this Convention is....  
stabilization of greenhouse gas concentrations in the  
atmosphere at levels that would **prevent dangerous  
anthropogenic interference with the climate system**

# AVOIDING DANGEROUS CLIMATE CHANGE

EDITED BY Hans Joachim Schellnhuber, Wolfgang Cramer,  
Nebojsa Nakicenovic, Tom Wigley and Gary Yohe



CAMBRIDGE

# Avoiding Dangerous Climate Change

Scientists increasingly believe that we risk 'dangerous climate change' if we exceed 450ppm of atmospheric CO<sub>2</sub> and the global average temperature rises by more than +2° celsius

We are currently at around 385ppm

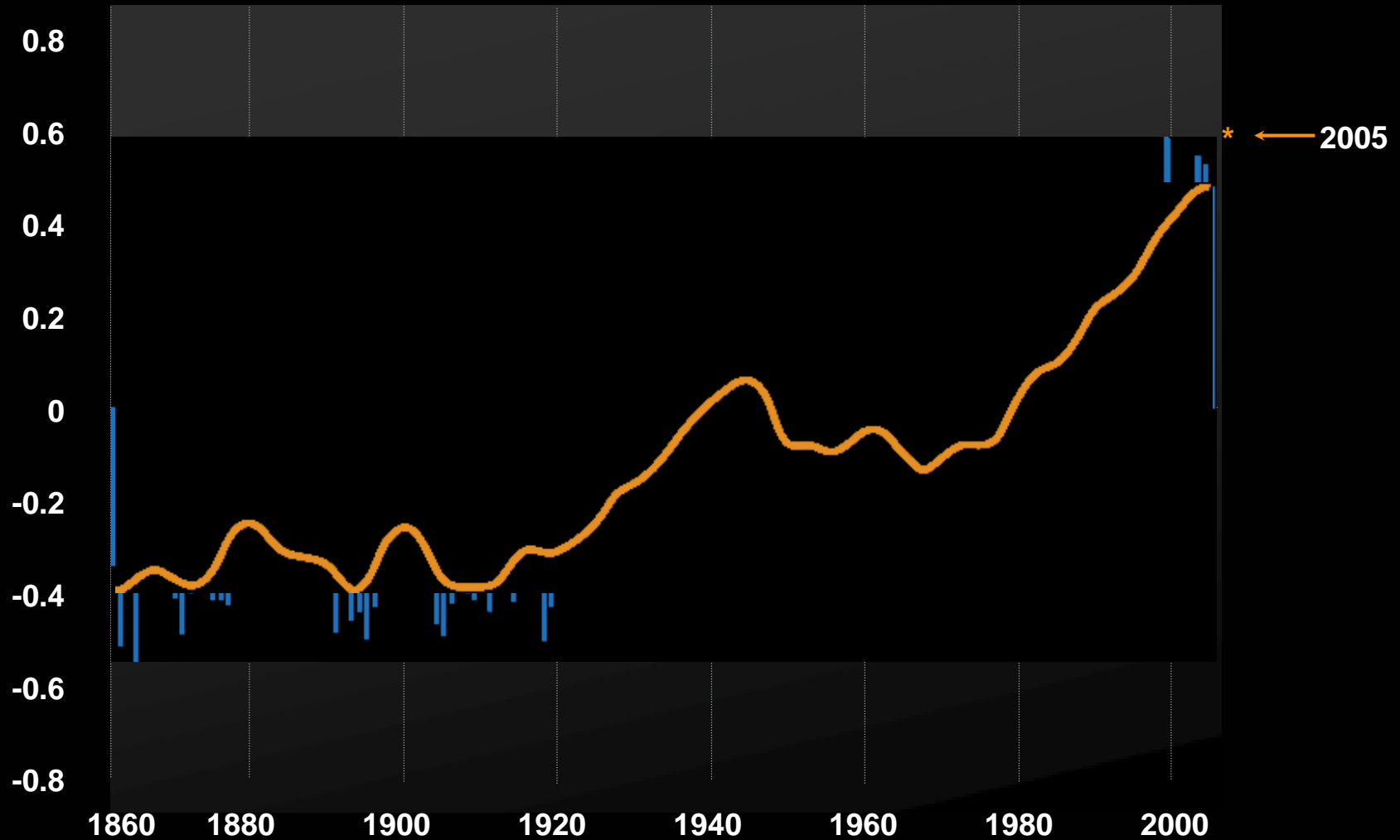
We add slightly over 2 ppm each year

Some suggest that this gives us around 25-35 years – until around 2030 to 2040 - to significantly cut global CO<sub>2</sub> emissions, by around 60-80 percent of global emissions below 1990 levels

Temp rise (°C)	Water	Food	Health	Land	Environment	Abrupt and Large-Scale Impacts
1°C	Small glaciers in the Andes disappear completely, threatening water supplies for 50 million people	Modest increases in cereal yields in temperate regions	At least 300,000 people each year die from climate-related diseases (predominantly diarrhoea, malaria, and malnutrition)  Reduction in winter mortality in higher latitudes (Northern Europe, USA)	Permafrost thawing damages buildings and roads in parts of Canada and Russia	At least 10% of land species facing extinction (according to one estimate)  80% bleaching of coral reefs, including Great Barrier Reef	Atlantic Thermohaline Circulation starts to weaken
2°C	Potentially 20 - 30% decrease in water availability in some vulnerable regions, e.g. Southern Africa and Mediterranean	Sharp declines in crop yield in tropical regions (5 - 10% in Africa)	40 – 60 million more people exposed to malaria in Africa	Up to 10 million more people affected by coastal flooding each year	15 – 40% of species facing extinction (according to one estimate)  High risk of extinction of Arctic species, including polar bear and caribou	Potential for Greenland ice sheet to begin melting irreversibly, accelerating sea level rise and committing world to an eventual 7 m sea level rise  Rising risk of abrupt changes to atmospheric circulations, e.g. the monsoon  Rising risk of collapse of West Antarctic Ice Sheet  Rising risk of collapse of Atlantic Thermohaline Circulation
3°C	In Southern Europe, serious droughts occur once every 10 years  1 - 4 billion more people suffer water shortages, while 1 – 5 billion gain water, which may increase flood risk	150 - 550 additional millions at risk of hunger (if carbon fertilisation weak)  Agricultural yields in higher latitudes likely to peak	1 – 3 million more people die from malnutrition (if carbon fertilisation weak)	1 – 170 million more people affected by coastal flooding each year	20 – 50% of species facing extinction (according to one estimate), including 25 – 60% mammals, 30 – 40% birds and 15 – 70% butterflies in South Africa  Onset of Amazon forest collapse (some models only)	
4°C	Potentially 30 – 50% decrease in water availability in Southern Africa and Mediterranean	Agricultural yields decline by 15 – 35% in Africa, and entire regions out of production (e.g. parts of Australia)	Up to 80 million more people exposed to malaria in Africa	7 – 300 million more people affected by coastal flooding each year	Loss of around half Arctic tundra  Around half of all the world's nature reserves cannot fulfill objectives	
5°C	Possible disappearance of large glaciers in Himalayas, affecting one-quarter of China's population and hundreds of millions in India	Continued increase in ocean acidity seriously disrupting marine ecosystems and possibly fish stocks		Sea level rise threatens small islands, low-lying coastal areas (Florida) and major world cities such as New York, London, and Tokyo		
More than 5°C	The latest science suggests that the Earth's average temperature will rise by even more than 5 or 6°C if emissions continue to grow and positive feedbacks amplify the warming effect of greenhouse gases (e.g. release of carbon dioxide from soils or methane from permafrost). This level of global temperature rise would be equivalent to the amount of warming that occurred between the last age and today – and is likely to lead to major disruption and large-scale movement of population. Such "socially contingent" effects could be catastrophic, but are currently very hard to capture with current models as temperatures would be so far outside human experience.					

# Global Temperature Since 1861

Combined annual land air and sea surface temperatures from 1861-2004



# Climate Change 2007: The Physical Science Basis

## 4<sup>th</sup> IPCC 2007 Report

- Very high confidence that human activities have led to global warming
- Numerous long term changes observed – including changes in precipitation; wind patterns; extreme weather including droughts, heavy precipitation, heat waves, the intensity of tropical cyclones, and a decrease in permafrost layer
- Likely increase in global temperatures of between 1.8°C (1.1°C-2.9°C) to 4.0°C (2.4°C-6.4°C) by 2100

How is the Kyoto Protocol  
responding to the challenge?



# Kyoto and the climate challenge

## **The first commitment period target (2008-2012)**

Developed nations' targets= -5 percent of emissions (-1%)

Developed nations' emissions performance?

Abdication of the United States

Developing nations & major emergent emitters?

## **The second commitment period targets? (2013-2018)**

Targets for developed countries?

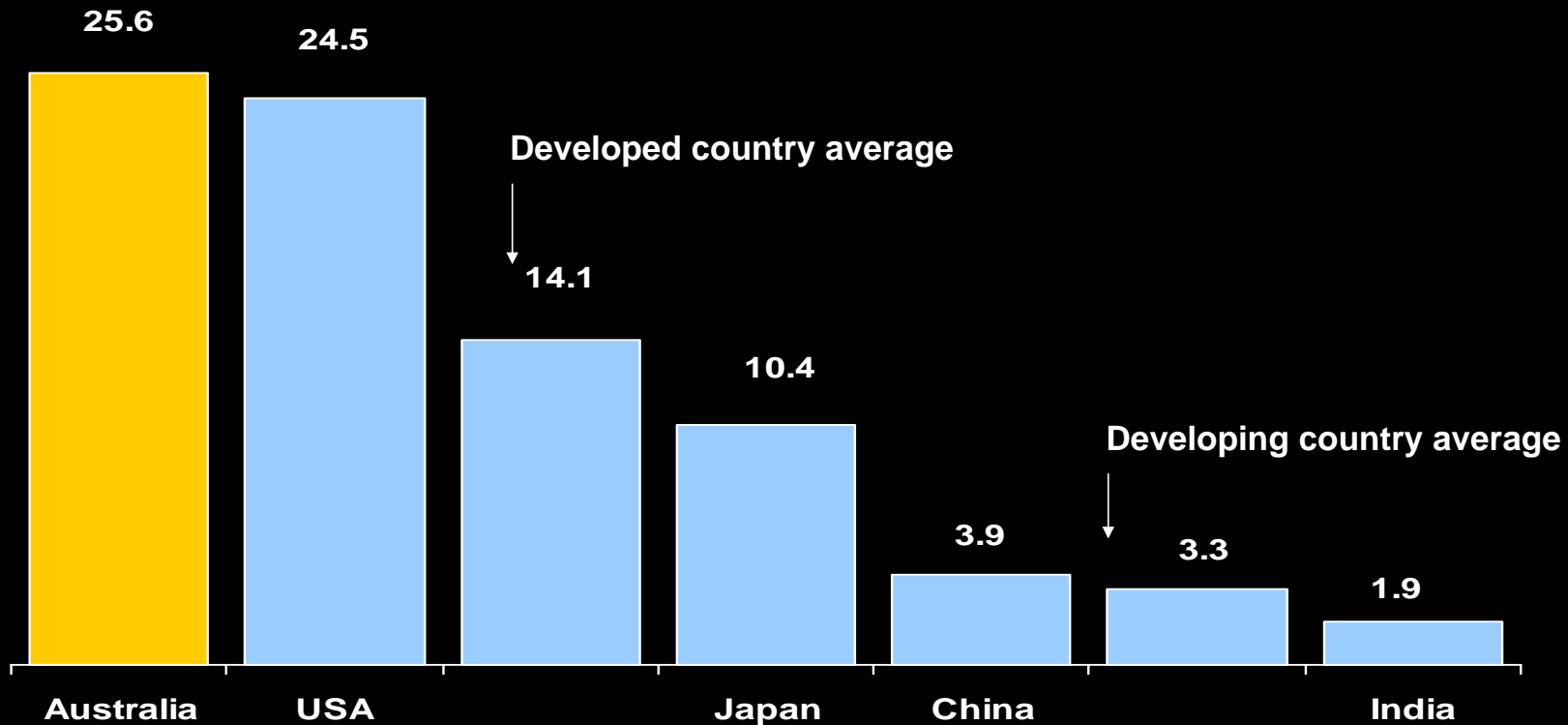
Targets for major emergent emitters? (China, India Brazil)

A dramatic volcanic eruption is captured in this image. A massive, towering plume of bright orange and yellow fire and smoke billows upwards from the right side of the frame. The plume has a textured, almost cauliflower-like appearance. In the center of the dark, smoky sky, a bright, circular sun or moon is visible, casting a soft glow. The overall scene is one of intense natural power and heat.

**How is Australia  
responding to the challenge?**

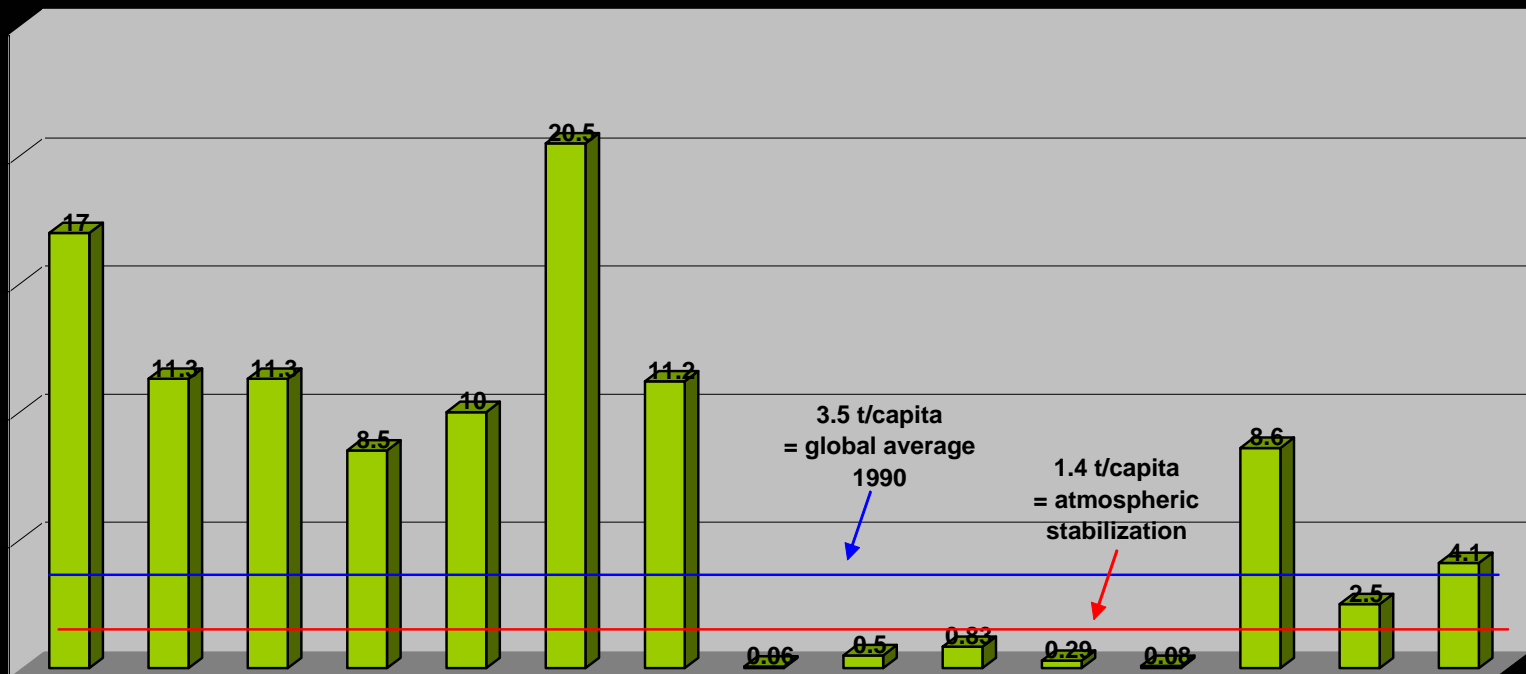
# Global emissions per Person

Greenhouse gas emissions, annual tonnes CO<sub>2</sub>e per person



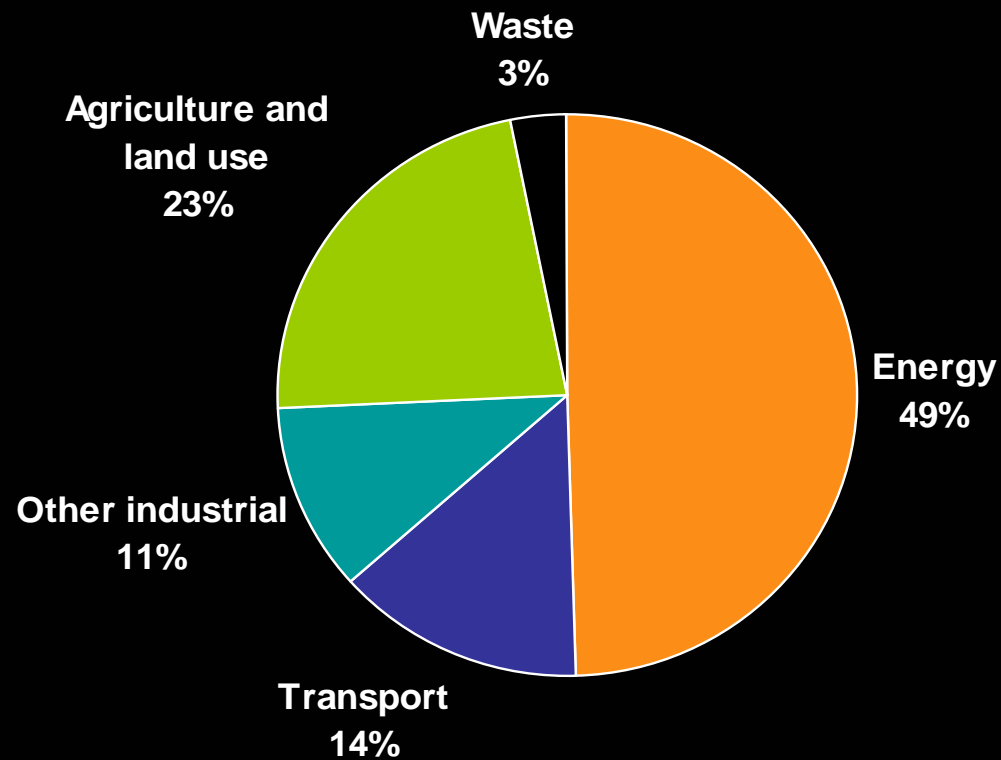
Source: World Resources Institute (2005) [tonnes CO<sub>2</sub>e]

# Contract and converge



Sources: IPCC 2001; Larsen and Shah; 1994; UNFCCC 2000.

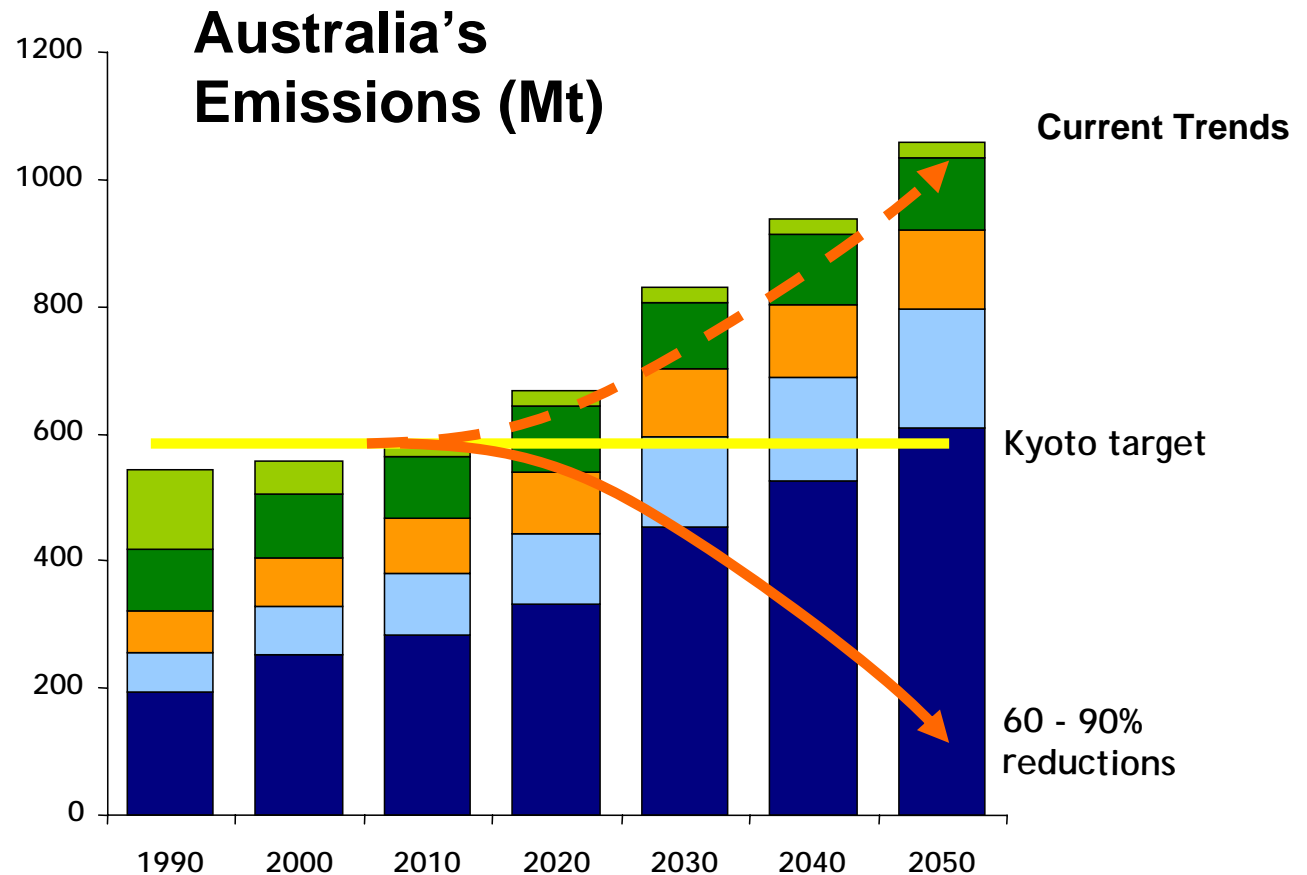
# Australia's Emissions 2004



Source: Australian Greenhouse Office (2004) National Greenhouse Gas Inventory

# Australia's greenhouse trajectory

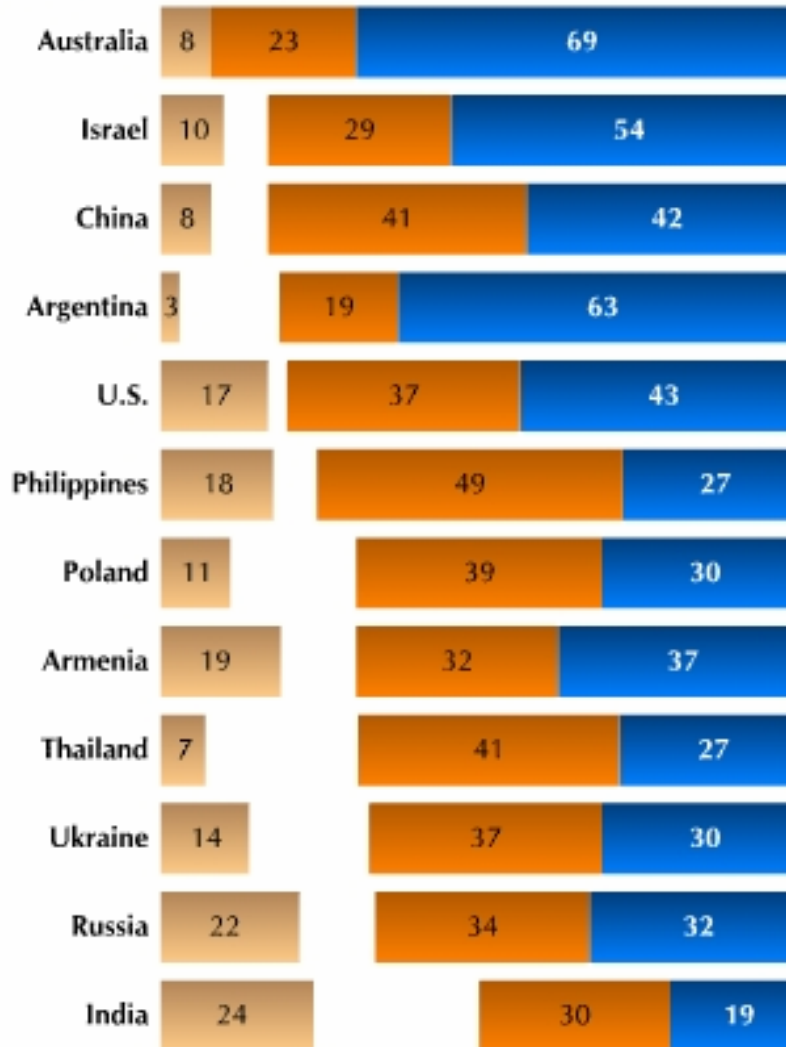
Where we are going...



Source: Adapted from the Australian Greenhouse Gas Inventory and ABARE projections

## Views of Global Warming

- Until we are sure that it is really a problem, we should not take any steps that would have economic costs
- ...should be addressed, but its effects will be gradual, so we can deal with the problem gradually by taking steps that are low in cost
- ...a serious and pressing problem. We should begin taking steps now even if this involves significant costs



WPO/CCGA

What does the Australian public want?

# Australia's actions to date

## International arena

- Refusal to ratify Kyoto (despite 108% target)
- Failure to engage effectively with China, India etc
- Asia Pacific Partnership on Clean Development and Climate Pact (AP6)



# Australia's actions to date

## Domestic arena (national)

- No national emissions reduction target
- AGO and voluntary measures and low level financial assistance to industry for mitigation and adaptation
- Strong national financial and policy support for 'clean' coal and geosequestration
- MRET of 2 percent
- Negligible support for renewable energy technologies
- Possible interest in carbon trading
- No support for a carbon levy



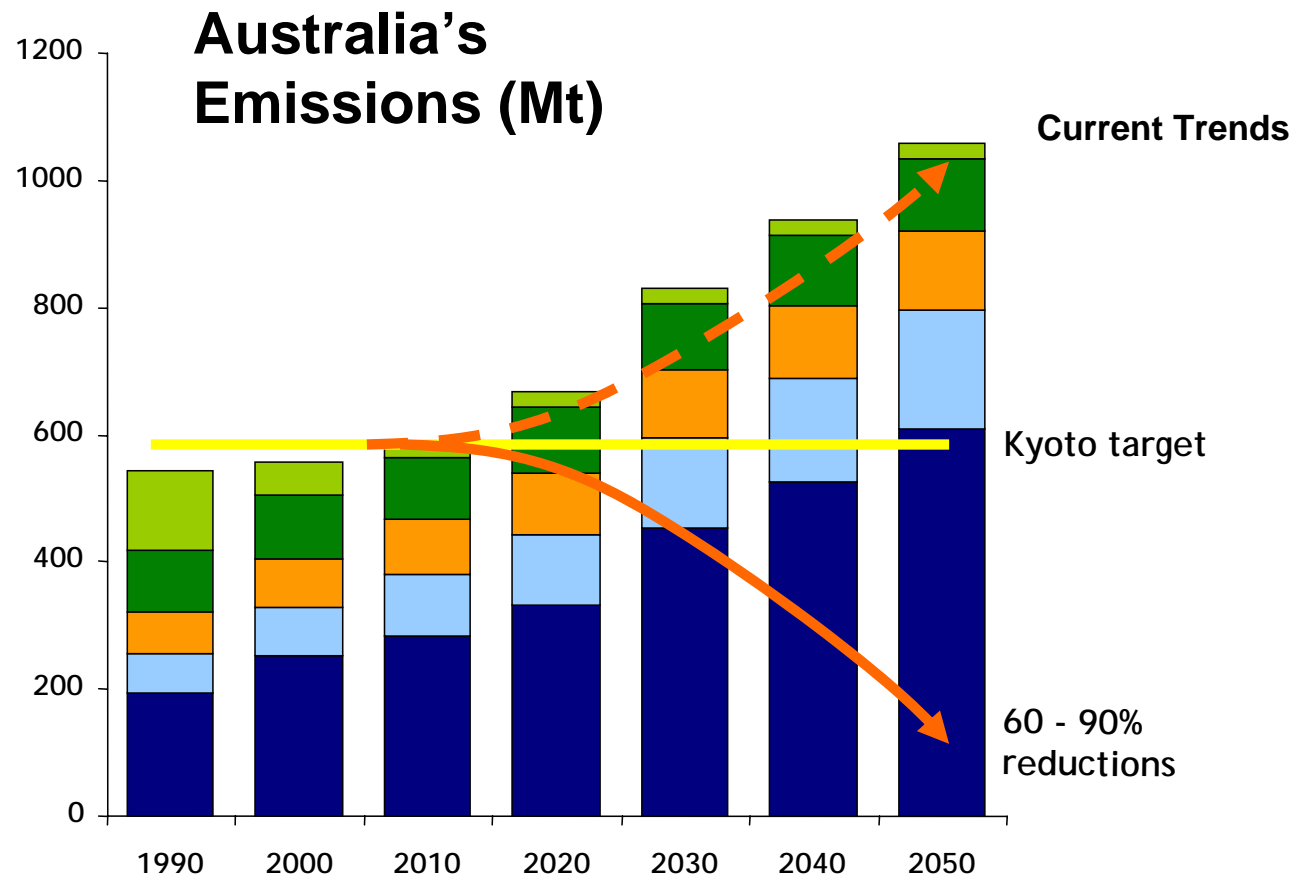
# Australia's actions to date

## Domestic arena (States)

- Strong States' opposition to nuclear power
- States' interest in carbon trading
- Strong States' financial and policy support for 'clean' coal and geosequestration
- Strong support for continued development of coal- and gas-fired power stations
- Some State-level support for legislated long term emissions targets (e.g. 60 percent from 1990 levels by 2050 for South Australia; 60 percent from **2000 levels** by 2050 in Victoria)

# Australia's greenhouse trajectory

What we need to achieve....



Source: Adapted from the Australian Greenhouse Gas Inventory and ABARE projections

# **Adaptive governance and climate change**

**Environmentally effective**

**Flexible**

**Economically efficient**

**Inclusive and participatory**

# Australia's options

## 1. Different forms of international cooperation

Ratification of Kyoto

Regional pacts and 'bubbles'

International Carbon trading

# Australia's options

## 2. Regulatory solutions

Effective national and State emissions targets (-30% below 1990 levels by 2020, and 80-90% below 1990 levels by 2050 at latest)

Regulations and planning laws covering energy efficiency/conservation

Regulations promoting uptake of new technologies



# Australia's options

## 3. Market-based solutions

Carbon trading

Carbon tax or levy

Subsidies and assistance for mitigation (energy conservation and efficiency measures) and adaptation

# Australia's options

## 4. Technological solutions

Renewable energy technologies

(solar, wind, wave, tidal, geothermal)

'Clean' coal and carbon capture and storage (CCS)' ?

Nuclear power?





# Australia's options

## 5. Education and institutional capacity building

New designs for community action, participatory planning and policy implementation

Reducing consumption and sharing our wealth  
(locally and globally)

**“The broad conclusion of our analysis is that urgent action should be taken to reduce the risk of committing the world to the real possibility of very high temperature increases.”**

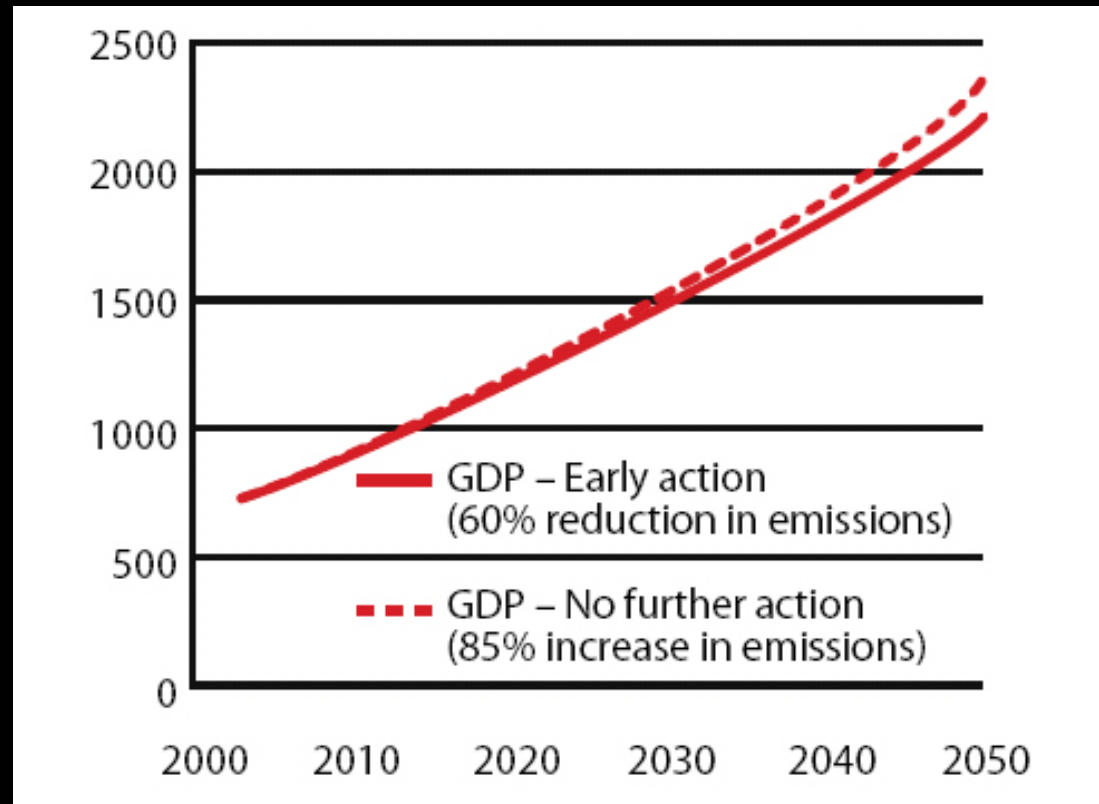
Sir Nicholas Stern

Lead author, Stern Review on the economics of climate change

# It's Achievable and Affordable

## Cutting emissions has little impact on the Australian economy

Real GDP  
(\$b 2005)



Source: The Allen Consulting Group (2006)



Photo: NASA