Centre for Energy and Environmental Markets

UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA



Climate change, carbon trading and the built environment

Presentation to
Property Portfolio Management, Sydney, 27-28 October 2008

Dr Iain MacGill, Joint Director - CEEM

CEEM established …

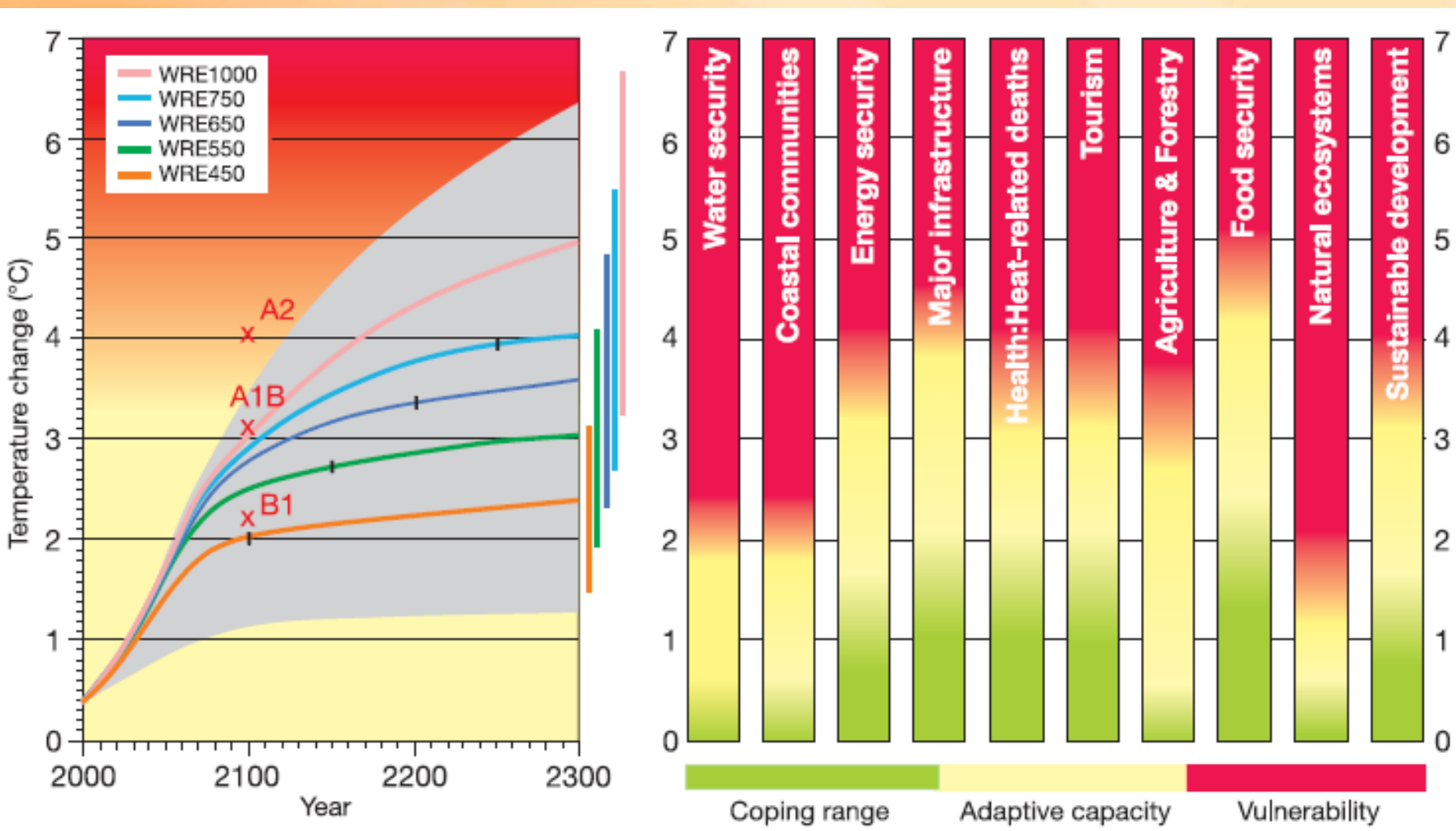
- *to provide a formal interdisciplinary framework* for joint work between UNSW researchers in Engineering, Business, Social Sciences, Environmental Sciences…
- *through UNSW Centre* providing Australian research leadership in interdisciplinary design, analysis + performance monitoring of energy + environmental markets, associated policy frameworks
- *in the areas* of
  - Energy markets
    - spot, ancillary services and derivative markets, retail markets
    - *Primary focus on the Australian NEM*
  - Energy related environmental markets
    - Eg. National Emissions Trading, MRET, Energy Efficiency Certificate Trading, Renewable energy support…
  - Broader policy frameworks and instruments to achieve desired societal energy and environmental outcomes: eg. EE policies

CEEM Research program areas

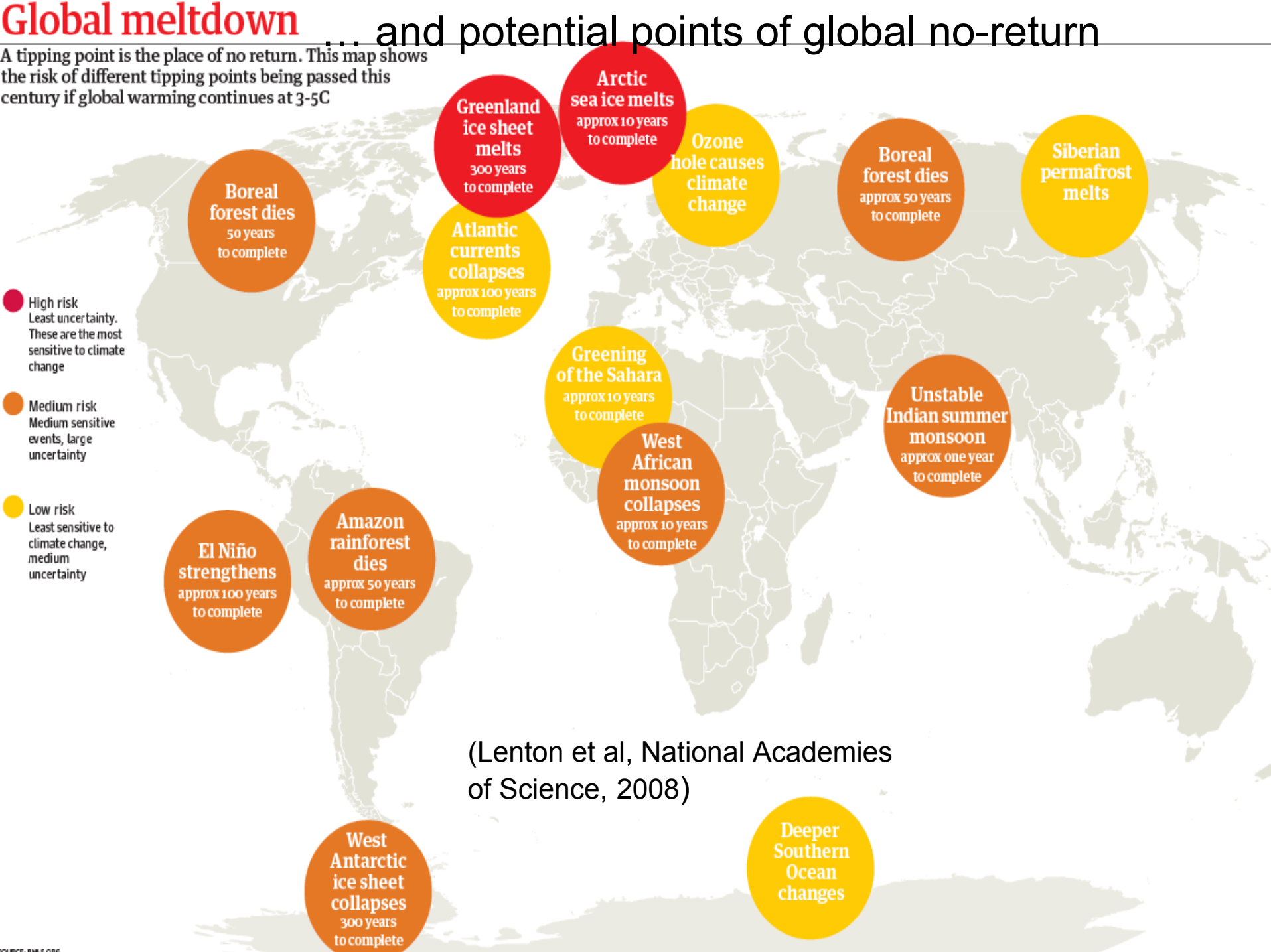
- Environmental market design
  - emissions trading and its interactions with energy markets
- Distributed Energy
  - Load management, energy efficiency and distributed generation opportunities, the challenges of behavioural change
- Renewable energy
  - Facilitating the integration of renewable energy into the National Electricity Market
- Electricity industry restructuring
  - with a focus on retail market design
- Technology Assessments for our sustainable energy options
  - EE, Renewables, Carbon Capture and Storage, Nuclear
- Market governance
  - the strengths and weaknesses of market mechanisms; oversight, regulation

Potential warming and Australian vulnerability

(IPCC FAR WGII, 2007)

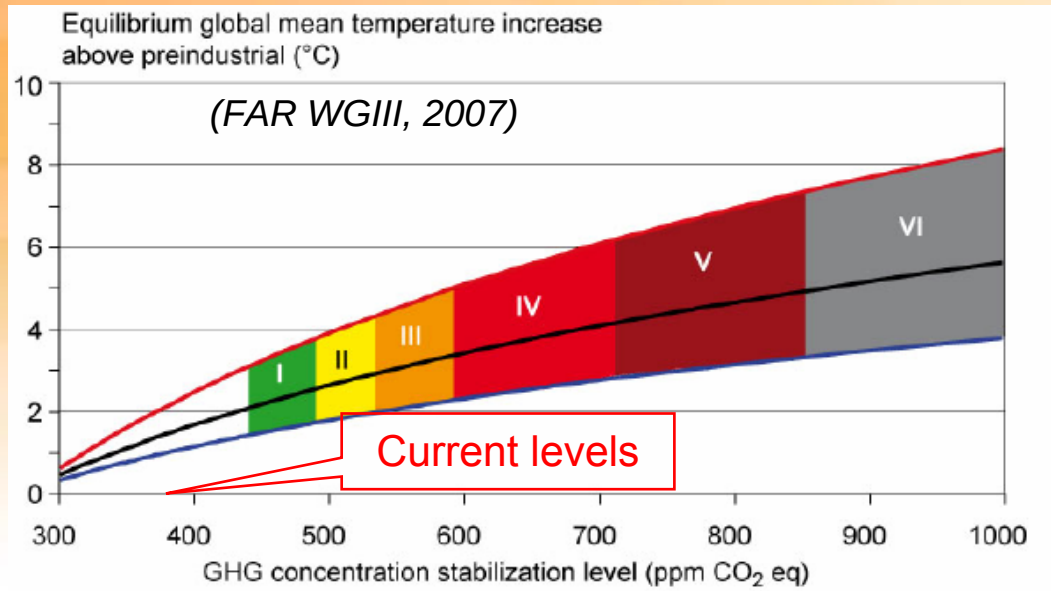


Global meltdown … and potential points of global no-return



(Lenton et al, National Academies of Science, 2008)

The mitigation challenge - first stabilisation…



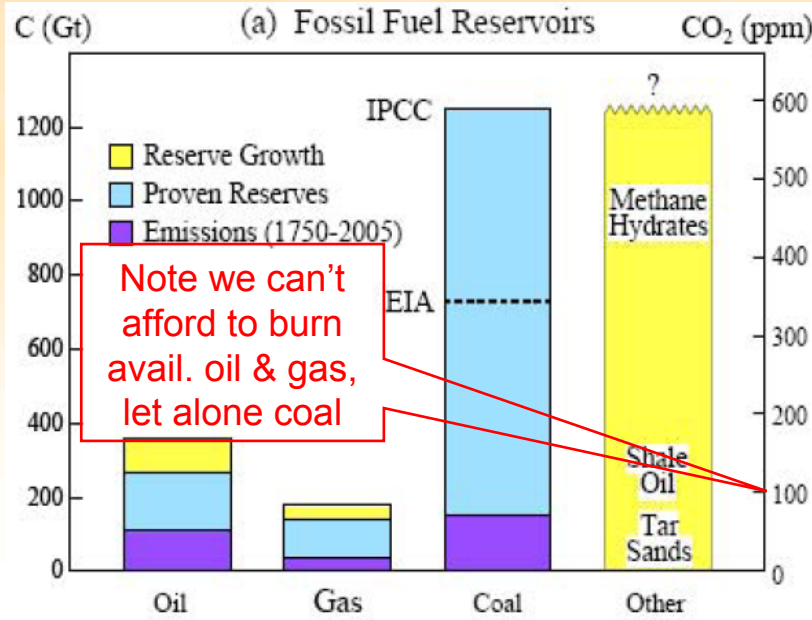


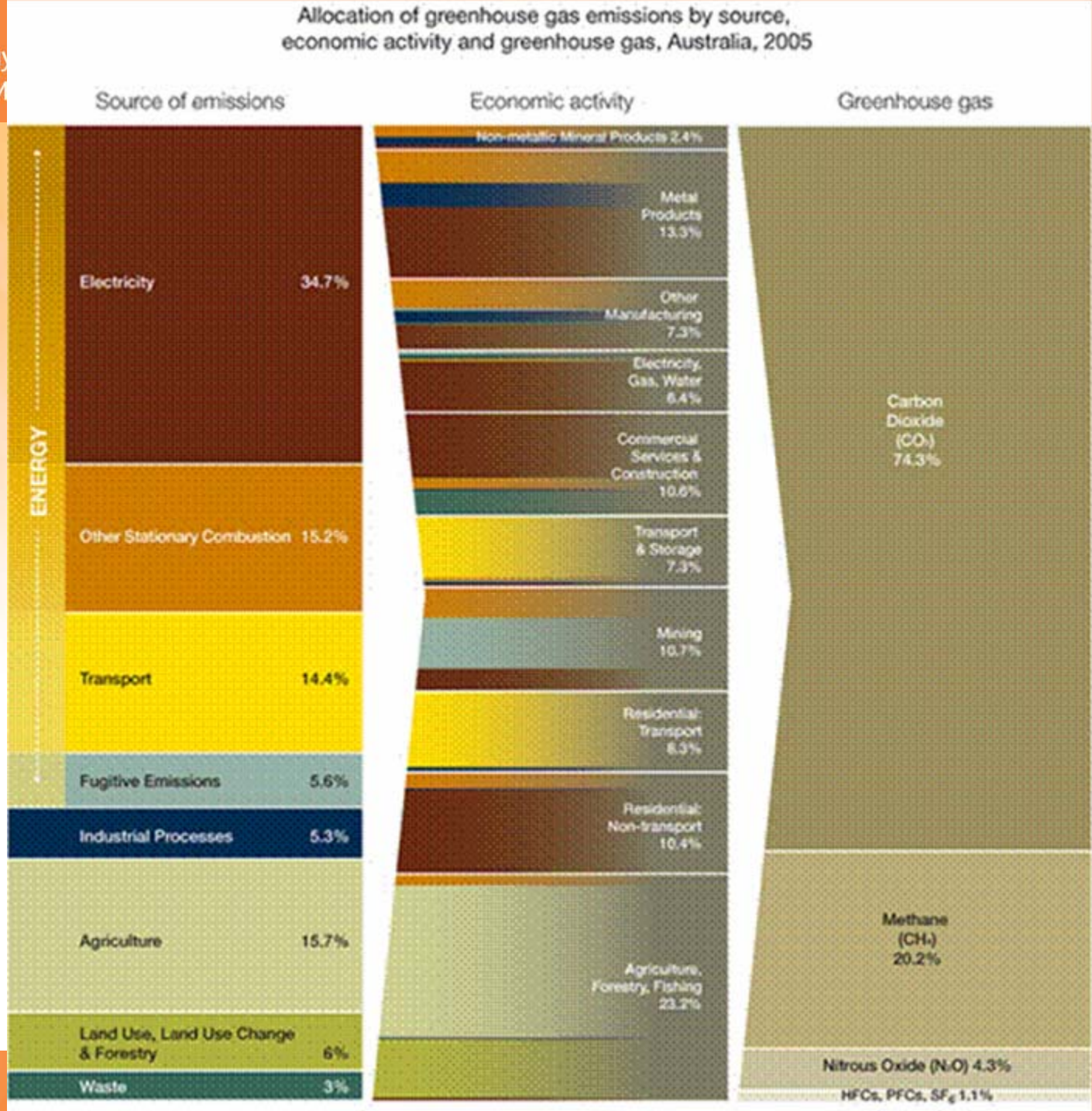
Table SPM.5: Characteristics of post-TAR stabilization scenarios [Table TS 2, 3.10][a)]

Category	Radiative Forcing (W/m^{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

The most recent science: *Climate Change – faster, stronger, sooner* (WWF, Overview of climate science since IPCC FAR, 10/2008)

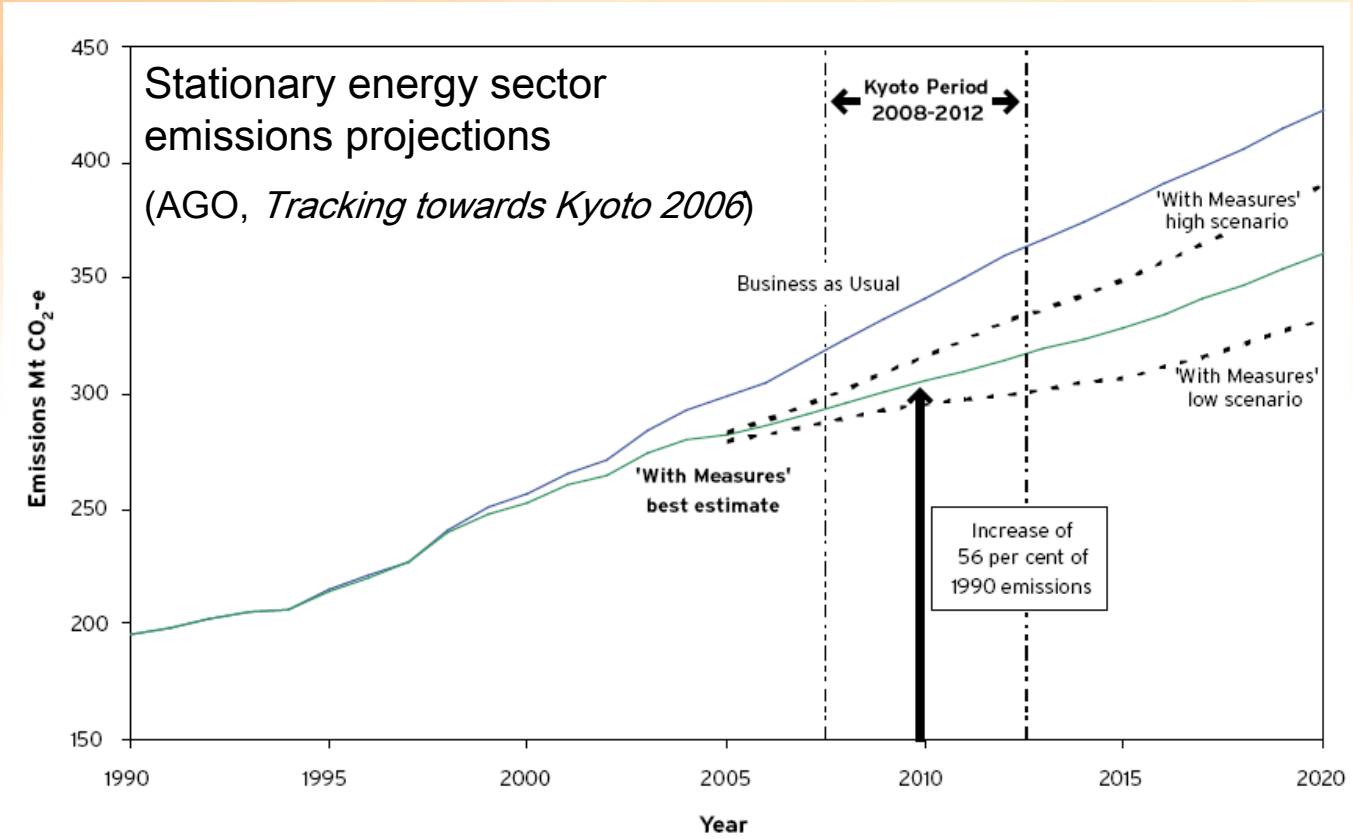
- The Arctic Ocean is losing sea ice 30 or more years ahead of projections … It is currently forecast that summer sea ice could completely disappear somewhere between 2013 and 2040 – a state not seen on planet Earth for more than a million years. This is likely to open the gates to climate change that is even more rapid and abrupt than has been forecast up to now
- Since 1990, global sea level has been rising 1.5 times faster than forecast in IPCC's TAR (2001). In addition to this,new studies have projected global sea level rise by the end of the century to reach up to more than 2 X the maximum estimate of 0.59m presented in the FAR.
- Global carbon dioxide (CO2) emissions released as a consequence of human activity have been accelerating, with their growth rate increasing from 1.1% per year between 1990 and 1999, to more than 3% per year between 2000 and 2004. The actual emissions growth rate since 2000 was greater than any of the scenarios used by the IPCC in either the Third or Fourth Assessment Reports
- Over the past 15 years, about half the CO2 emissions arising from human activity have been absorbed by land and ocean. However, the capability of these natural 'sinks' is declining at a greater rate than forecast in earlier studies. This means that more of the CO2 emitted from human activities will stay in the atmosphere and contribute to global warming
- **A re-examination of the climate impacts reported in the FAR indicates that 80% cuts in *global* greenhouse gas emissions are needed by 2050 to keep global average temperature rise below 2°C – and to limit climate impacts to 'acceptable' levels.**
- **However, even with an 80% emissions cut, damages will be significant, and much more substantial adaptation efforts than those currently planned will be required to avoid much of the damage**

The Climate and Energy and Built Environment connection



Australia's challenging context for climate policy

- Energy-related emissions climbing – 70% of total
  - Stationary energy +35% over 1990–2004, projected +56% in 2010
  - 'On track' to meet Kyoto 108% target due to 'land clearing' hot air



- Electricity generates 35% of total emissions + fastest growing sector.

Challenges for the built environment

- Potential direct impacts of climate change
- Potential impacts of policy responses – CPRS, MRET
  - Energy prices
  - Potential direct participation in some measures
  - Wider possible impacts
- Opportunities for the built environment

Possible direct impacts of climate change

(Australian Government, *Climate Change Adaptation*, 2008)

- **Increases in temperature**
  - Increase in peak demand for electricity in summer. However, peak demand for winter heating is likely to decrease.
  - Extreme temperatures are likely to have impacts on the production and transmission of energy.
  - Decrease in the longevity of exterior materials of buildings and infrastructure
  - Increased cost of cooling buildings and/or retrofitting to increase energy efficiency of buildings.
  - Increased risk of bushfire.
- **Altered rainfall patterns**
  - Changes in the availability and quality of water supply.
  - Decreases in rainfall and increased periods of drought will increase disruption to socio-economic infrastructure.
- **Changes in intense rainfall events**
  - Increases in rainfall may exceed the coping capacity of current stormwater and wastewater systems, leading to flooding and associated damage to infrastructure and property.
  - More intense rainfall may increase damage to infrastructure and buildings.
- **Altered frequency of extreme weather events**
  - Increased incidences of disruptions to key services, such as electricity supply and transport.
  - Increased damage to physical and socio-economic infrastructure and human wellbeing.
  - Insurance costs for extreme event damage are likely to increase.
- **Sea level rise**
  - Increased chance of damage to coastal buildings, infrastructure through storm surges and flooding.
  - Increased risk of high salinity in some coastal areas … damage buildings and infrastructure.

Possible adaptation options

(AGO, *Assessment of Need to Adapt Buildings for Unavoidable Consequences of Climate Change*, August 2007)

Climate change impact	Residential buildings	Commercial buildings
INCREASED AVERAGE TEMPERATURES, MORE EXTREMELY HIGH TEMPERATURES, FEWER EXTREMELY LOW TEMPERATURES *Most of Australia (all 13 sites), less warming in some coastal areas (e.g. Gold Coast, Perth) and Tasmania (Hobart), greater warming north-west (Darwin)*	Passive solar design: • Control solar gain • Provide adequate ventilation • Provide adequate insulation • Add thermal mass	Passive solar design: • Decrease lighting and equipment loads • Upgrade air-conditioning system (passive solar design may eliminate need for any mechanised cooling system) • Use of reflective glazing and external shading • Increase insulation and add thermal mass • Use of passive ventilation methods • Use of automated building controls
MORE SUMMER RAIN IN NORTH AND EAST, MORE AUTUMN RAIN INLAND, LESS RAIN IN SPRING AND WINTER *Most of Australia, but southern areas have less rain in all seasons, and Hobart has increased winter rain.*	• Rainwater collection and use • Methods to reduce water demand • On-site water re-use • Stormwater control	• Methods for decreasing potable water consumption (both internally and externally) • Installation of water sub-meters • Minimise use of potable-water-based cooling systems

MORE-INTENSE CYCLONES, WIND SPEEDS AND STORMS *Wind speeds, extreme rainfall events and intense local storms generally increasing over the whole continent, potentially most marked in the north-east (all 13 sites, possibly more so in Darwin, Cairns and Brisbane)*	• Upgrade fasteners in roof structures and in sub-floor • Weathertightness and drainage detailing	• Design for increased wind loadings
HUMIDITY	None identified	
RADIATION	As for temperatures	
FLOODING *Greater chance of flooding events in areas where increased rainfall and storms events likely; potentially all sites affected with possibly more risk in Cairns, Brisbane, and the Gold Coast.*	• Avoid flood-prone areas • Increase minimum floor levels • Use of water-resistant construction materials • Installation of vulnerable services as high as possible	• Improved land-use and site management • Use of water-resistant construction materials • Higher placement of vital equipment and supplies
HAIL EVENTS *Decreased frequency of hail events in Melbourne.* *Increased frequency of hail events in Sydney*	• Use of impact-resistant roofing materials • Designing more appropriate window protection	• Protection of externally fitted services and fixtures
BUSHFIRES *Increases in bushfire frequency and intensity across all of Australia*	• Use of fire-resistant building materials • Installation of domestic sprinkler systems in high risk zones	• N/A

Federal Government policy development

- **Emission Trading System by 2010**. Detailed design finalised by end 2008.
- **Mandatory Renewables Target** of 20% by 2020, 45,000GWh. Scheme design finalised end 2008
- Demonstration and commercialisation funding
  - $500M **Renewable Energy Fund** intended to develop, commercialise and deploy renewable energy.
  - $500M under **National Clean Coal Fund** to finance deployment of clean coal technologies
- A wide range of Energy Efficiency policies and measures
  - Equipment and building energy and emission performance measuring, information and regulation
- Ongoing NEM restructuring

- *numerous diverse State Government policy efforts*

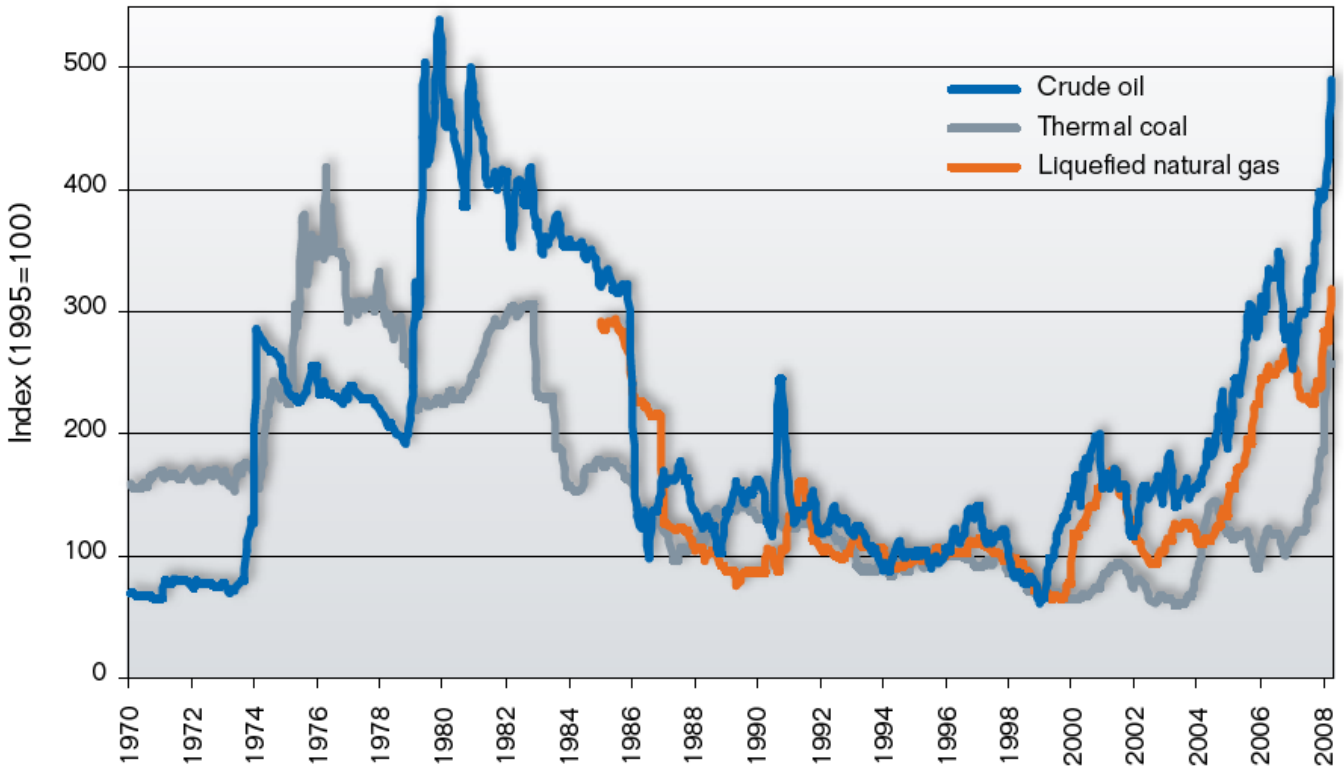
Impact of forthcoming CPRS, expanded MRET

- Potential direct participation in CPRS for large market participants in Built Environment
- Electricity & gas price increases
  - impact of carbon emission costs + potentially changed generation mix driven by MRET raising wholesale market prices
  - Costs of retailer compliance with MRET under their REC liabilities
- Wider possible impacts
  - Costs of other services due to impact of their energy and emissions

Non-climate drivers of Australian energy prices such as international price increases….

Figure 3.12 Oil, gas and coal prices, 1970 to 2008

(Garnaut Report, 2008)



Note: Nominal prices converted to SDRs and deflated by the G7 CPI. Indexed to 1995. Prices are as at January for 1970–2007 and as at April for 2008.

Source: Table compiled by the Centre for International Economics based on IMF IFS Statistics, OECD Main Economic Indicators, *Financial Times*, and CIE estimates.

Load growth driving major network expenditure

(Energy Australia, 20010-14 Expenditure Plans)

Figure 1.1: Building Block components of the annual revenue requirement ($bn nominal)

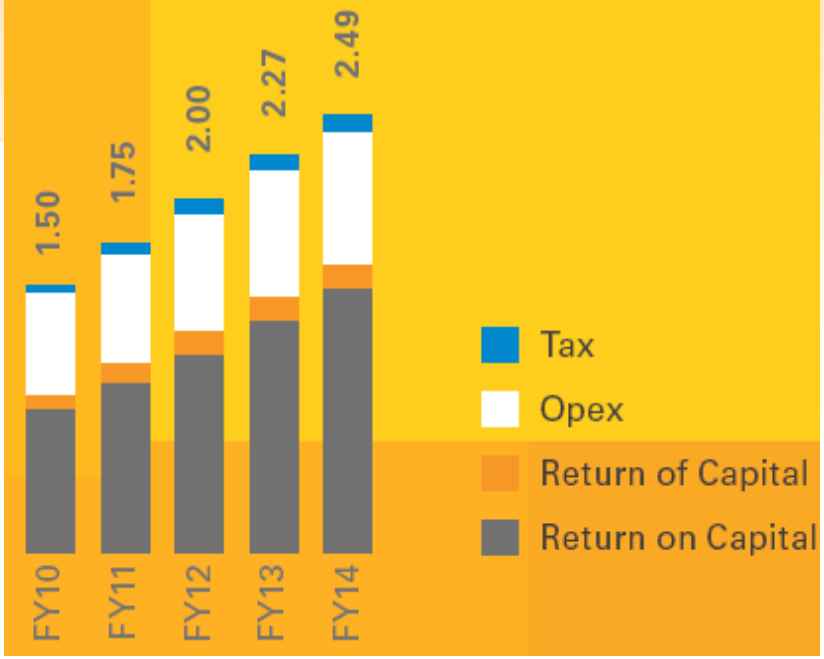
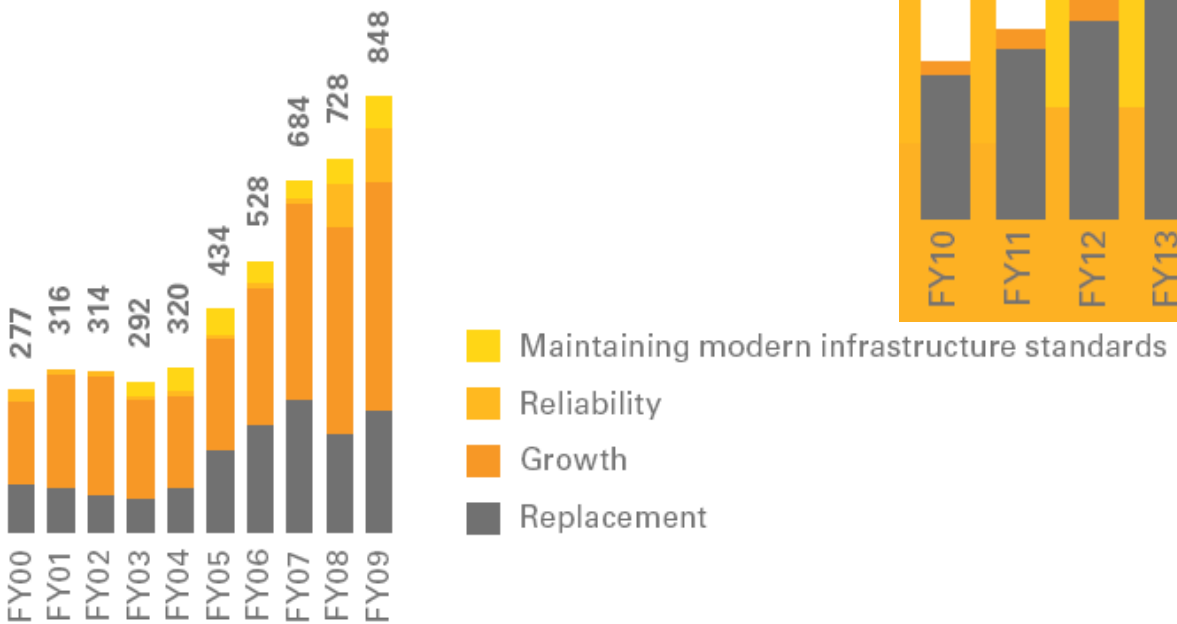


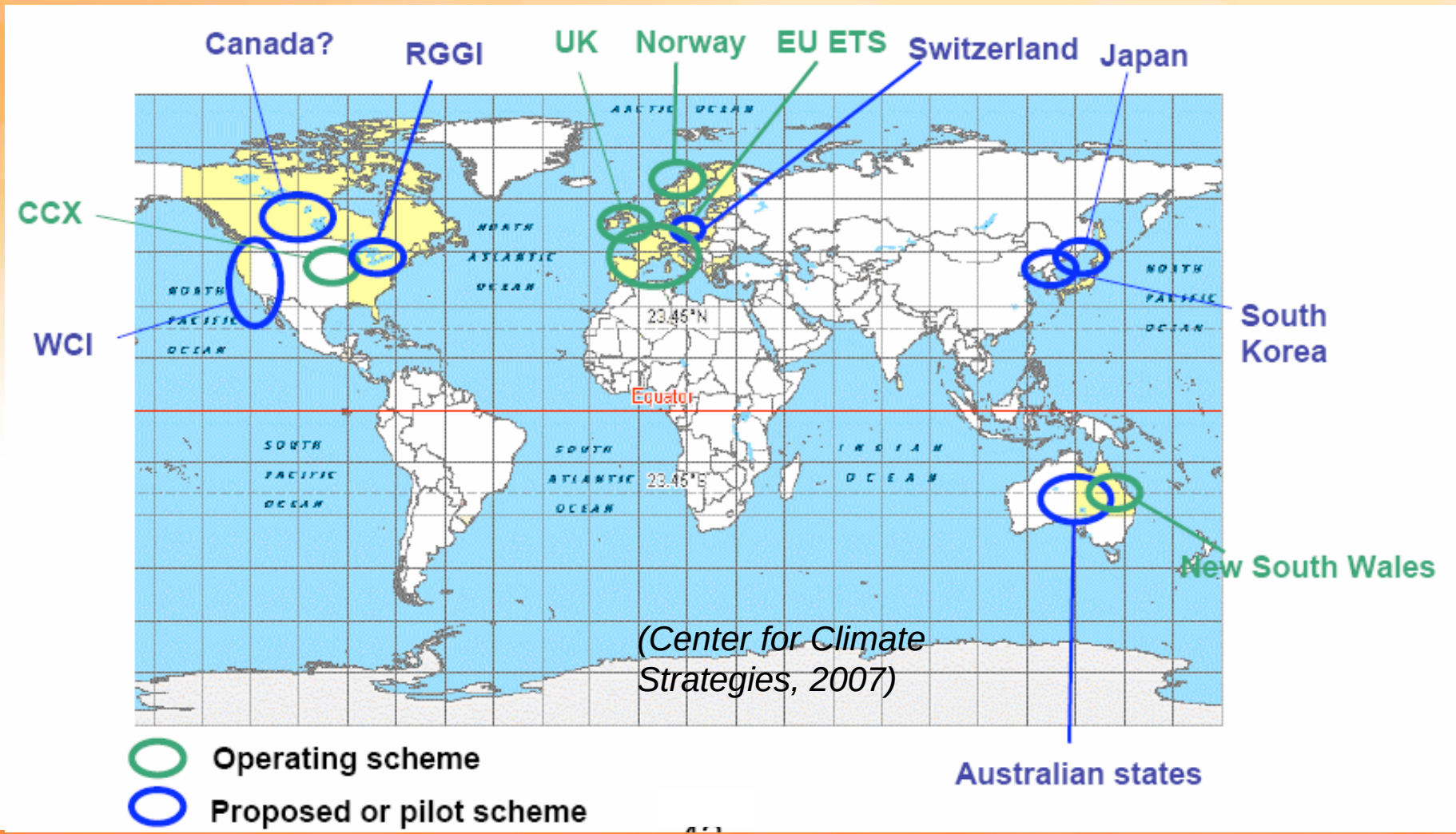
Figure 5.5: Capital expenditure by driver (FY07 $m real)



What policy role can ETS/CPRS play?

- Large emitters require a permit for each tCO2-e emitted. Number of available permits capped. Permits therefore have value and can be traded.
- *Note that only works if physical emissions are actually reduced*
- In theory, assuming idealised markets,
  - universal ETS only policy required
  - any additional climate change policies can only increase the cost of meeting the cap while not changing its environmental effectiveness
- In practice, emissions trading markets + energy markets they have to drive
  - suffer from wide range of market failures
  - may struggle to appropriately 'price' uncertainties about future
  - Established by political process inevitably involving compromises that reduce effectiveness
- ETS contribution to policy mix
  - Major role is for driving substitution – ***if it can't do this, try another approach***
    - Will still require other policies to drive behaviour + technology innovation
  - In theory, highly compatible with other policies including market-based
    - Prices of ETS and/or other policies adjust wrt changing marginal costs

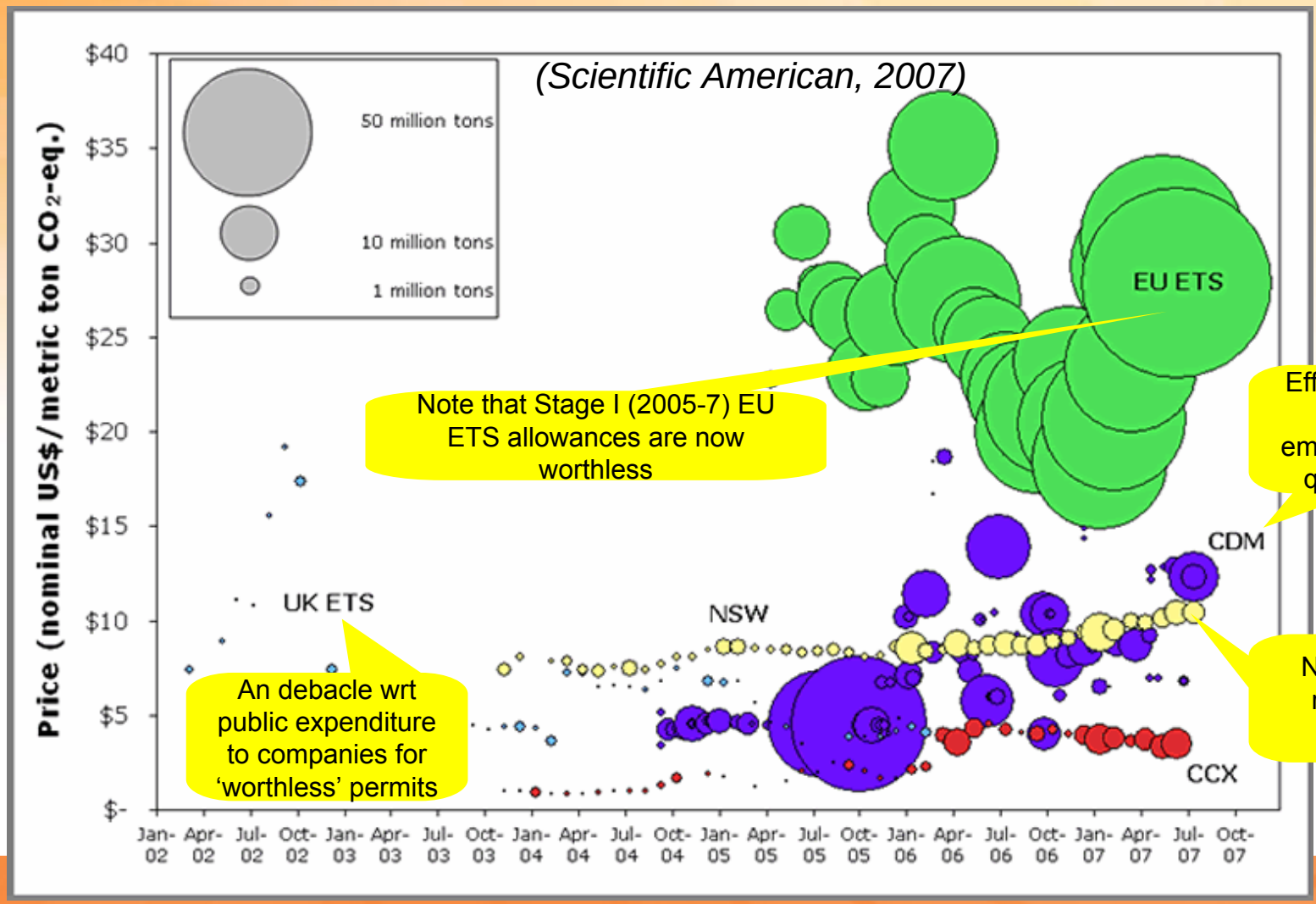
Existing and proposed ETS around world



Scheme	Emissions covered	Geographical reach	Emission sources targeted	Number of sources	Absolute or relative targets?	Start
EU ETS	CO_2	European Union	Large industrial and energy-intensive installations	~10,000 units	Absolute targets	2005
NSW GGAS	CO_2, CH_4, N_2O, PFCs, HFCs, SF_6	New South Wales (Australia)	Power generation, energy efficiency, industrial processes and carbon sequestration in forests	>160 projects so far and 32 benchmark participants	Relative targets	2003 (NSW) & 2005 (ACT)
JVETS	CO_2	Japan	Direct emissions from combustion of fuels and waste materials; direct emissions from processing chemicals and materials; and indirect emissions (e.g. use of grid-electricity)	90 entities	Absolute targets	2006/2007 (participant-dependent)
RGGI	CO_2	A group of Northeast and Mid-Atlantic US states	Electricity generating units that have a nameplate capacity equal to or larger than 25 MW and burn more than 50 per cent fossil fuels	Between a few and a few hundred units per state	Absolute targets	Compliance starts in 2009
CCX	CO_2, CH_4, N_2O, PFCs, HFCs, SF_6	US, Canada, Mexico, Brazil	Sources in the electric power sector and fossil fuel combustion and process emissions in the manufacturing sectors	43 entities ("Members")	Absolute targets	2003
CDM & JI	CO_2, CH_4, N_2O, PFCs, HFCs, SF_6	Global involvement	A wide range of activities	467 registered CDM projects, >100 JI projects in the pipeline	No targets	2005 (CDM) & 2008 (JI)

(PWC/IETA, 2007)

Performance to date has been mixed



The EU ETS

- The primary instrument for reducing CO2 emissions across power generation and heavy industry in Europe
- However, to date (Phase I)
  - emissions reduced? yet likely €20bn+ windfall profits; most to emitters
  - Perverse incentives that likely reduced investment in appropriate low-emission technologies
  - EC under 'intense pressure to restore credibility to scheme through their review of phase II NAPs and to demonstrate that 'cap and trade' schemes can deliver environmental benefits" (Betz and Sato, Climate Policy, 2006)
- And the future?
  - Phase II; Minor emissions reduction of covered sectors from 2005 levels; estimates of windfall profits of €20bn/year (Financial Times, June 2007) *(c.f. estimated €45bn/year on EU Common Agricultural Policy in 2012)*
  - Phase III; EU target of 20%+ emission reductions in 2020 and more auctioning. However, *EC impact assessment suggests target can be reached by other than ETS sector if EU energy efficiency & renewable strategy are implemented properly, let alone the use of the 'global carbon market* (CEPS, *The Making of the EU ETS*, 2007)

Proposed CPRS design

- Coverage
  - Six Kyoto gases, initially all sectors other than agriculture & forestry (opt-in). Direct 'downstream' participation by approx. 1000 large emitters, 'up-stream' participation by fuel suppliers for smaller emitters, no real scope for offsets
- Reporting and compliance
  - National Greenhouse and Energy Reporting System (NGERS)
  - Emissions Reporting System (OSCAR) – single report for both schemes
  - Scheme obligations based on operational control
  - Large emitters ≥125kt – 3rd party assurance required
- National emissions targets
  - Long term national emissions target – 60% reduction c.f. 2000 levels by 2050, Medium term target range announced in white paper, 5 years of caps &10 years of gateways
- Carbon market
  - Unlimited banking, limited borrowing, price cap, initially limited one-
- Allocation
  - Mix of auction and free-allocation, all revenue goes towards supporting households and business transition (Climate Change Action Fund), initial fuel tax offsets, free permits to EITE, compensation to seriously impacted industries (electricity sector adjustment scheme)

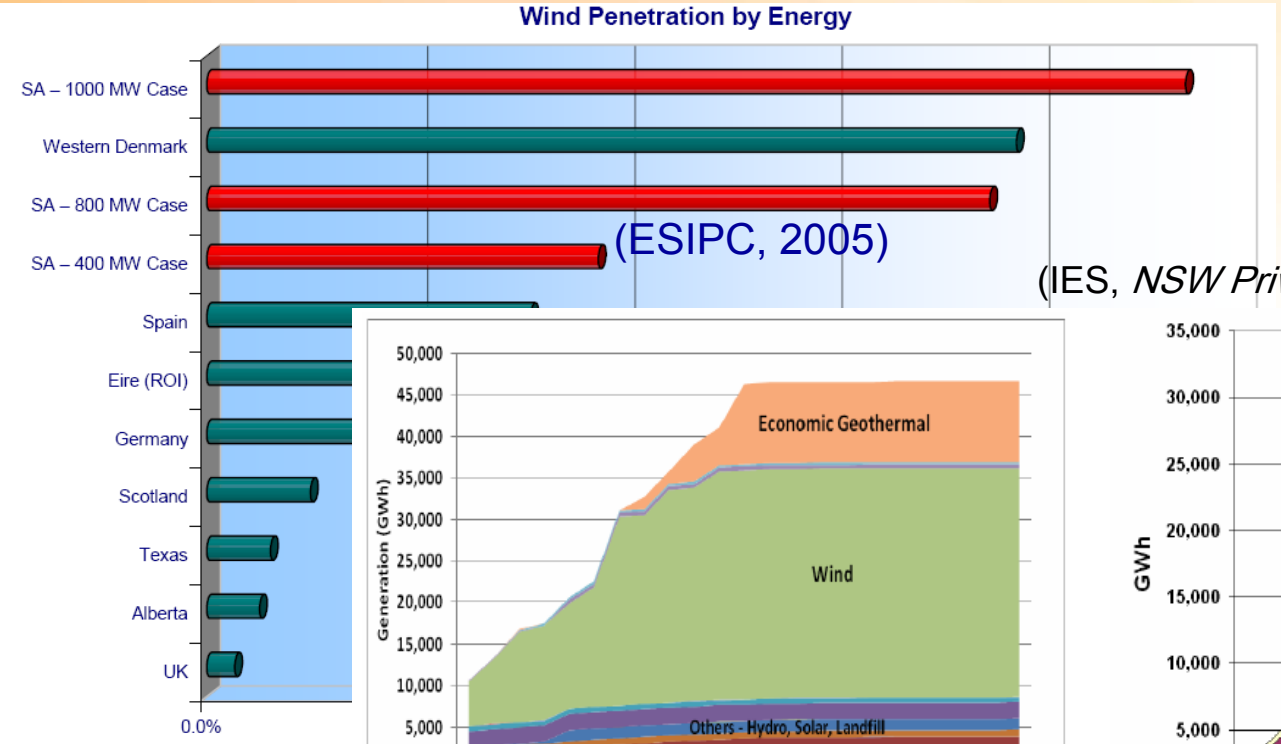
National Greenhouse and Energy Reporting System (NGERS)

- Intended to provide robust & transparent emissions and energy reporting for emissions trading, other policy activities, public disclosure
- Expected to cover approx. 700 corporations by 2010-11 reporting period. Corporations that *may* meet or exceed thresholds should be collecting data, those *likely* to meet thresholds next year should be considering setting up accounting and reporting systems
- Registration and reporting by corporations with operational control over facilities (activit(y/ies)... that form a single undertaking or enterprise
- Report energy production & consumption, direct (scope 1) & energy-related off-site (scope 2) emissions

Who has obligations (Australian Govt, NGERS presentation, July 2008)

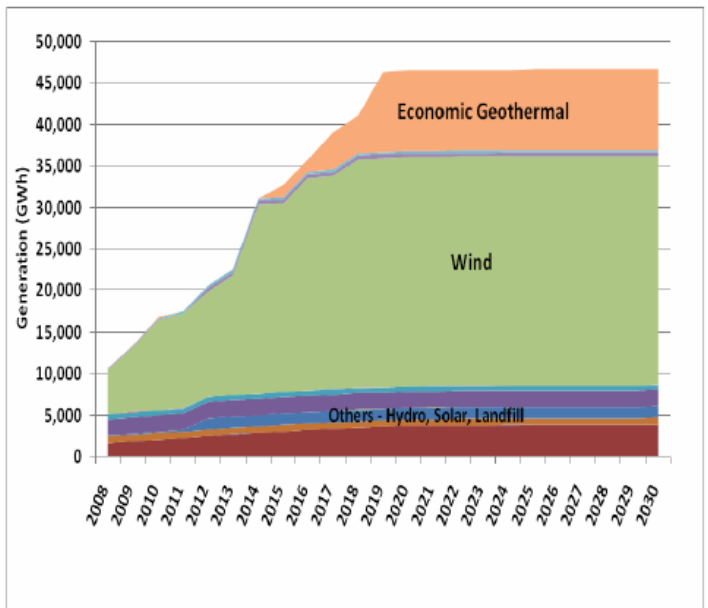
Expanded MRET – 20% by 2020

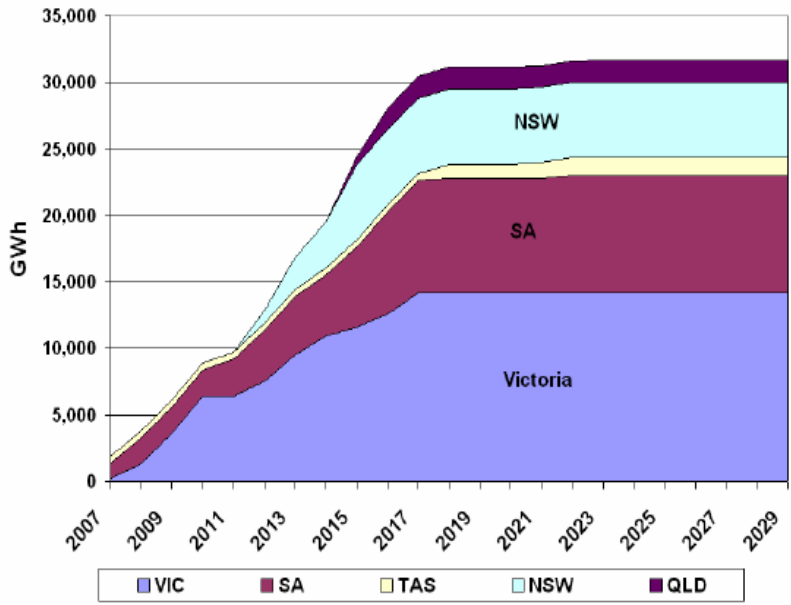
- Scheme expansion rules still to be finalised
- Possible very wind high penetrations in SA + Vic; major challenge for operation of the NEM



(ESIPC, 2005)

(IES, *NSW Privatisation Conference*, 2008)





One view on interactions b/n ETS and MRET

Table 14.2 Interaction between the emissions trading scheme and the Mandatory Renewable Energy Target

(Garnaut Final Report, 2008)

Emissions trading scheme trajectory	MRET ramp-up rate: Gentle	MRET ramp-up rate: Aggressive
Gentle	• Low permit price • Moderate renewable energy certificate price • Moderate impact on retail electricity prices • Mitigation activity outside MRET unlikely	• MRET cannibalises emissions trading scheme • Very low (even zero) permit price • Emissions trading scheme becomes non-functional • High renewable energy certificate price • High impact on electricity prices • Little mitigation activity outside MRET • No incentive for investment in other low-emissions technologies
Aggressive	• Permit price steadily increases over time • As wholesale electricity prices rise, renewable energy certificate prices decline, possibly to zero—implying early phase-out of the MRET • Moderate-to-high impact on retail electricity prices—depending on level of mitigation elsewhere in the economy • Investment in portfolio of renewable and other low-emissions technologies	• Permit and certificate price paths would be highly dependent on interaction of the two schemes • Prices could be range from high to very low • MRET most likely to cannibalise emissions trading scheme • High impact on retail electricity prices • Most investment likely to be in increasingly expensive renewable energy options

Current timetable for CPRS introduction

March to June 2008	Phase 1 consultation with stakeholders to inform the development of the Green Paper, including: • ongoing consultation with states and territories through the Council of Australian Governments; • roundtable discussions with peak industry and non-government organisations, with inaugural meetings held on 3 March; • consultation with the agriculture and forestry sectors on the question of their inclusion in the emissions trading scheme and on the timeframe for that inclusion; and • targetted consultations on technical design issues.
July 2008	Public release of the Green Paper on scheme design
July to September 2008	Phase 2 consultation on the Green Paper
December 2008	Public release of exposure draft of legislative package
December 2008 to February 2009	Phase 3 consultation on exposure draft legislation package
End 2008	Firm indication by Government of planned medium-term trajectory for the scheme
March 2009	Bill introduced into Parliament
Mid-2009	Government aims to achieve passage of bill by Parliament at this time
During 2009	Phase 4 consultation on emissions trading regulations
3rd quarter 2009	Act enters into force; scheme regulator established
2010	Emissions trading scheme will commence

Possible impacts of CPRS & MRET

- Depends on wide range of uncertainties – emissions targets, scheme designs and external factors such as financial crisis etc
  - Both schemes can be easily 'designed and implemented' in a way that reduces impacts
- Growing number of opinions & associated modelling by key stakeholders
  - questionable value at this time?
- Some initial trading but very little 'real' money changing hands at present
  - Australian Emission Units being traded OTC but note very little liquidity
  - *(no trades since 26/09/08 for reported figures from Point Carbon, October 24 2008)*

AEU OTC closing prices ($/t)

Delivery	Bid	Offer	Close
AEU 2010/11	..	..	..
AEU 2011/12	21.75	22.50	21.75
AEU 2012/13	22.50	24.50	22.75

The prices reflect OTC levels on 23 October. AEUs are quoted in A$.
Prices provided by brokerages Newedge and TFS and market traders.
For methodology, see www.pointcarbon.com.

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Garnaut modelling

Figure 12.1 Australian emissions reductions trajectories to 2050 (reduction in total emissions)

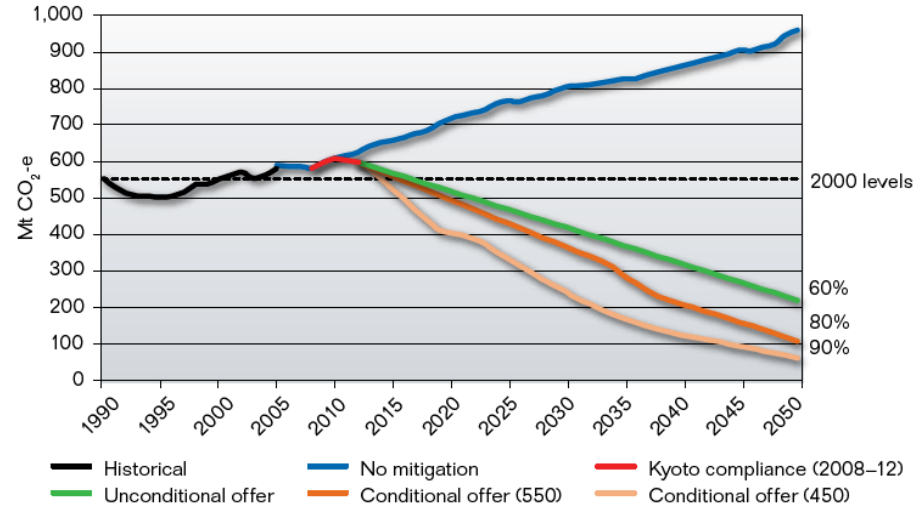


Figure 20.5 Australia's electricity demand

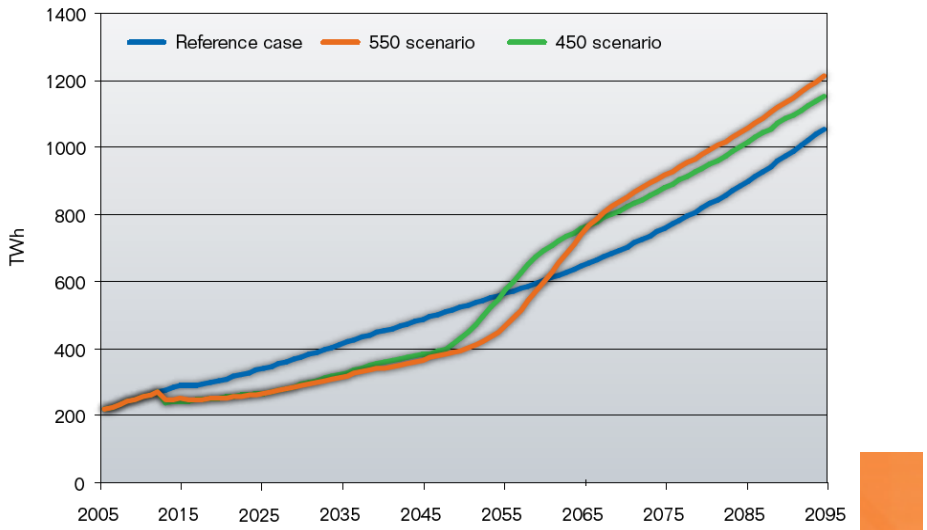


Figure 20.6 Electricity demand reduction in selected sectors, 550 scenario

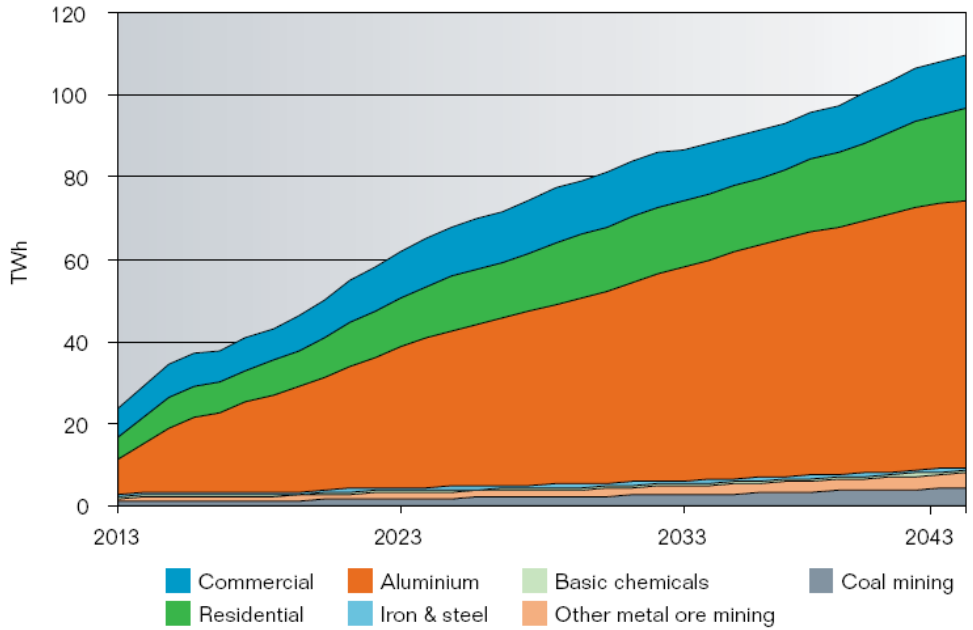
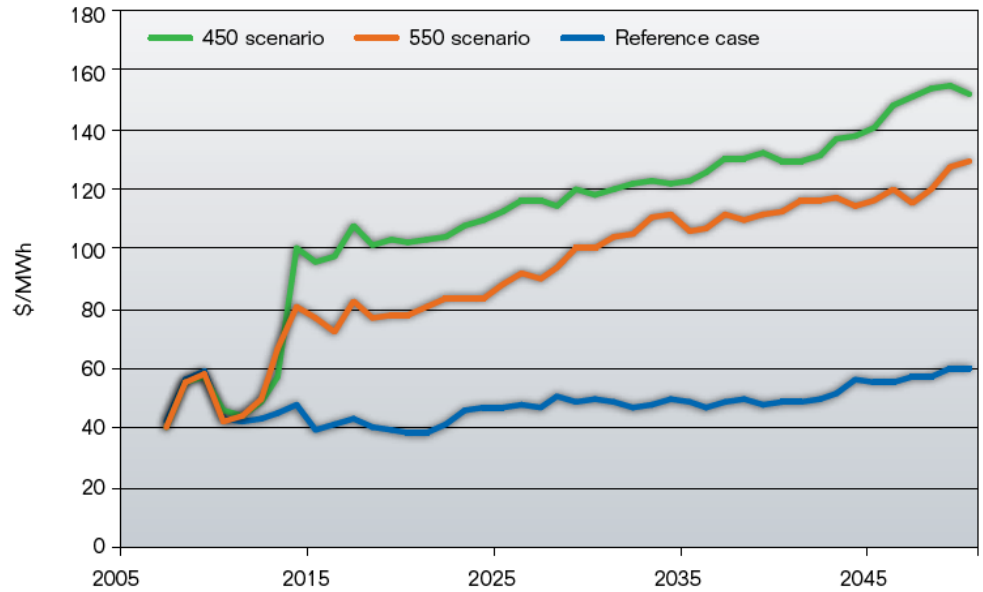


Figure 20.14 Wholesale electricity prices, 2005–50



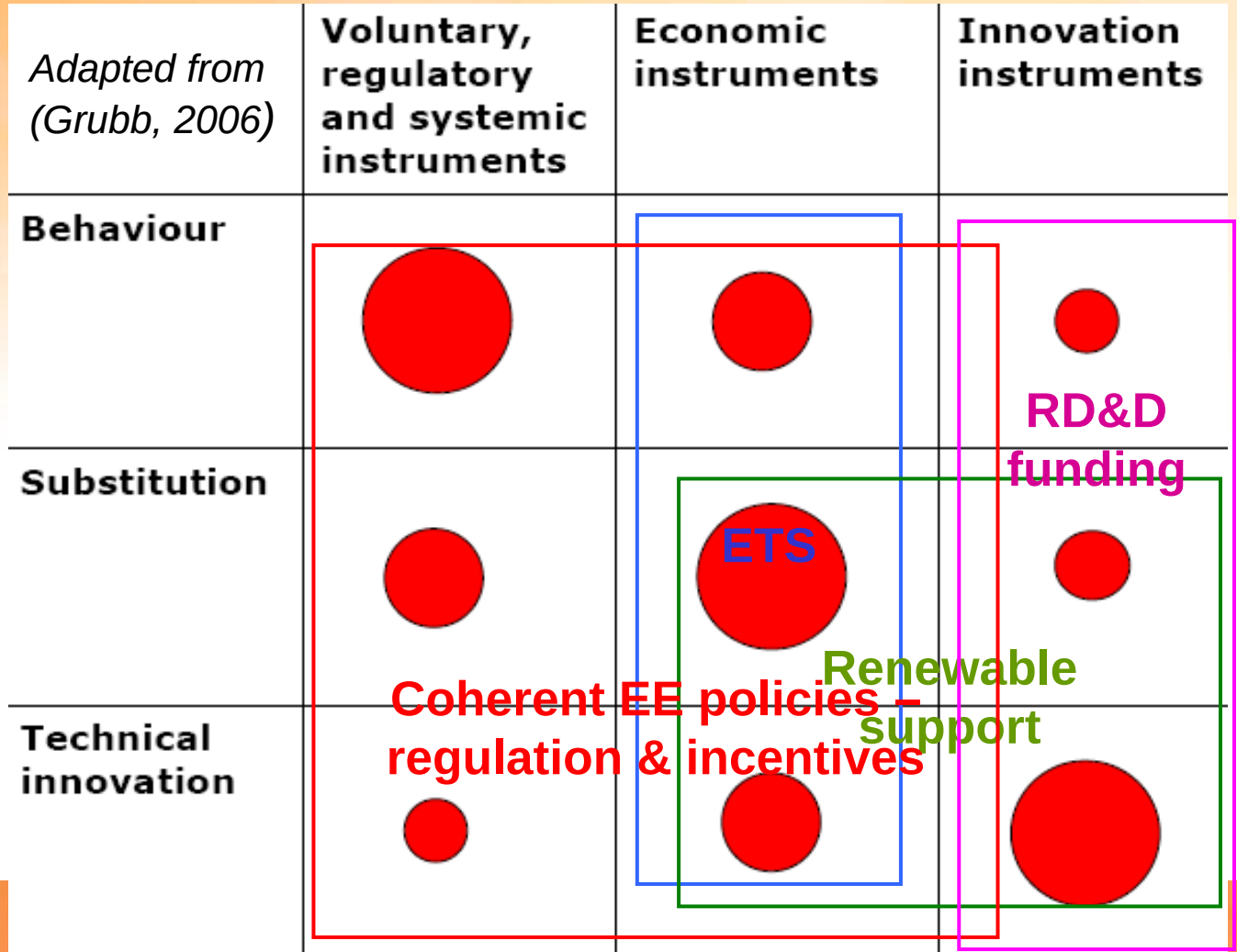
Note: These results were generated using Strategist and standard technology assumptions.

Potential impacts of recent economic developments

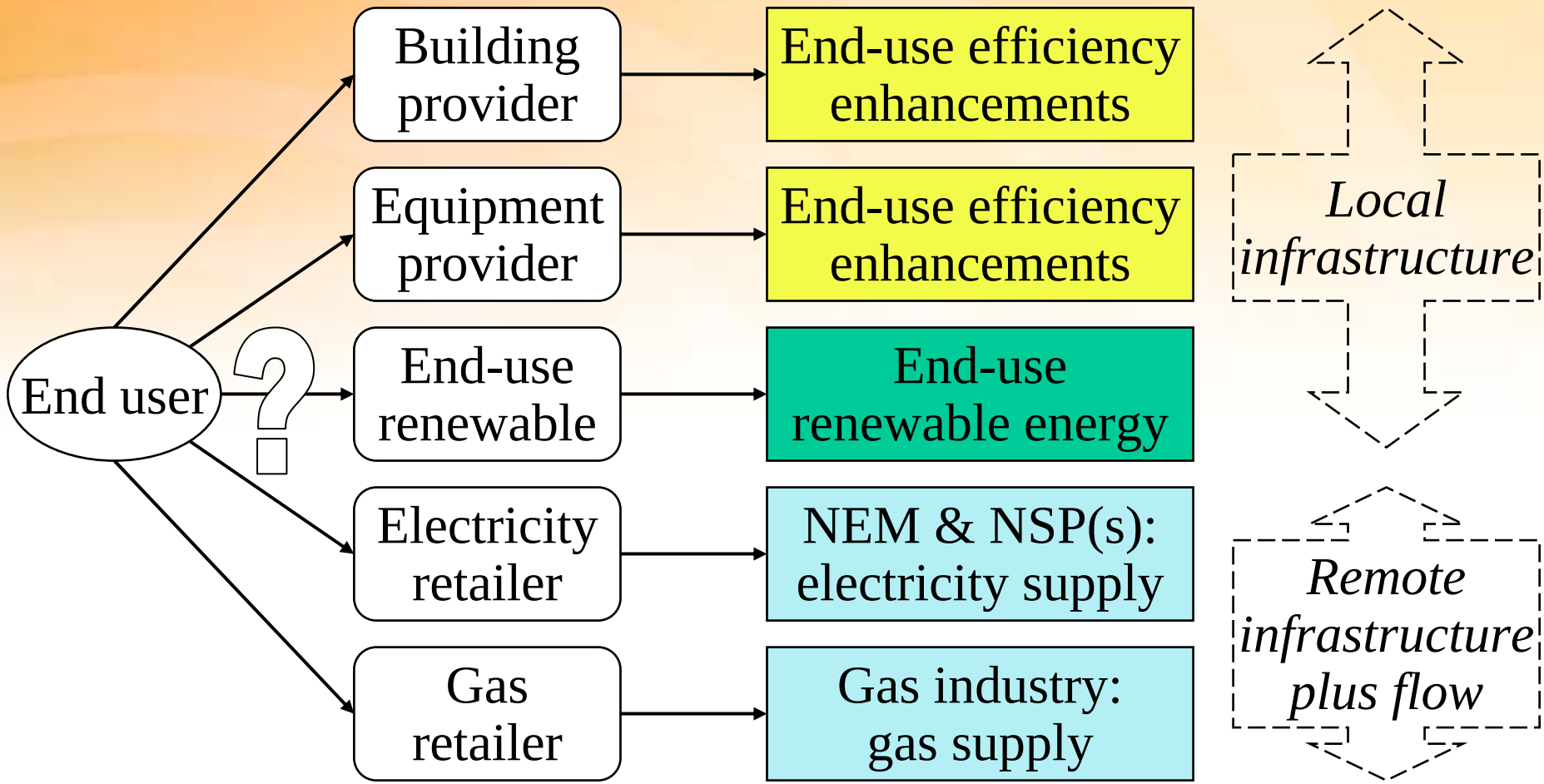
- *Viewpoint from Point Carbon, 24 October 2008*
  - Financial crisis and pending recession increasing pressure to delay planned 2010 introduction of (CPRS) – or lower its ambition
  - "So far Prime Minister Kevin Rudd and his minister for climate change, Penny Wong, have insisted that while they aim to design a "responsible" scheme, it will not be delayed or changed due to the crisis."
  - Some key issues
    - Delay to scheme introduction will increase and prolong market uncertainty
    - "The question now is whether the government can convince players in the nascent market that it will stand firm on the start date, providing the market with sufficient confidence to grow." (Joanne Saleeba, IGCC)
    - "For the moment, their rhetoric remains strong but the real test will be as the reality of negative conditions further unfolds in coming months," "…. lower growth will mean lower emissions which effectively creates some breathing space against targets in the earliest years anyway and works to naturally soften the impact". (Craig McBurnie, ABN Amro).

- *Very easy to modify CPRS/MRET design to reduce their direct impacts on economy (and on tackling climate change) – a major governance challenge*

What's still missing for a coherent sustainable energy policy framework?



Ideal decision making in the stationary energy sector: *led by the end-user*



Energy efficiency policy

- NFEE
  - CoAG/MCE sign-off and implementation underway on Stage 1
  - Seven implementation paths
    - Buildings
      - Minimum performance standards for new residential + commercial buildings
    - Commercial and Industrial
      - Energy Efficiency Opportunities assessments for large users
    - Appliances and Equipment
      - Expanded MEPS + labeling for electrical (+ gas) appliances + equipment
    - Government
    - Trade and Professional Training and Accreditation
    - Consumer Information
    - Finance
  - Proposed Stage 2 under consideration by CoAG/MCE
    - Could include broad based measures, *current discussion paper rather limited*
- Some State efforts
  - VIC EPA license conditions with mandatory audits + action & VEET, SA REES
  - NSW Energy Savings Fund (project funding + rebates on EE appliances)

New Federal EE commitments (BCSE, 2007)

- goal to "*put Australia on track to being at the forefront of OECD EE improvement*".
  - Perhaps 3 X rate of current technical EE improvement by Australia (Saddler)
  - EU committed to 20% energy efficiency target beyond BAU – new benchmark
- Financial incentives:
  - $90m Green Building Fund to subsidise 50% of cost of retrofitting commercial buildings up to $200,000 per building.
  - $75m for small/medium-sized manufacturers to upgrade efficiency of production
  - low-interest HECS-Style $10,000 loan for households to install EE and water efficient equipment such as solar PV, solar hot water, insulation, lighting.
  - $1000 rebate for solar hot water
  - $500 rebate for insulation per rental property
  - $30,000 for every school in Australia for energy efficiency upgrades and solar PV.
- Regulation
  - Phase out electric storage water heaters vs solar, heat pump, gas water heaters.
  - Phase out conventional incandescent light-bulbs
  - Commitment to upgrade EE standards for new and existing homes
- Information
  - Implement compulsory point-of-sale sustainability scorecards wrt transparent and nationally consistent protocol for home energy and water efficiency ratings
  - Establish a new ten-star appliance rating system and Greenhouse and Energy Minimum Standards to fast track smart efficient technology
  - Mandate disclosure of energy or environmental ratings for appropriate types of large commercial buildings at point of sale and point of lease

Some recent developments

- MCE December 2007 commitments for NFEE Stage II
  - Expending and enhancing the Minimum Energy Performance Standards (MEPS) program;
  - Heating, ventilation and air conditioning (HVAC) high efficiency systems strategy;
  - Phase-out of inefficient incandescent lighting;
  - Government leadership though green leases;
  - Development of measures for a national hot water strategy, for later consideration.

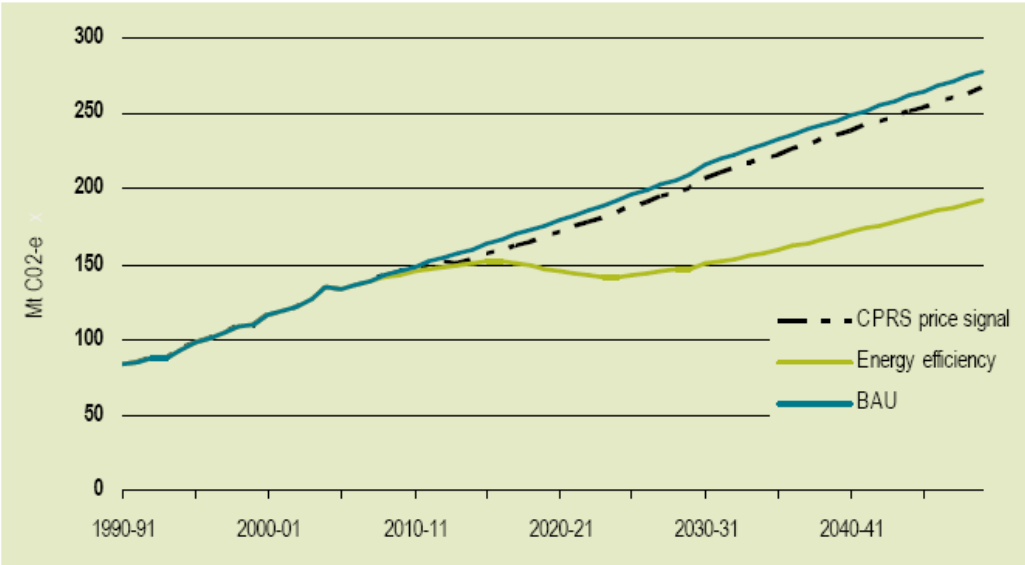
  - *Further Stage One measures that will be introduced subject to Regulatory Impact Statements include provision of energy use benchmarks on energy bills and mandatory disclosure of energy performance of residential and commercial buildings*

- COAG has agreed to develop a National Strategy for Energy Efficiency, to accelerate energy efficiency efforts across all governments and to help households and businesses prepare for the introduction of the Commonwealth Government's Carbon Pollution Reduction Scheme (CPRS). Streamlined roles and responsibilities for energy efficiency policies and programs are to be agreed by end December 2008, and implementation of this Strategy will be finalised by June 2009, to ensure that programs assisting households and businesses to reduce their energy costs are in place prior to the introduction of the CPRS.) *(COAG Communique, 2 October 2008*

The Building Sector's potential role

- "commercial and residential buildings provide some of the most affordable forms of greenhouse gas (GHG) abatement in the economy. *Significant gains are available now without the need to invent and apply new technologies*. They do not involve substantial risk or uncertainty and would provide significant gains now and into future.
- …the building sector's role *complements* the Government's proposed Carbon Pollution Reduction Scheme (CPRS). Stimulus for transforming the building sector's energy efficiency would immediately enhance any carbon price signal that emerges from CPRS and lessen the adjustment costs across the economy as a whole.
- …Additional policy needs include national white certificate scheme; provision of green depreciation; and public funding for building retrofit." (ASBEC & CIE, 2008)

1.4 GHG emissions by the building sector



Note: The series 'CPRS price signal' plots only expected effect of the CPRS price signal on electricity demand. It has not attempted to account for other influences on the price of electricity (such as other policy measures), nor the supply side response to the CPRS. This series reports the impact on GHG emissions that results from an increase in electricity prices.

Data source: CIE (2007) and ASBEC CCTG estimates.

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Thank you… and *questions*

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