Centre for Energy and Environmental Markets

UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA



# The Energy Future of Australia:
## What role for the Asia-Pacific Partnership on Clean Development and Climate (AP6)

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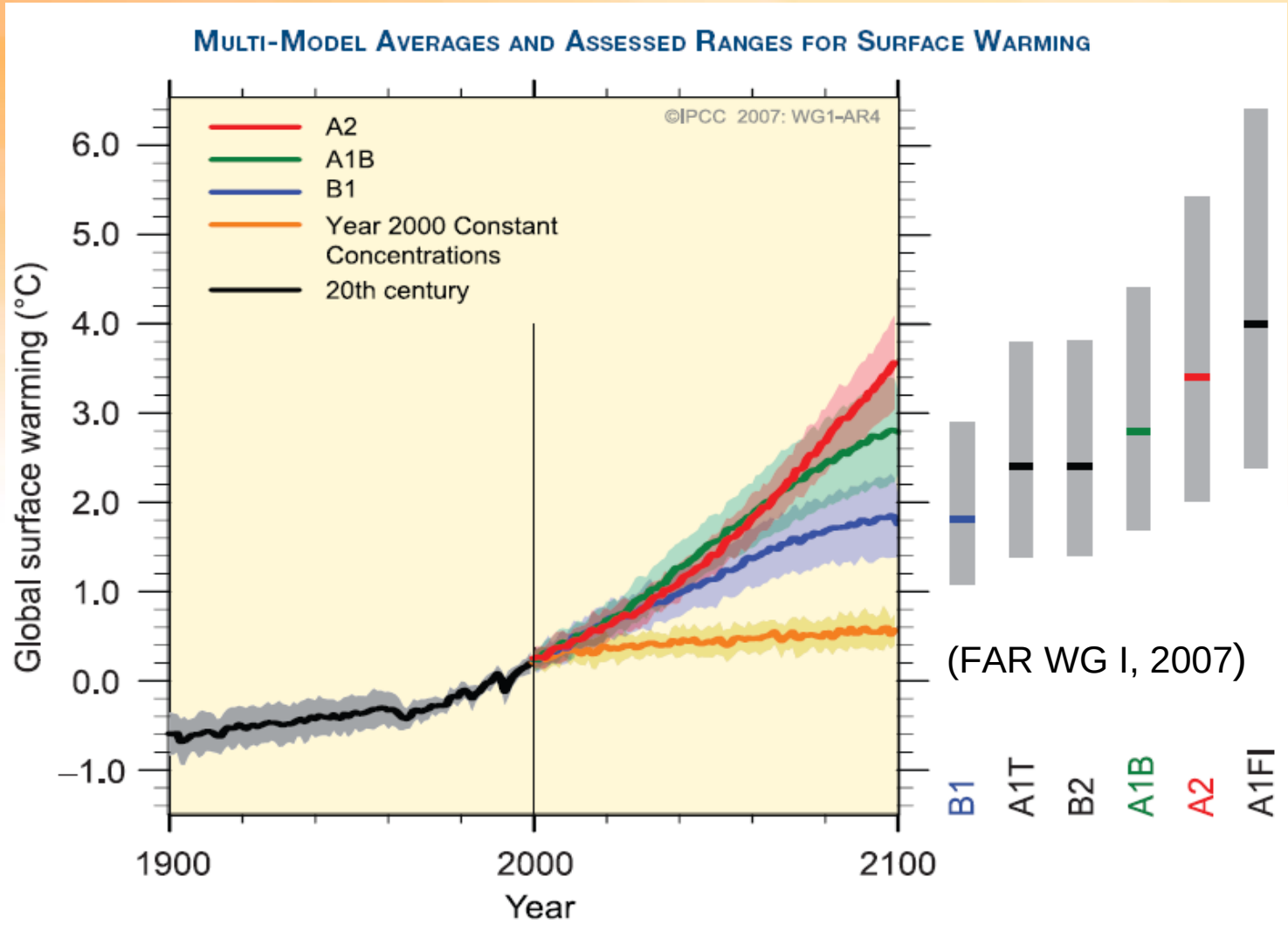
**AIE Young Energy Professionals Workshop**

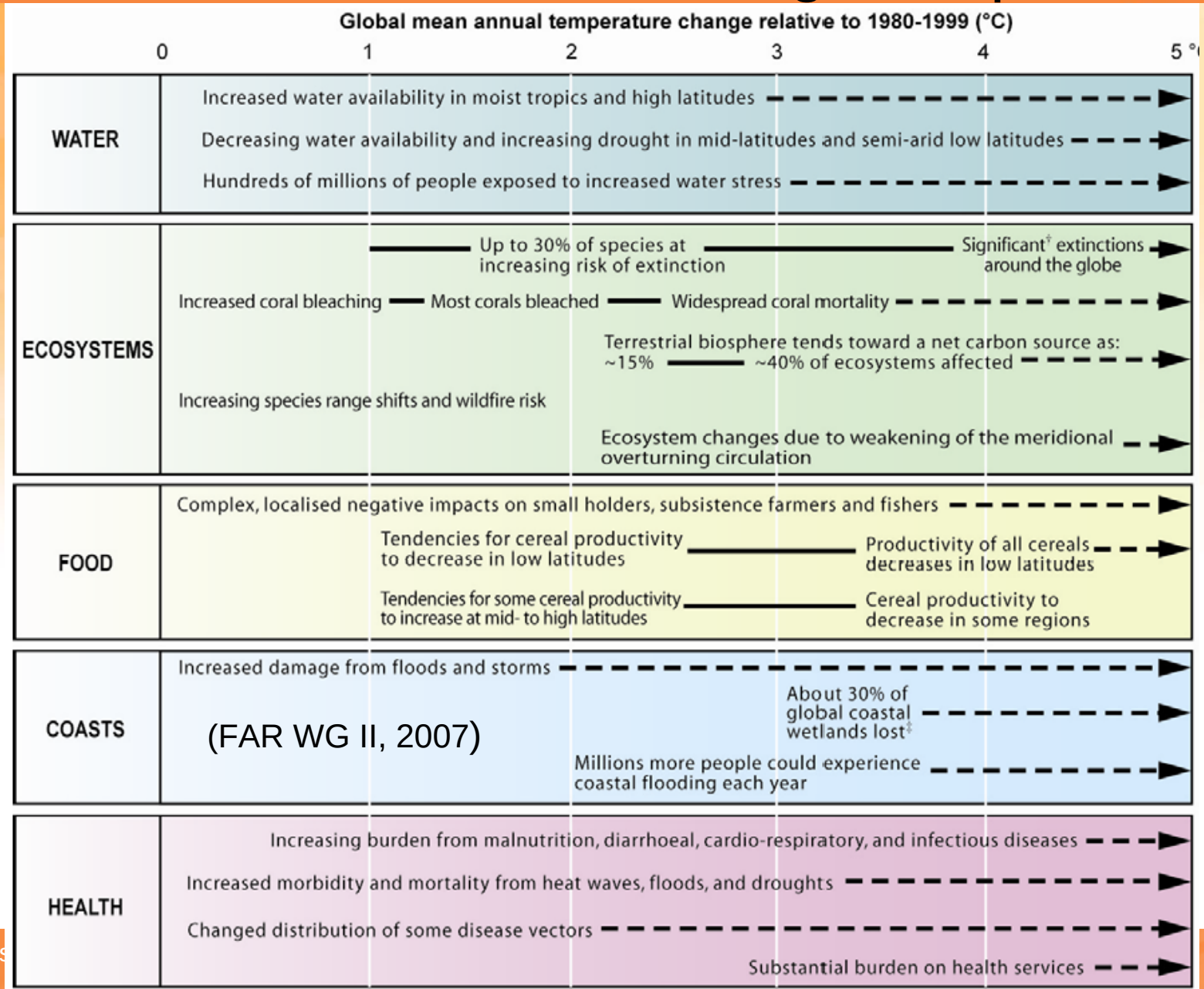
Sydney, 3 July 2007

# Global context for climate change - temperature



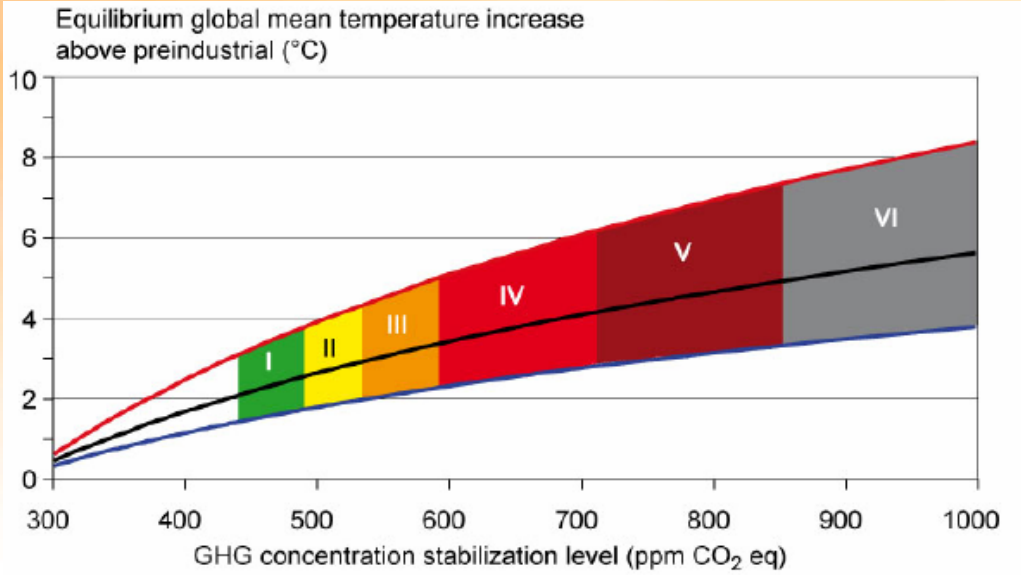

(FAR WG I, 2007)

# Global context for climate change - impacts




(FAR WG II, 2007)

# Global context for climate change - mitigation

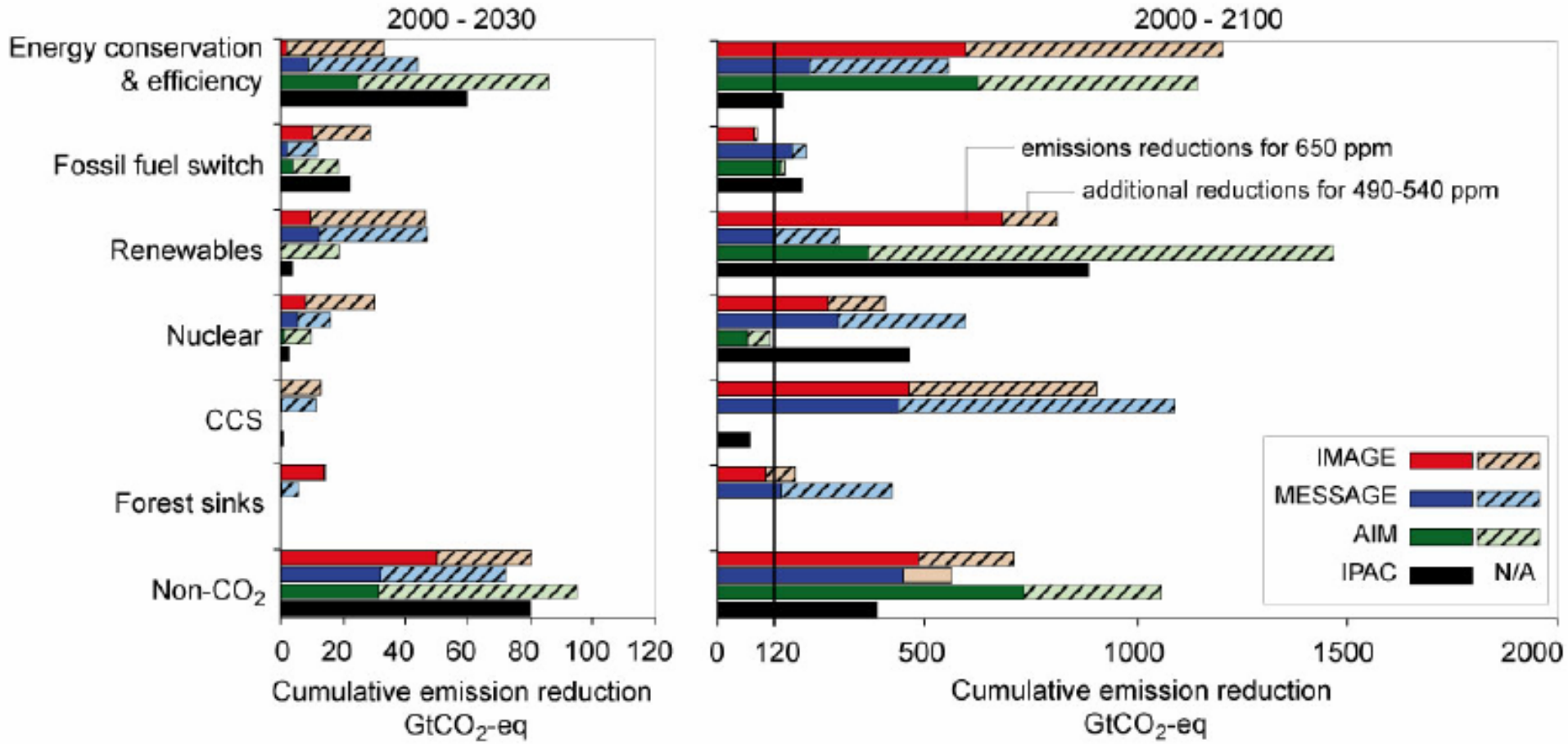



(FAR WGIII, 2007)

***Table SPM.5**: Characteristics of post-TAR stabilization scenarios [Table TS 2, 3.10]*[a)]

| Category | Radiative Forcing ($W/m^2$)[2)] | $CO_2$ Concentration[c)] (ppm) | $CO_2$-eq Concentration[c)] (ppm) | Global mean temperature increase above pre-industrial at equilibrium, using "best estimate" climate sensitivity[b), c)] (°C) | Peaking year for $CO_2$ emissions[d)] (year) | Change in global $CO_2$ emissions in 2050 (% of 2000 emissions)[d)] (%) | No. of assessed scenarios |
|---|---|---|---|---|---|---|---|
| I | 2.5 – 3.0 | 350 – 400 | 445 – 490 | 2.0 – 2.4 | 2000 - 2015 | -85 to -50 | 6 |
| II | 3.0 – 3.5 | 400 – 440 | 490 – 535 | 2.4 – 2.8 | 2000 - 2020 | -60 to -30 | 18 |
| III | 3.5 – 4.0 | 440 – 485 | 535 – 590 | 2.8 – 3.2 | 2010 - 2030 | -30 to +5 | 21 |

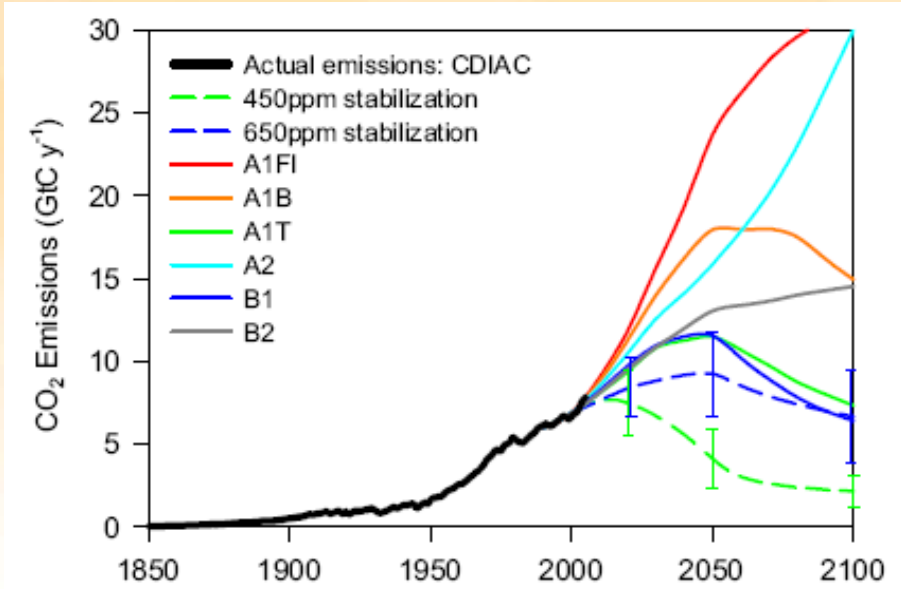
# Global context for climate change - options

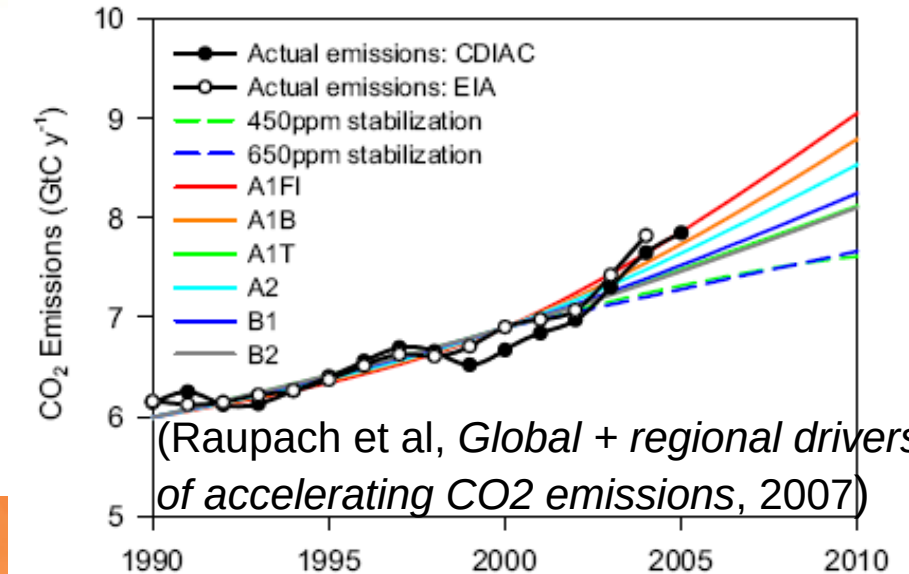



(FAR WGIII, 2007)

# Global context for climate change – progress?

- Current emission trajectory exceeds the 'worst case' IPCC scenarios
- Considerable costs + risks in delaying emission reductions
  - technology options 20 years away need to be 3-7 times better than existing ones to be worth waiting




(Raupach et al, *Global + regional drivers of accelerating CO2 emissions*, 2007)

# Global context for climate change – policy needs

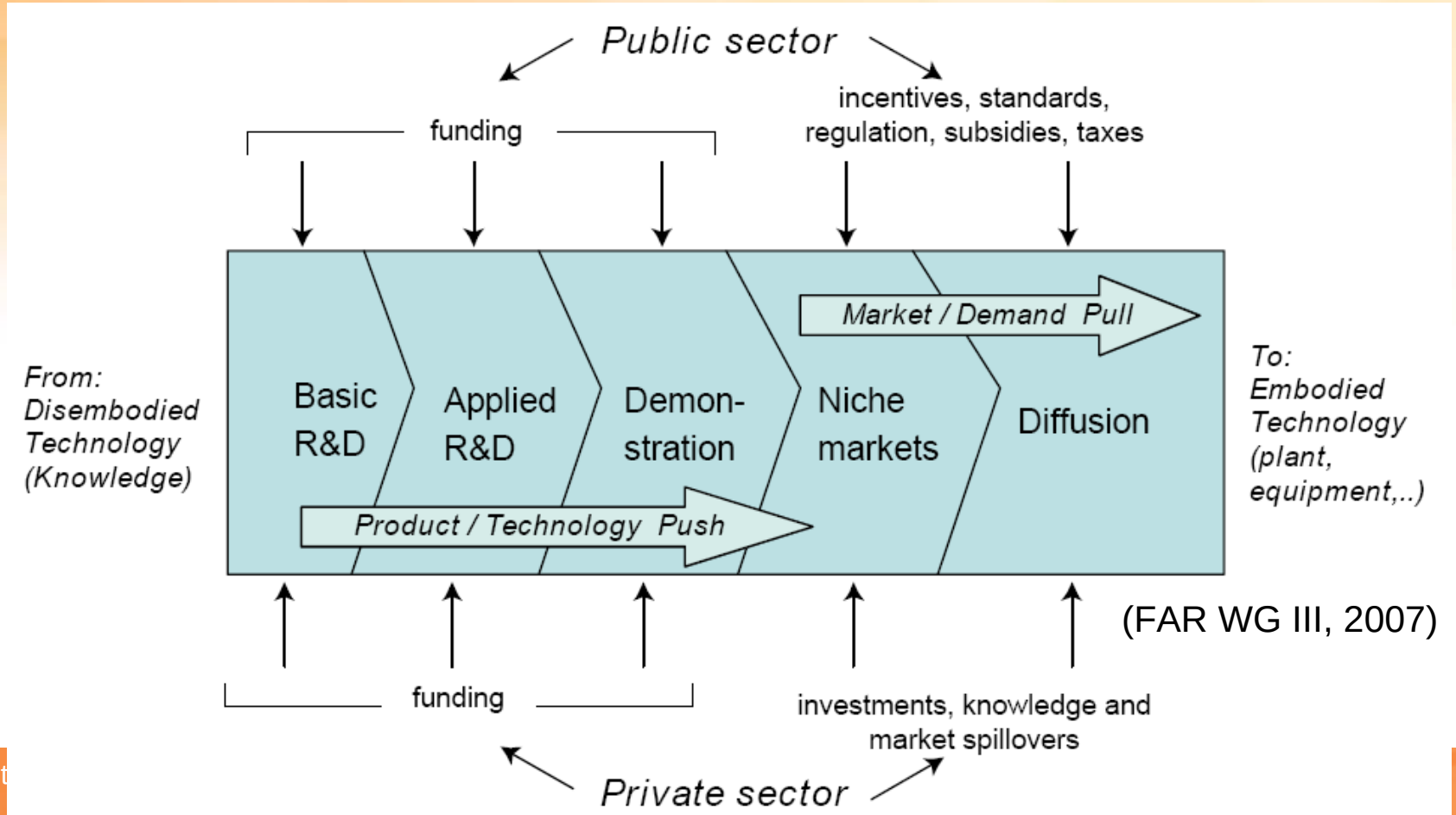
- A coherent policy framework required

| | Voluntary, regulatory and systemic instruments | Economic instruments | Innovation instruments |
|---|---|---|---|
| Behaviour |  |  |  |
| Substitution |  |  |  |
| Technical innovation |  |  |  |

(Grubb, 2006)

# Global context for climate change – innovation

- A coherent *innovation* policy framework required to develop and diffuse abatement technologies




(FAR WG III, 2007)

**Table 13.3** Assessment of international agreements on climate change.[45]

| Approach | Environmental effectiveness | Cost-effectiveness | Meets distributional considerations | Institutional feasibility |
|---|---|---|---|---|
| National emission targets and international emission trading (including offsets) | Depends on participation and compliance. | Decreases with limited participation and reduced gas and sector coverage | Depends on initial allocation | Depends on capacity to prepare inventories and compliance. Defections weaken regime stability |
| Sectoral agreements | Not all sectors amenable to such agreements, thereby limiting overall effectiveness. Effectivenss depends on whether agreement is binding or non-binding | Lack of trading across sectors increases overall costs, although they may be cost-effective within individual sectors. Competitive concerns reduced within each sector. | Depends on participation. Within-sector competitiveness concerns are alleviated if treated equally at global level. | Requires many separate decisions and technical capacity. Each sector may require cross-country institutions to manage agreements |
| Coordinated policies and measures | Individual measures can be effective; emission levels may be uncertain; success will be a function of compliance | Depends on policy design | Extent of coordination could limit national flexibility, but may increase equity. | Depends on the number of countries (easier among smaller groups of countries than at the global level) |
| Cooperation on Technology RD&D[a] | Depends on funding, when technologies are developed and policies for diffusion | Varies with degree of R&D risk Cooperation reduces individual national risk | Intellectual property concerns may negate the benefits of cooperation. | Requires many separate decisions. Depends on research capacity and long-term funding |
| Development-oriented actions | Depends on national policies and design to create synergies | Depends on the extent of synergies with other development objectives | Depends on distributional effects of development policies | Depends on priority given to sustainable development in national policies and goals of national institutions |
| Financial mechanisms | Depends on funding | Depends on country and project type | Depends on project and country selection criteria | Depends on national institutions |
| Capacity building | Varies over time and depends on critical mass. | Depends on programme design | Depends on selection of recipient group | Depends on country and institutional frameworks |

[a]Research, Development and Demonstration.

(FAR WG III, 2007)

# Technology transfer

- Already seeing considerable funding for energy related projects in developing world
  - *Increasing amount supporting sustainable energy*

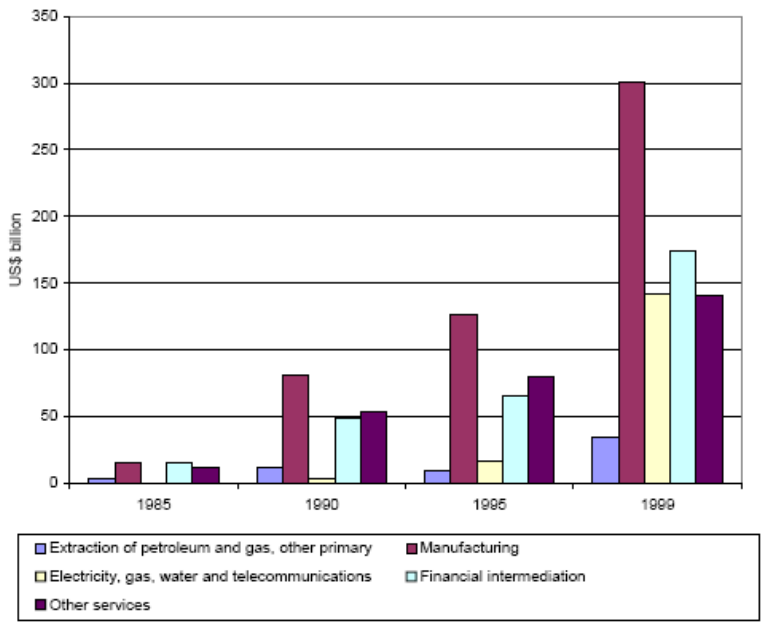



**Figure 13.5** Total OECD foreign direct investment ( FDI) outflows to selected sectors
Source: OECD (1999)

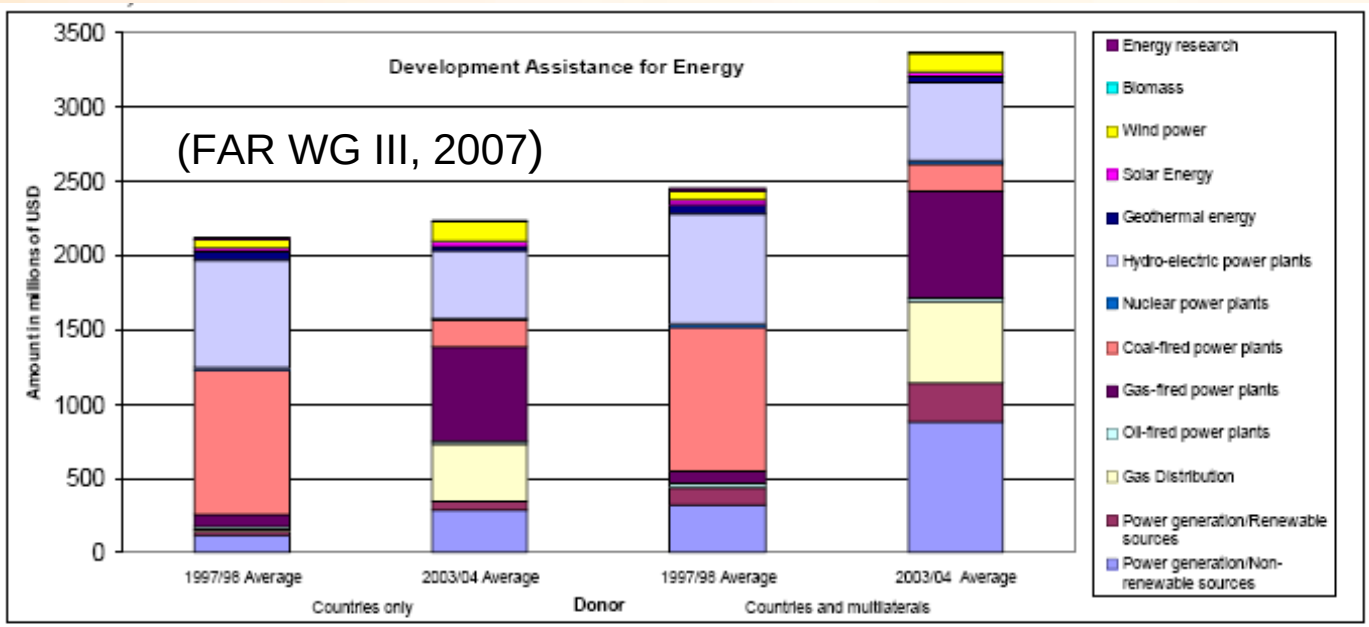
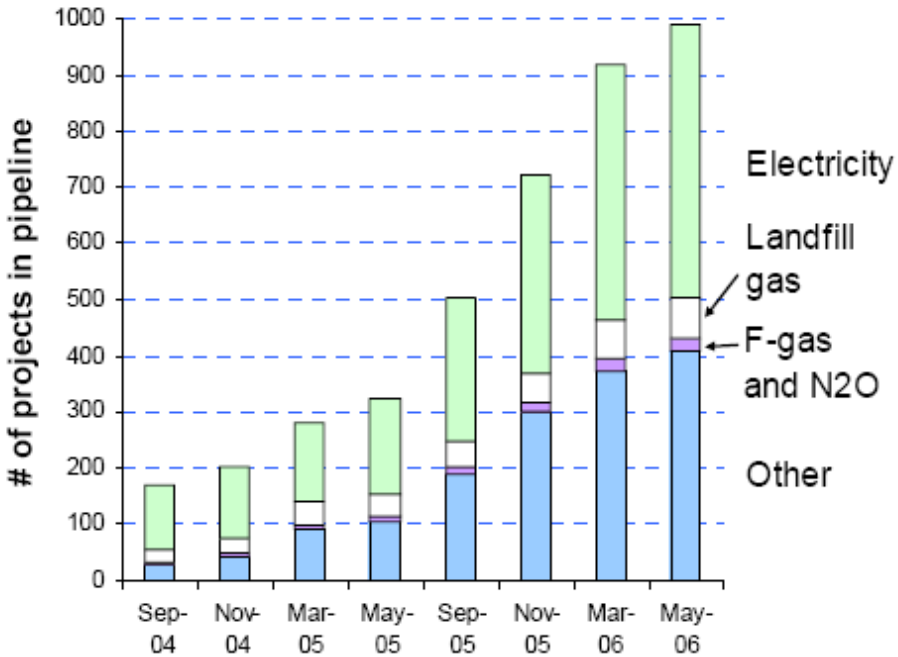



**Figure 13.6:** Development assistance for energy
Source: OECD.

# Kyoto Protocol Clean Development Mechanism

- Seeing US$billions investment in emission reductions projects in developing countries – particularly China + India
- *How do financial commitments to date with AP6 compare?* **Entirely insignificant** (Aust = $100m over 5 yrs)



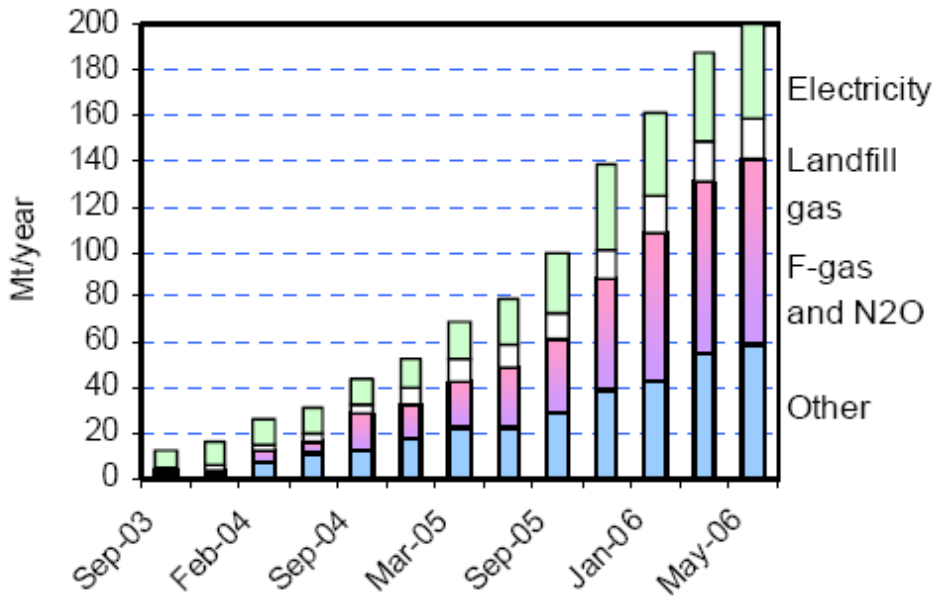




**Figure 13.3** Evolution of the Clean Development Mechanism portfolio in terms of $CO_2$-equivalents per year and number of projects. (FAR WG III, 2007)
Source: Ellis and Karousakis (2006).

# The Australian energy context

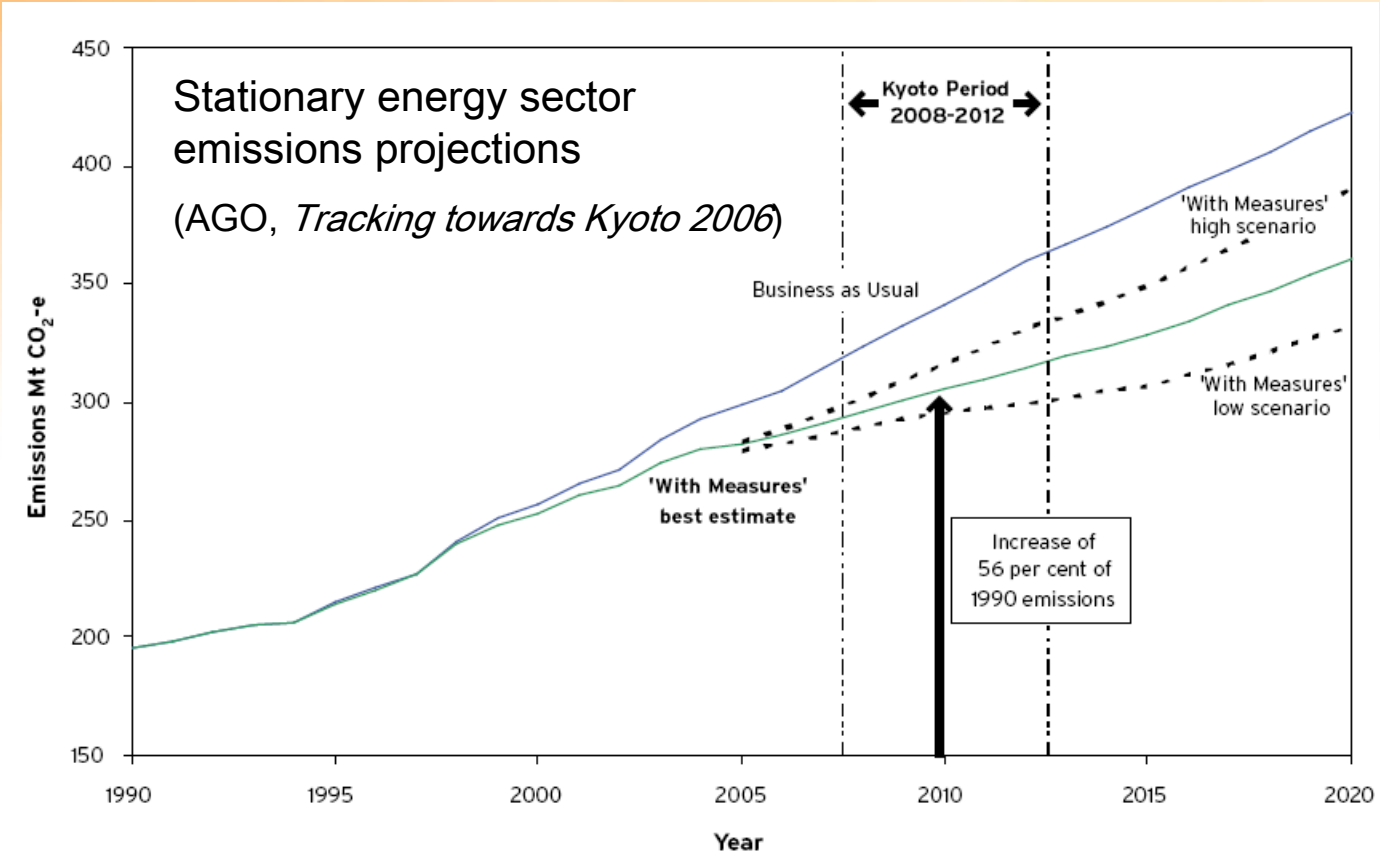
- Large, low cost + high quality coal, gas and U reserves
- Major energy exporter – World #1 Coal, #2 Uranium, #5 LNG
- An energy intensive economy c.f. other industrialised nations
- Amongst the world's highest per-capita greenhouse emissions

| ***% of Global...*** | Population | GDP | Energy Production | Energy Consumption | Fossil-fuel GHG emissions |
|---|---|---|---|---|---|
| *Australia* | *0.3* | *1.3* | *2.3* | *1.0* | *1.3* |
| China | 21 | 5.4 | 14 | 15 | 18 |
| India | 17 | 1.7 | 4.2 | 5.1 | 4.1 |
| United States | 4.6 | 31 | 15 | 21 | 22 |
| Japan | 2.0 | 14 | 0.9 | 4.8 | 4.6 |
| Korea | 0.8 | 1.8 | 0.3 | 1.9 | 1.7 |
| Germany | 1.3 | 5.6 | 1.2 | 3.1 | 3.2 |

(IEA, *World Energy Statistics 2006*)

# A challenging context for climate policy

- Energy-related emissions climbing – 70% of total
  - Estimated +35% over 1990–2004, projected +56% in 2010




- Growing volume + value of energy exports

# Australian climate policy framework

- Federal Govt
  - 108% Kyoto target; has not ratified but commitment to still meet
    - "ineffective, no action by developing countries, no US ratification"
  - Advocates R&D&D of new techs. c.f. deployment of existing options *although now supports emissions trading post 2012*
  - Key player in AP6 with US,, Japan, South Korea, China + India.
    - "Voluntary, non-legally binding framework for cooperation to facilitate development + diffusion of existing + emerging technologies + practices"
- State Govts
  - Some urging Kyoto ratification, setting aspirational longer-term targets, establishing market-based deployment schemes

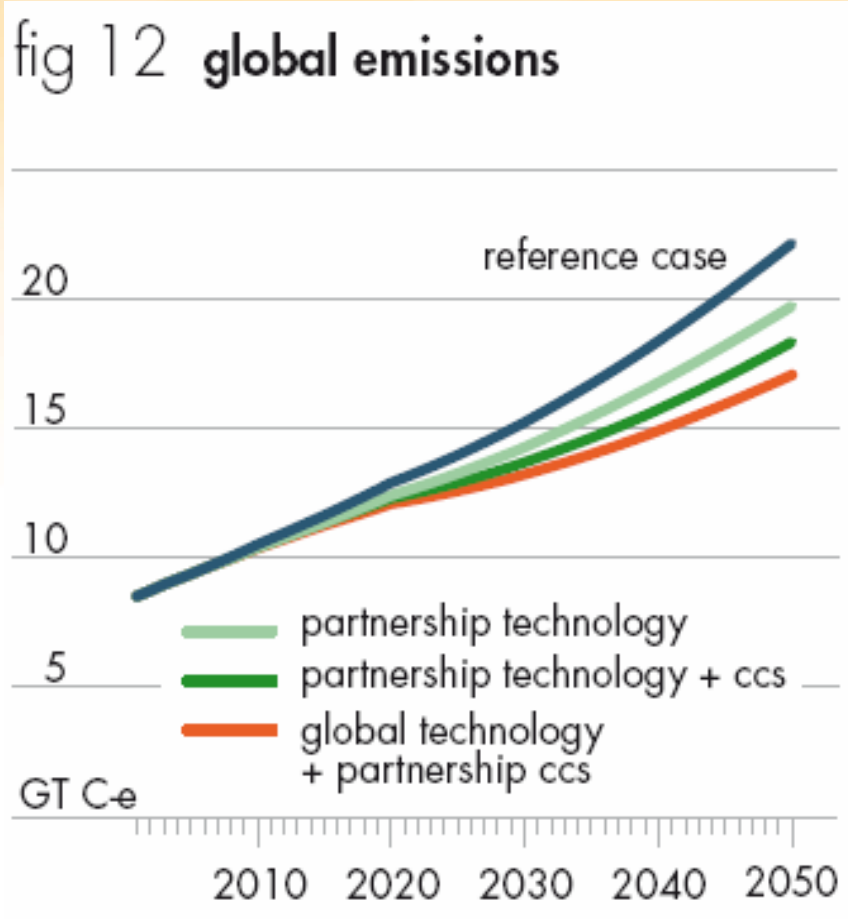
# The Asia Pacific Partnership

- Six countries of AP6 represent roughly half the world's population, GDP, energy consumption and greenhouse gas emissions
  - Includes world's 4 largest coal producers (China, US, India + Australia) + 2 largest coal importers (Japan + Korea). All countries in world's top ten coal consumers
  - Includes #1 (US), #3 (Japan) + #5 (South Korea) largest uranium consumers, Australia #2 uranium exporter.
- A "framework for international cooperation…to develop, deploy and transfer cleaner more efficient technologies… consistent with to our efforts under the UNFCCC… will complement but not replace the Kyoto Protocol"
  - Although Australian PM Howard: "The fairness and effectiveness of this proposal will be superior to the Kyoto Protocol."
- A technology accord
  - No binding targets, voluntary actions, major industry partnership roles, R&D & Demonstration focused without 'market-pull' policies, strong support for Carbon Capture + Storage (CCS) + nuclear technologies
  - One of many bilateral + multi-party, technology focussed, climate change partnerships between nations outside Kyoto Protocol
- Very small financial commitment to date
  - Australia: $100m over 5 years

# ABARE AP6 Scenarios

(ABARE, *Technological development and economic growth*, 2006)

- Assumes CCS costs of US$25-30/tCO2 (effectively requires ETS/tax)
- Argues against a carbon price now
  - "… important to ensure that .. the necessary technologies to substantially reduce emissions actually exist and are capable of deployment before technology 'pull' policies are adopted."
- ABARE Scenarios not a sensible assessment of AP6 given funding to date, other policy efforts
  - AP6 funds 100 X smaller than other sustainable energy funding flows to developing countries



# Aust. Technology R&D & Demonstration

- Climate policy emphasis on R&D & Demonstration of promising but emerging GHG techs, especially CCS
  - Research mapping geological reservoirs, CO2 capture, coal gen.
  - *Important component of AP6 funding commitments ($100m over 5 yrs)*
  - Low Emission Technology Demonstration Fund (LETDF)
    - support demonstration of energy technologies with major abatement potential by 2020–2030.
    - A$500 million over 2006 – 2012 intended to leverage $1billion+ of private investment
    - Projects to date focused on CCS + advanced coal generation techs
    - Funding for emerging renewable energy technologies
- Early lessons
  - Time delay before significant abatement reductions might be achieved
  - Serious money required to drive demonstrations
  - potential project proponents calling for carbon price to make technologies commercial. **Federal Govt now supports ETS for 2012**

# Some lessons for technology innovation

- Innovation certainly required - *policy question is how best to achieve it*
  - Public support for R&D&D important but longer time frames + risks
  - Market-pull mechanisms incl. EE regulation, renewable targets + carbon pricing to drive deployment + increase private R&D the higher priority
- AP6 a multi-party tech-focused partnership b/n six key nations
  - Initial portfolio of AP6 projects “weighted towards sectoral assessments, capacity building, identifying best practices + tech research + demonstration”
  - Useful ‘no and low regrets’ outcomes possible through voluntary framework + R&D, but limited given present energy market drivers
  - Larger success of AP6 (+ all policies) depends on contribution to widespread adoption + diffusion of existing + emerging abatement techs to stabilise atmospheric GHGs at ‘safe’ levels

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*Thank you… and questions?*

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