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The Australian energy and climate policy context and potential implications for DE: the Garnaut Review, CPRS and expanded RET

Decentralised Energy: Technology, Policy and Opportunities for Australia & the Asia-Pacific Region
Sydney, 20-21 November 2008

Dr Iain MacGill, Joint Director - CEEM

www.ceem.unsw.edu.au

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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

More information at www.ceem.unsw.edu.au

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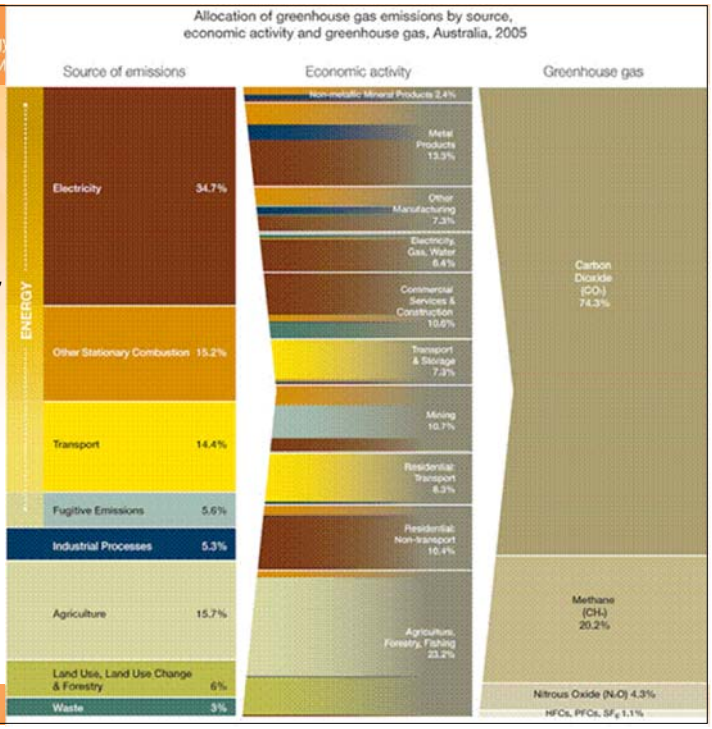
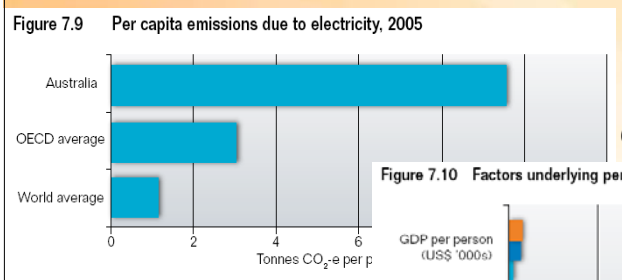
Australia's Climate and Energy connection

(PM Taskgroup on ETS, 2007)

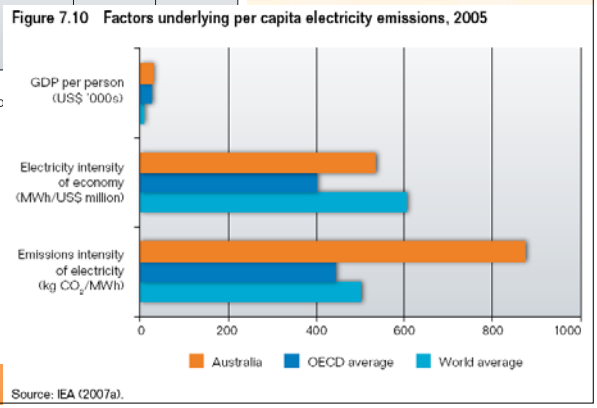


The key challenge of coal-fired generation



Sources: IEA (2007a); DCC (2008b).

(Garnaut Review, 2008)



Source: IEA (2007a).

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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*

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Potential impacts of CPRS, eRET on DE

- Energy and emissions reporting requirements for larger facilities and organiations
- Mandatory direct participation in CPRS for large emitting facilities
- 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
  - Including costs of other services due to impact of their energy and emissions
  - But also societal expectations of our energy future

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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

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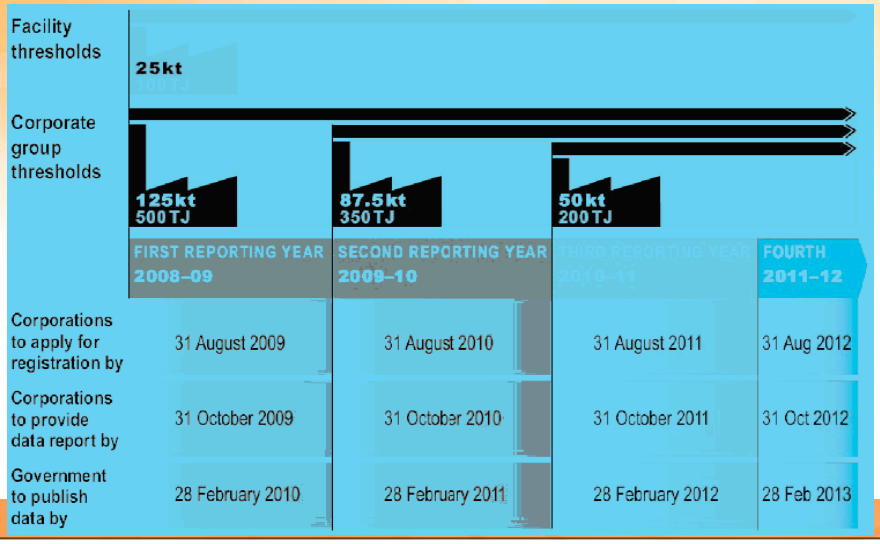
Who has obligations (Australian Govt, NGERS presentation, July 2008)



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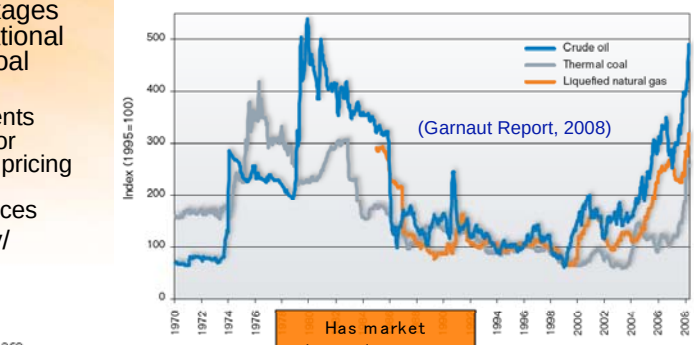
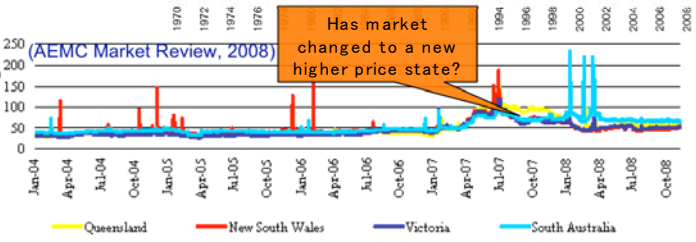
Non-climate drivers of Australian energy prices

- Likely greater linkages b/n local &international prices for black coal and gas
  - Largely represents downside risk for prices b/c local pricing has been than international prices
- Tightening supply/ demand balance
- Extreme climate events
  - 2007 drought impacted hydro and cooling of coal plants

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





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Load growth driving major network expenditure

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

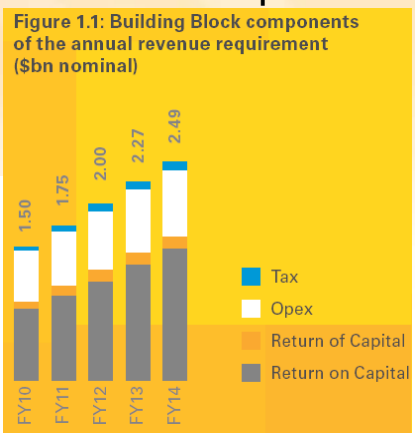
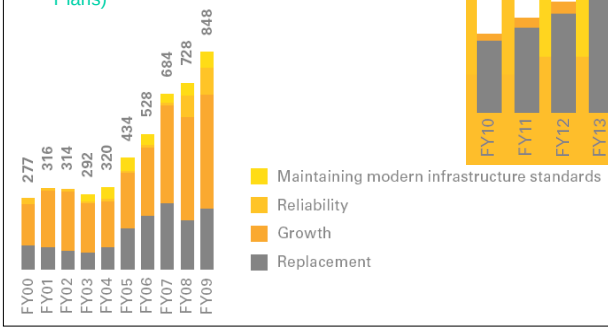


Figure 5.5: Capital expenditure by driver (FY07 $m real)

(Energy Australia, 20010-14 Expenditure Plans)



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Emissions trading (ETS/CPRS)

- An approach to establish price on greenhouse emissions
  - Large emitters require a permit for each tCO2-e emitted. Number of available permits capped. Permits therefore have value and can be traded. Price of permits represents carbon price on emissions.
- What policy role can ETS/CPRS play? *Opinions vary*
  - Assuming idealised markets, universal ETS only policy required
    - any additional policies can only increase cost of meeting cap while not changing its environmental effectiveness
  - Requires other policies to correct market failures – eg. for EE, innovation
  - Requires other policies because limits to what price drivers alone deliver
  - *One possible way to establish carbon price within comprehensive policy framework that can robustly deliver quick major emission reductions*
    - *Can be seen as an experimental policy – no proven superiority to other policy approaches and some notable failures to date*
    - *Unlikely to be possible to appropriately 'price' some future uncertainties*
    - *Established by political process inevitably involving compromises*
    - *Prices only ever part of decision making context*

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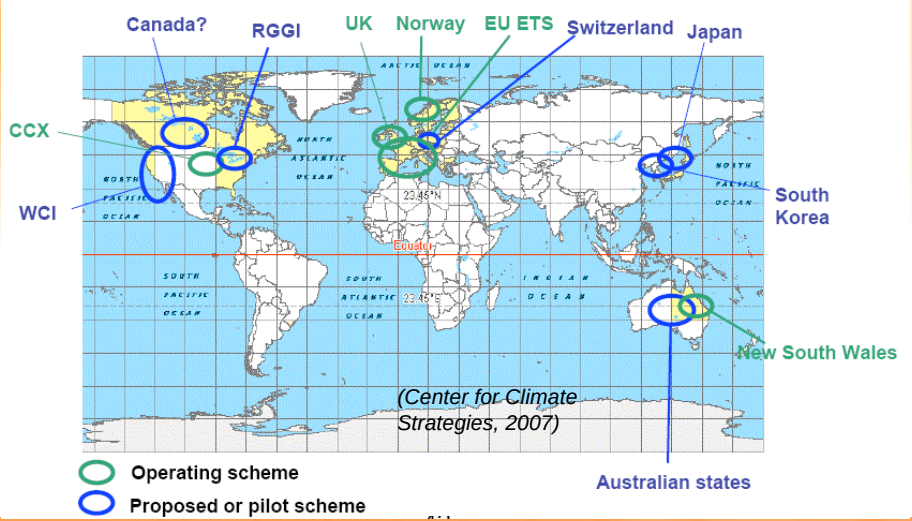
Existing and proposed ETS around world



(Center for Climate Strategies, 2007)

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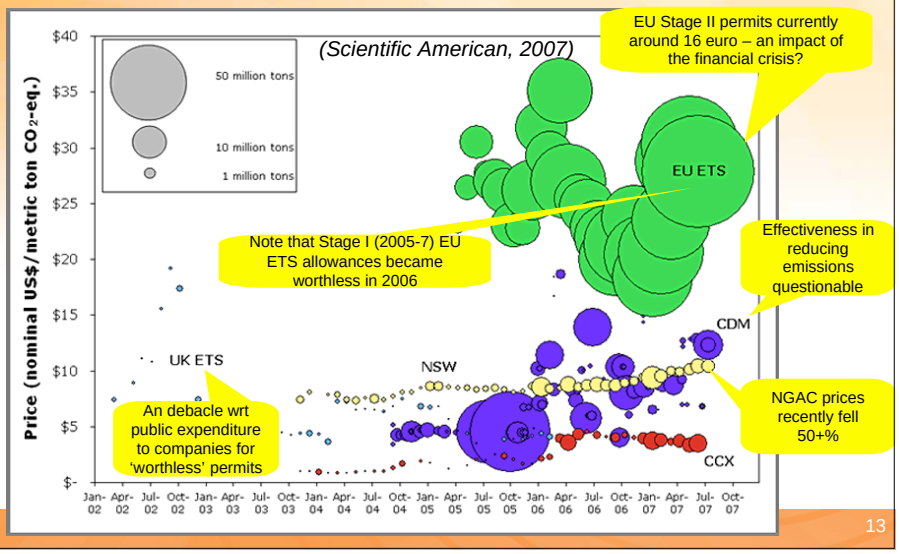
Performance to date has been mixed



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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)

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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-way international trading
- 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)

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Current timetable for CPRS introduction

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

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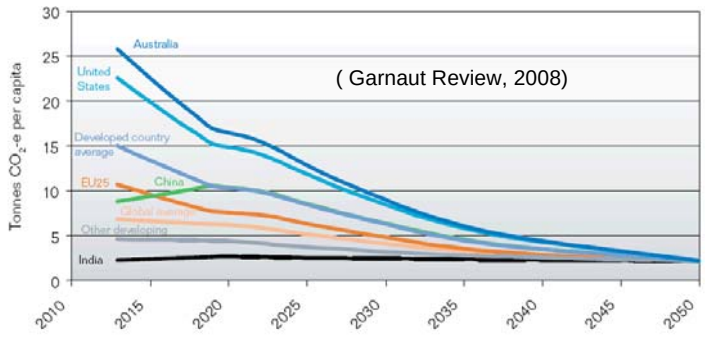
Garnaut: Global agreement scenario

- Contract and converge per-capita emissions
  - Australia and other high population growth countries 'compensated'
  - Australia given higher per-capita emissions entitlement than any other country for the next 41 years

Figure 9.5 Per capita emissions entitlements for the 450 scenario, 2012–2050



(Garnaut Review, 2008)

Note: The graph starts in 2012. Australia's 2012 starting value assumes Kyoto compliance, as do those for the EU25. Other countries start at their emissions level given by the reference case (the no-mitigation scenario) in 2012.

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Garnaut modelling

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

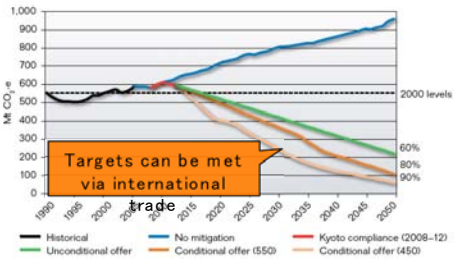


Figure 20.5 Australia's electricity demand

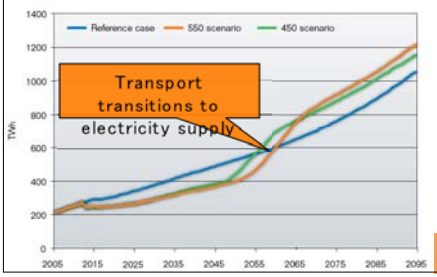


Figure 20.6 Electricity demand reduction in selected sectors, 550 scenario

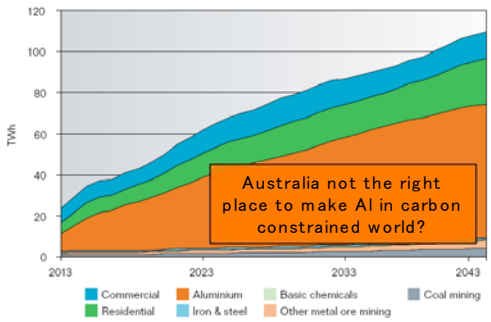
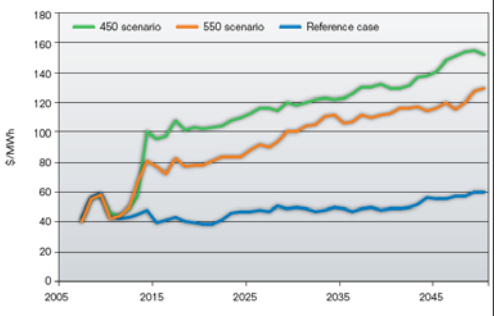


Figure 20.14 Wholesale electricity prices, 2005–50



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

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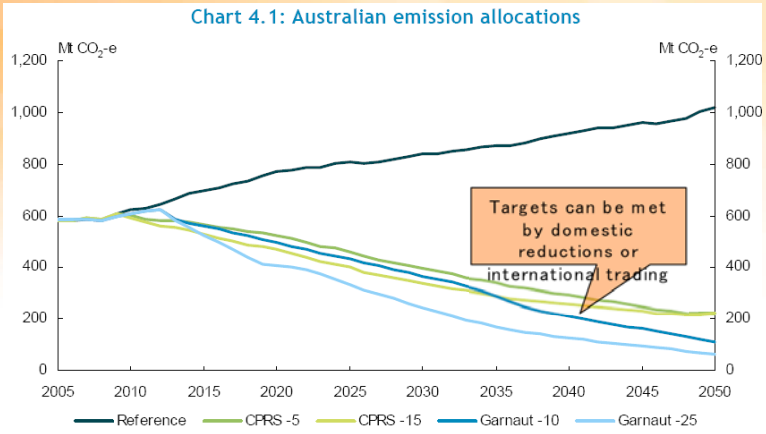
Australian Treasury modelling



Stabilisation goal (ppm)	550	510	550	450
Emissions change 2000 in 2020/2050 (%)	-5/-60	-15/-60	-10/-80	-25/-90

(Australian Treasury, *Australian Low Pollution Future*, 2008)

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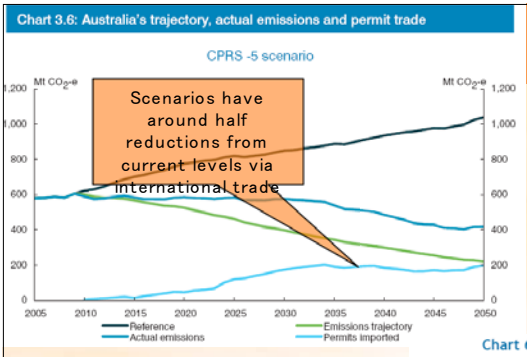

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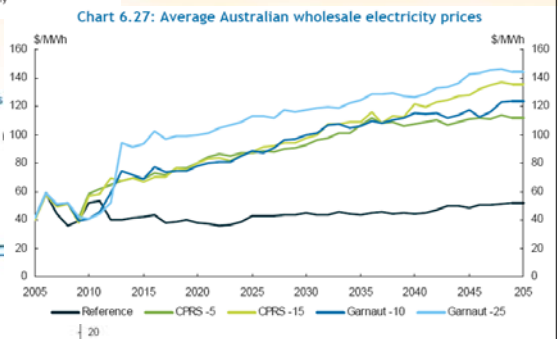
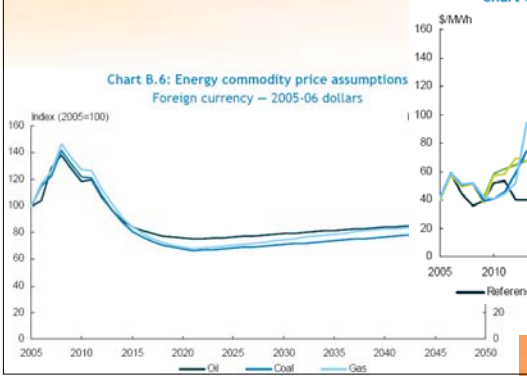
Some treasury modelling details





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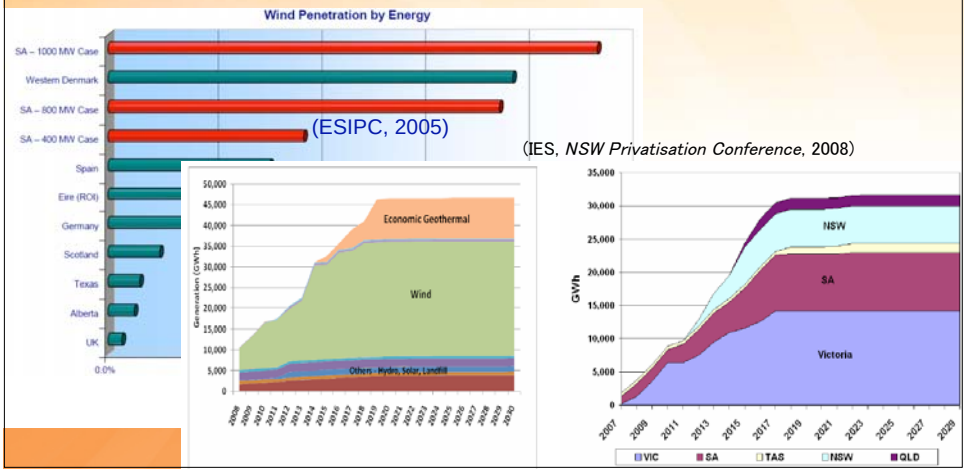
Expanded MRET – 20% by 2020

- 45,000 GWh of new renewables in 2020 then phased out to 2030
- Possible very wind high penetrations in SA + Vic; major challenge for operation of the NEM



(IES, *NSW Privatisation Conference*, 2008)

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Possible impacts of CPRS & eRET for DE

- CPRS
  - Largely question of price impacts which will depend on wide range of uncertainties – emissions targets, scheme designs and external factors such as financial crisis etc
    - Scheme can be easily 'designed and implemented' in a way that reduces impacts
  - Some possibilities for auction revenue to fund DE opportunities
  - Growing number of opinions & associated modelling by key stakeholders
  - 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, 24/11/2008)*
  - *Garnaut and Green paper make almost no mention of DE other than EE*
- eRET
  - Price impacts likely less significant than CPRS which prices all emissions, not just emissions reductions, while RECs price only on 'new' renewables
  - REC prices and timing of uptake may be significantly impacted by design choices
    - Deeming arrangements for small generation and renewable 'electricity displacing' technologies such as solar thermal?

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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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

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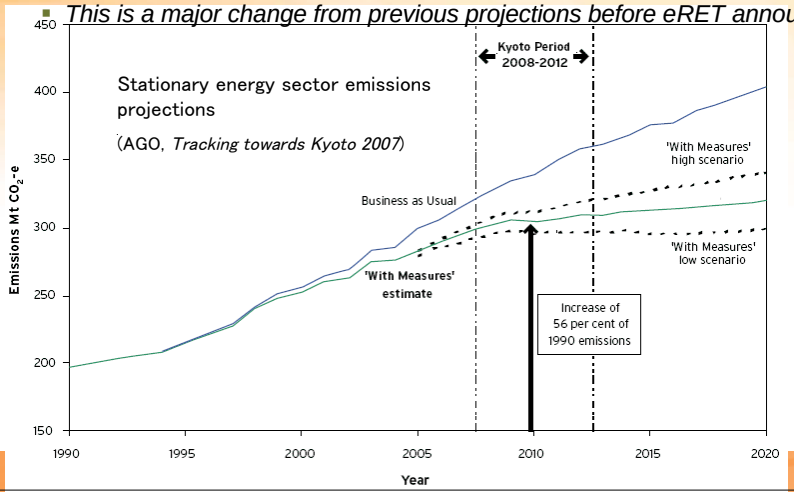
eRET expected to have significant impact

- Stationary energy emissions projected +56% from 1990 levels in 2010
- With new measures, *incl. 20% renewables*, projected +64% in 2020
  - electricity industry emissions falling slightly over 2010-2020
  - *This is a major change from previous projections before eRET announced*



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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).
- *Not difficult to modify CPRS/MRET design & settings to reduce price impacts & 'buy off' powerful stakeholders.*
- *A soft scheme looking increasingly likely but will then be largely ineffective on tackling climate change – a major governance challenge*

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AEMC Review of Energy Market Frameworks in light of Climate Change Policies

- Terms of reference
  - For AEMC to "…examine potential impacts of CPRS and expanded RET on both electricity and gas markets, determine what adjustments may be necessary, provide advice on implementation of any amendments required."
  - Aligned timetable for AEMC Review of Demand Side Participation (DSP)
- Issues paper October 2008
  - Convergence of gas and electricity markets
  - Generation capacity in the short term
  - Investing to meet reliability standards with increased use of renewables
  - Operating the system with increased intermittent Generation
  - Connecting new generators to energy networks
  - Augmenting networks and managing congestion
  - Retailing
  - Financing new energy investment
  - *No discussion of potential impacts of other policies including Energy Efficiency, or of higher prices on EE and DG uptake*
- Timetable: 1st Interim Report end08, 2nd Interim 06/09, Final 09/09

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

Adapted from (Grubb, 2006)	Voluntary, regulatory and systemic instruments	Economic instruments	Innovation instruments
Behaviour			
Substitution			
Technical innovation			

RD&D funding

ETS

eRET

Coherent DE policies – regulation & incentives

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RD&D only a small part of innovation cycle..

ETS largely irrelevant at present
Deployment policies key to major investment (asset finance)

Figure 4. Global new investment by technology, 2007

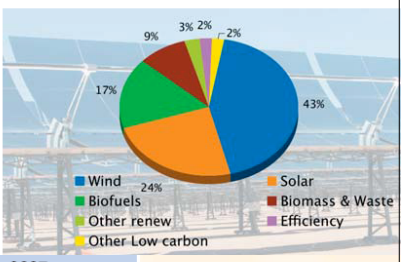
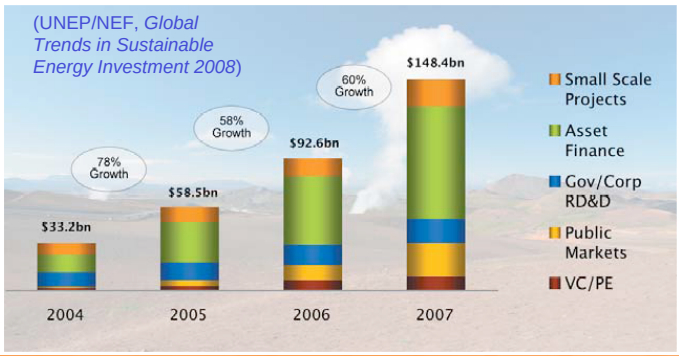


Figure 1. Global new investment in clean energy by asset class, 2004–2007

(UNEP/NEF, *Global Trends in Sustainable Energy Investment 2008*)



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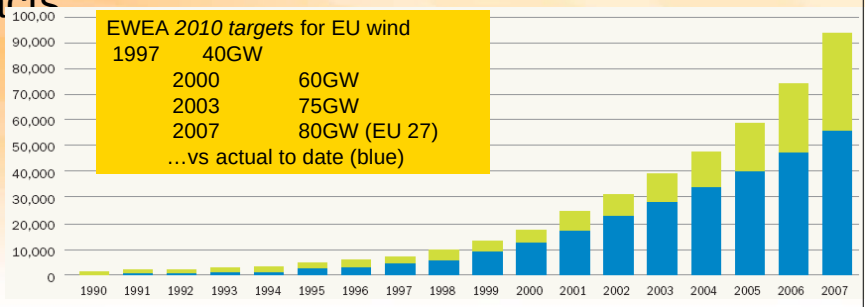
Deployment policies can have surprising impacts



- In 2010, EU wind might
  - Provide 5% of EU electricity supply
  - Reduce emissions 130Mt/yr (c.f. ETS reductions 50-100Mt/yr)
  - Support €11b/yr investment (c.f. ETS windfall profits of € 20+ b/yr)
  - be supporting a transition to lower emission generation around the world with significant green job creation in EU (EWEA, *Wind energy scenarios to 2030*, 2008)

To date EU RE policies far superior to ETS wrt energy security and emissions

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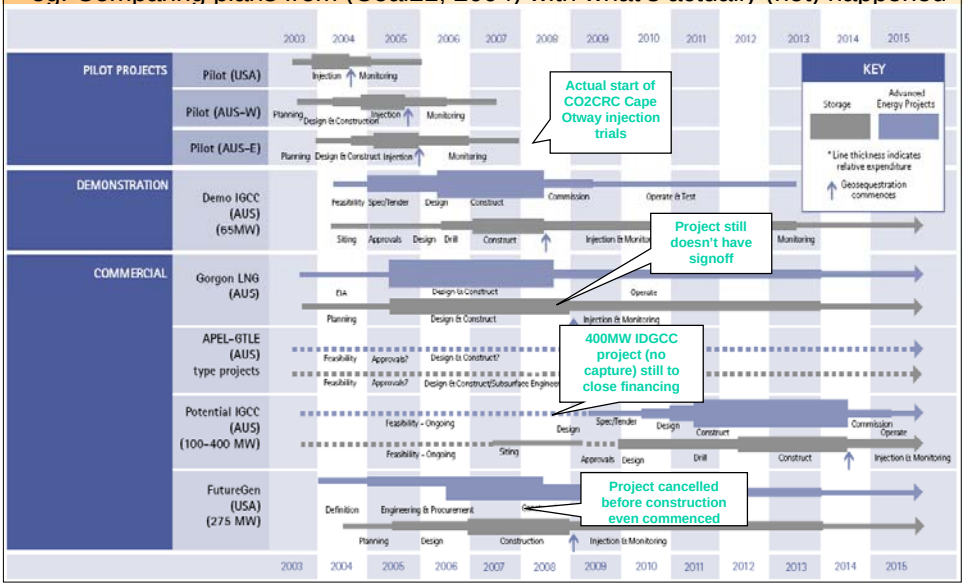
RD&D plans can have surprisingly little impact:

eg. Comparing plans from (Coal21, 2004) with what's actually (not) happened



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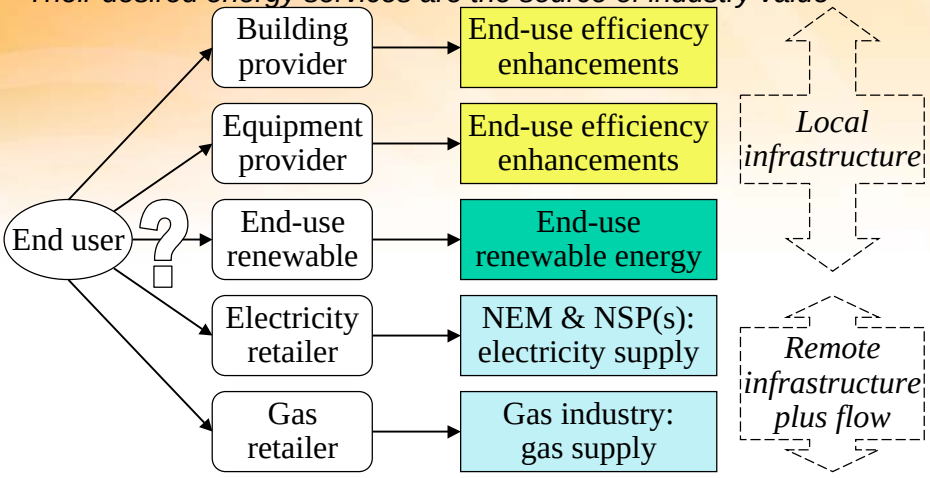
Ideal decision making in the stationary energy sector: *led by the end-user*

Their desired energy services are the source of industry value



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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)

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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

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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*

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In conclusion

- Primary impact of CPRS on DE likely via electricity (and gas) prices
  - These prices will depend on design – 'soft' scheme start will make CPRS near worthless for driving energy industry transformation in short-term
  - Little apparent attention by these policy makers to DE other than EE, main innovation needs they identify revolve around CCS
- Primary impact of eRET on DE will largely depend on final design arrangements on eligible technologies & deeming for DE
- Other key aspects of policy context including present AEMC Reviews on Demand-Side Participation and Impact of Climate Policies on Energy Market do not adequately address DE challenges and opportunities
- Forthcoming National Energy Efficiency strategy is critical after the mixed success of NFEE & other policy efforts to date
- Key missing part of present Australian energy and climate policy context is regulatory, incentive and innovation framework for DE

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Thank you… and *questions*

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