



After Copenhagen: The Future of the Carbon Pollution Reduction Scheme

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CEEM established ...

- *A formal collaboration between the **Faculties of Engineering, Business (Economics and Management)**, also Arts and Social Sciences, Science, Law*
- *through UNSW Centre aiming to provide Australian research leadership in interdisciplinary analysis + design of energy and environmental markets*
- *focussing in the areas of*
 - Energy markets within restructured electricity industries
 - Related environmental markets – emissions trading, renewable obligations, energy efficiency certificate trading, Greenpower...
 - Wider policy frameworks and instruments for achieving overall energy and environmental objectives including technology innovation, infrastructure, energy efficiency, behavioural change...

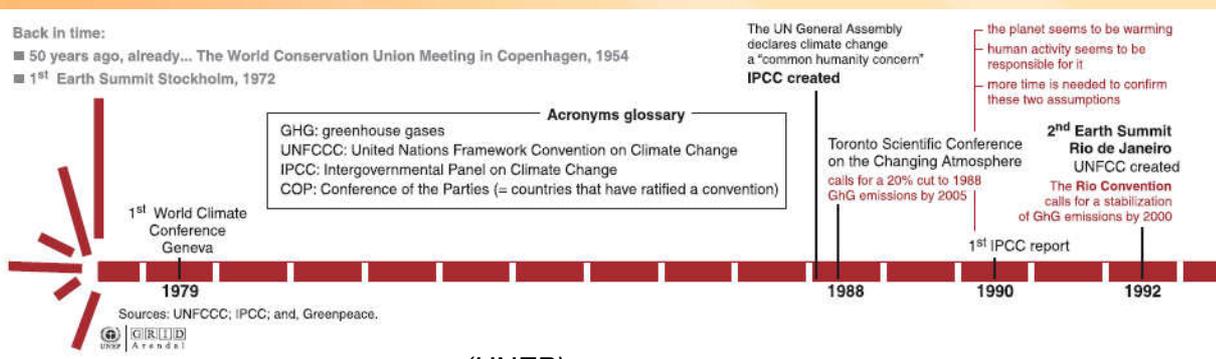


Some current CEEM research efforts

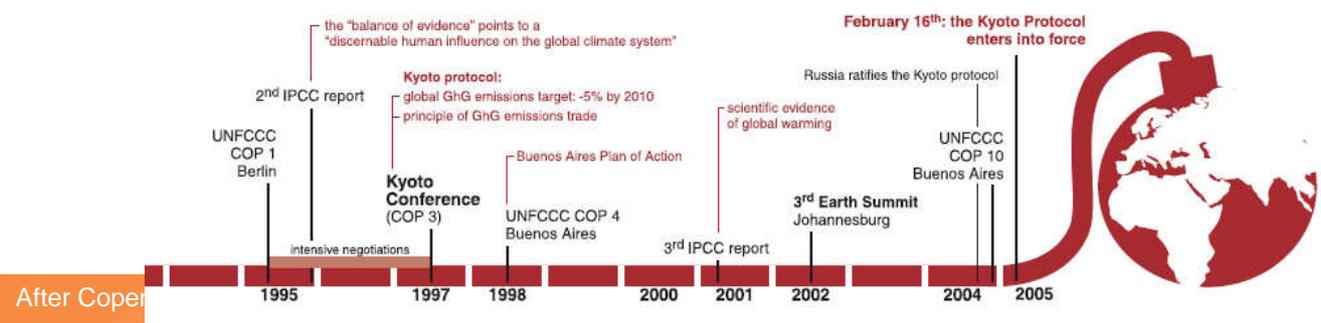
- Facilitating wind and PV integration in the NEM
 - Energy market design, forecasting and operation
- Renewable energy policy support options in restructured industries
 - MRET, proposed expanded Renewable Energy Target, feed-in tariffs
- Emissions Trading Schemes + options for Australia
- Modelling participant behaviour in energy + environmental markets
 - Interactions between spot and derivative markets
- Technology assessment for sustainable energy policy frameworks
 - Energy efficiency, gas + cogeneration, renewables, CCS, nuclear
- Economic modelling of Distributed Energy
- Energy efficiency policy – regulation, financial mechanisms
- Policy frameworks for technology innovation
- Sustainable energy services in the developing world



Progress largely internationally driven... to Kyoto



(UNEP)





... and onward to the Bali roadmap

Launches process to reach agreement on stabilisation of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system by the United Nations Climate Change Conference, 30 November–11 December 2009, in Copenhagen, to include:

Long-term global goal for emissions reductions

Measurable, reportable and verifiable nationally appropriate mitigation commitments or actions by developed countries

Nationally appropriate mitigation actions by developing countries supported and enabled by technology, financing and capacity-building in a measurable, reportable and verifiable manner

Enhanced action on development, deployment, diffusion and transfer of affordable environmentally sound technologies; cooperation on R&D of new and innovative technology

Enhanced action on provision of financial resources and investment for mitigation, adaptation and technology cooperation

Policy approaches and positive incentives to reduce deforestation and forest degradation in developing countries

Various approaches, including markets, to enhance and promote the social consequences of measures

Enhanced action on adaptation measures, focusing on developing island and African states, and including risk management and reducing economic diversification to build resilience

Ways to catalyse synergies among mitigation and adaptation efforts of public and private sector, and civil society

(www.iiss.org)

15 December 2007	Agreement by 13th Conference of the Parties on the Bali Action Plan, establishing Ad Hoc Working Group on Long-Term Cooperative Action under the Convention
22 February 2008	Submission of national positions, to be compiled by the secretariat for consideration by the group at its first meeting
March/April 2008	First meeting of Ad Hoc Working Group
June 2008	Second meeting of Ad Hoc Working Group, Bonn, Germany, in conjunction with the meeting of the UNFCCC Subsidiary Bodies on Implementation and Scientific & Technological Advice
August/September 2008	Third meeting of Ad Hoc Working Group
1–12 December 2008	Fourth meeting of Ad Hoc Working Group; presentation of progress report to 14th Conference of the Parties, Poznan, Poland
30 November–11 December 2009	Adoption of successor to Kyoto Protocol in Copenhagen, Denmark

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.. and (stopped, paused, refocused?) at Copenhagen

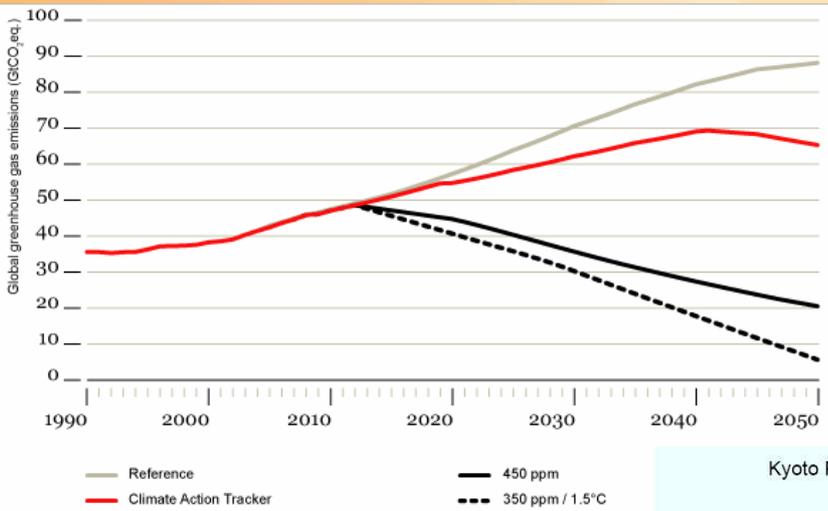
(Australian Government, Presentation at
CEEM 2010 Conference)

- The Copenhagen Accord
 - Part of a set of conference decisions: Other decisions extended UNFCCC working groups
 - High level political undertaking
 - not binding under international law
 - between leaders –with personal engagement
- Key points
 - Hold temperature increase below 2°C
 - Commitment to action:
 - Targets for developed countries
 - Actions by developing countries
 - A transparent system to track progress
 - Monitoring reporting and verification
 - Reporting every two years
 - Financial support for developing countries
 - approaching USD30 billion from 2010 to 2012
 - a goal of USD100 billion per annum by 2020
 - Mechanisms for REDD and technology

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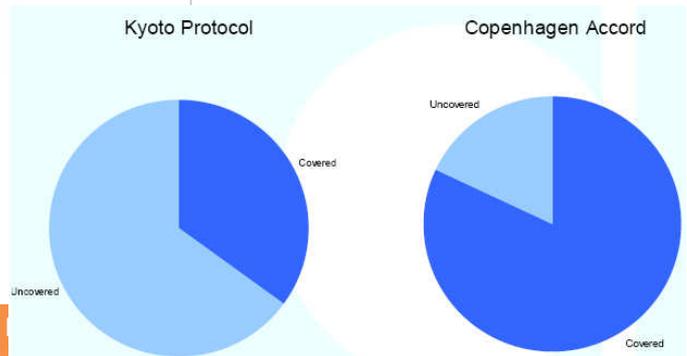


What Copenhagen might mean?



- Australian commitment
 - 5% unconditional
 - 5-15% if world unable to agree on 450ppm
 - -25% in context of global 450ppm agreement

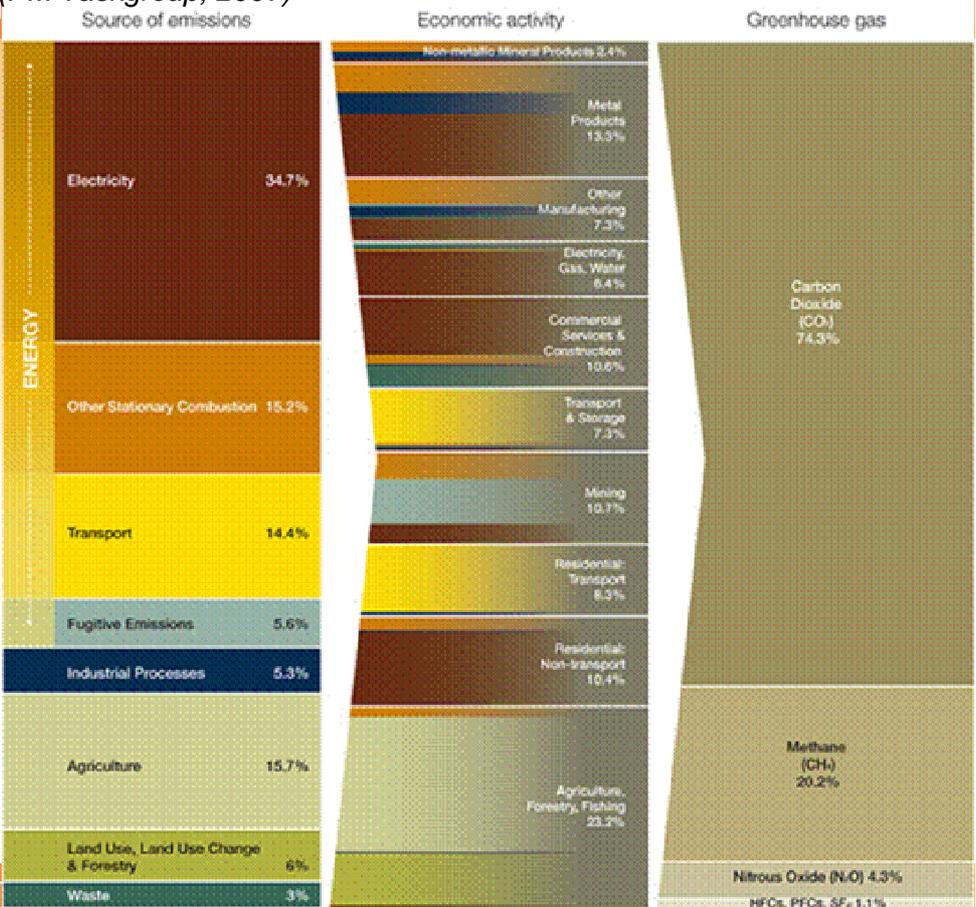
(The Climate Institute, Presentation at CEEM 2010 Conference)



After Copenhagen: The Future of the Carbon Pollution



Allocation of greenhouse gas emissions by source, economic activity and greenhouse gas, Australia, 2005



Australia's energy + climate context

Amongst the world's highest per-capita emissions

An energy + emissions intensive economy

Continuing emissions growth in most sectors including all energy

High agricultural and LULUCF emissions for a 'developed' country

After Copenhagen: The Future

Key current Australian energy + climate policy efforts

- Significant reliance on economic instruments with proposed CPRS, implemented eRET

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

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Emissions trading – from theory to practice

(Clive Spash, *Brave New World of Carbon Trading*, www.clivespash.org)

- Underlying economic theory on pollution control
 - An aberration on otherwise perfectly functioning markets
 - A single measurable pollutant
 - Known or knowable pollution control costs and benefits
 - Optimal pollution control equates marginal costs of control & benefits
- ... may not adequately address challenges of practical implementation?
 - Oversimplification and assuming away uncertainty
 - CO2 equivalence, understood damage and control costs, price impacts and responses
 - Markets, power and vested interests
 - Are markets always efficient, who are the key players and their drivers



How does emissions trading work?

Mechanics of a cap and trade scheme

Emitters of greenhouse gases need to acquire a permit for every tonne of greenhouse gas that they emit.

The quantity of emissions produced by firms will be monitored, reported and audited.

At the end of each year, each liable entity will need to surrender a permit for every tonne of emissions that they produced in that year.

The number of permits issued by the Government in each year will be limited.

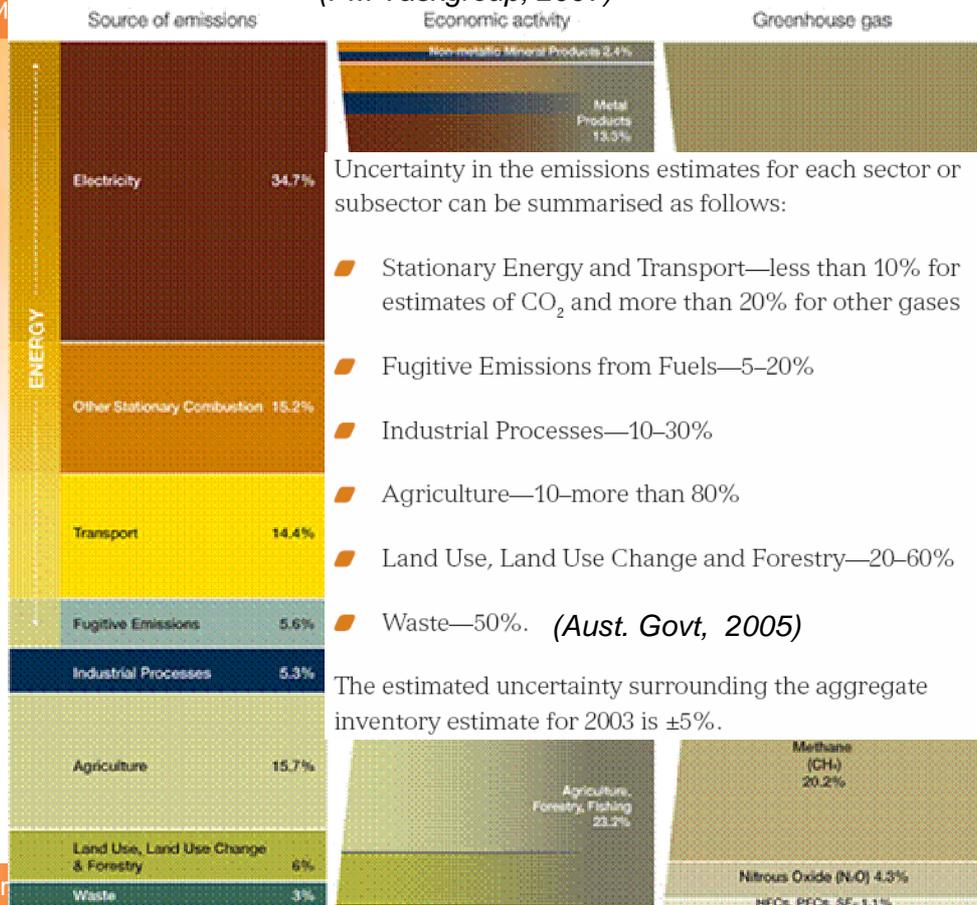
Firms will compete to purchase the number of permits that they require. Firms that value the permits most highly will be prepared to pay most for them, either at auction or on a secondary trading market. For some firms, it will be cheaper to reduce emissions than to buy permits.

Certain categories of firms will receive an administrative allocation of permits, as a transitional assistance measure. Those firms could use the permits or sell them.



Emissions measurement a key challenge for carbon markets

Allocation of greenhouse gas emissions by source, economic activity and greenhouse gas, Australia, 2005 (PM Taskgroup, 2007)



Uncertainty in the emissions estimates for each sector or subsector can be summarised as follows:

- Stationary Energy and Transport—less than 10% for estimates of CO₂ and more than 20% for other gases
- Fugitive Emissions from Fuels—5–20%
- Industrial Processes—10–30%
- Agriculture—10–more than 80%
- Land Use, Land Use Change and Forestry—20–60%
- Waste—50%. (Aust. Govt, 2005)

The estimated uncertainty surrounding the aggregate inventory estimate for 2003 is ±5%.



What policy role can ETS play?

- *Nothing new about a price on carbon – some carbon already highly valuable: change is to add an additional price reflecting climate externality*
- ETS only effective wrt its ability to drive changes, operational but especially investment, in markets that drive physical emissions
- 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 + the 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 adverse compromises
- 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



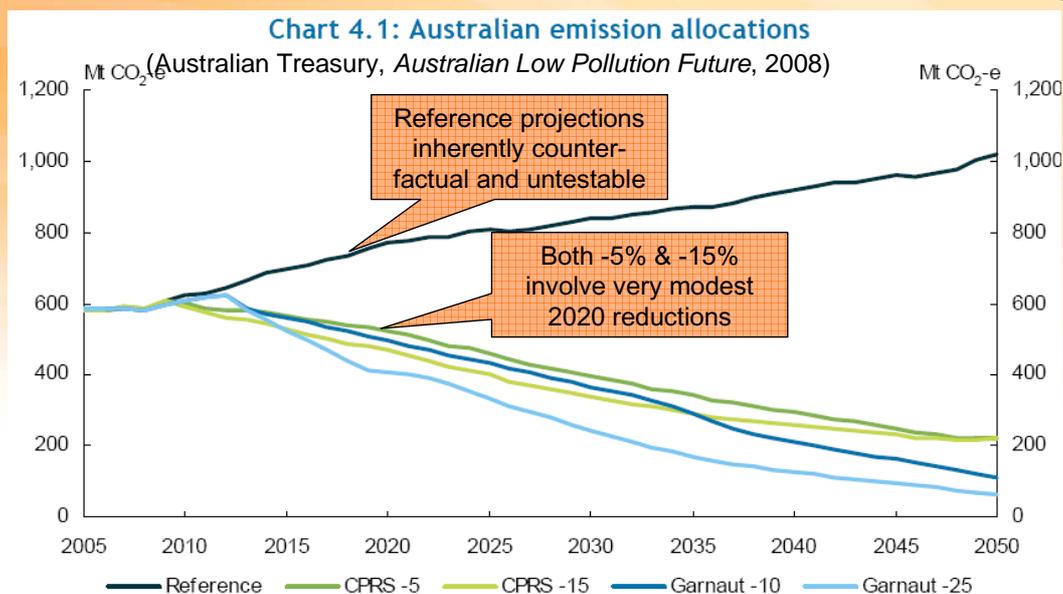
Potential policy challenges

- Share many of usual policy challenges with any regulatory approach + potentially add new ones
 - Novel – learning likely required + mistakes will be made: do we have time?
 - Key decision making is investment: have to establish ‘markets’ that drive this appropriately
 - Inevitable complexity in attempting to match commercial market with physical actions that reduce emissions
 - Potential loss of control on decision making might see adverse impacts with other policy objectives....
 - ***These are designer markets: Greatest competitive advantage for participants may lie in gaming rules and especially design process***
 - Growing appreciation of the limitations of markets? eg. GFC
 - *However, emissions trading appears to be the key policy of choice for much of the developed world – at least in part, due to its ‘politics’*
IS THIS NOW CHANGING?

Proposed Carbon Pollution Reduction Scheme

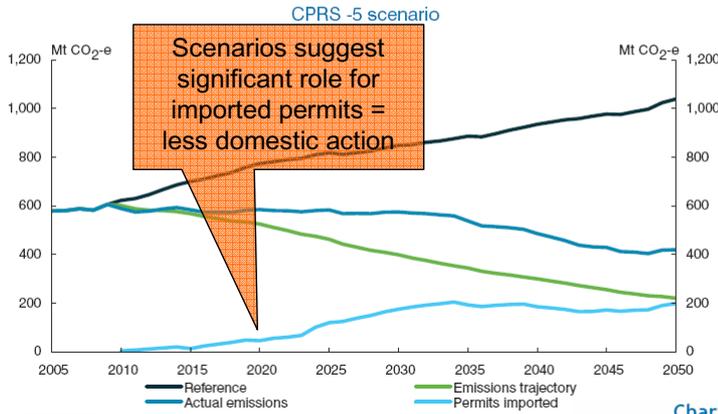
- Coverage
 - 6 Kyoto gases, approx. 75% national emissions
 - Around 1000 firms with mandatory obligations, otherwise upstream liability on liquid fuels and gas will see carbon price delivered through energy prices
 - Mandatory participation by all sectors other than Agriculture (coverage not before 2015), forestry (voluntary opt-in) and potentially some waste
- Unlimited use of some kyoto units including CDM
- Price caps (but not floors)
- Permit allocation
 - Free ‘administrative’ allocation to EITE and some other strategic (politically powerful) sectors
 - Otherwise auctioning
- Revenue from auctioning
 - ‘protect’ vulnerable consumers
 - support some sectors in achieving emission reductions

Australian Treasury modelling: National targets



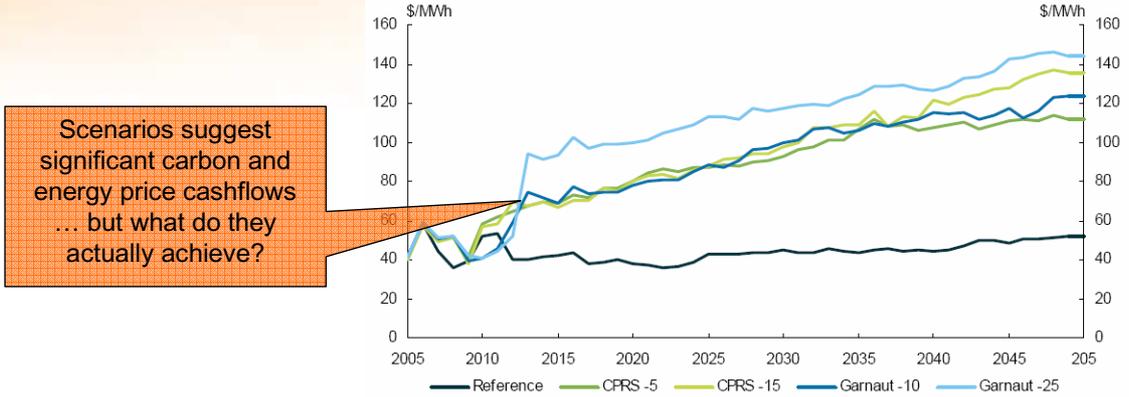
Scenario	Stabilisation goal (ppm)	Emissions change 2000 in 2020/2050 (%)
Reference	550	-5/-60
CPRS -5	510	-15/-60
CPRS -15	550	-10/-80
Garnaut -10	450	-25/-90
Garnaut -25		

Chart 3.6: Australia's trajectory, actual emissions and permit trade

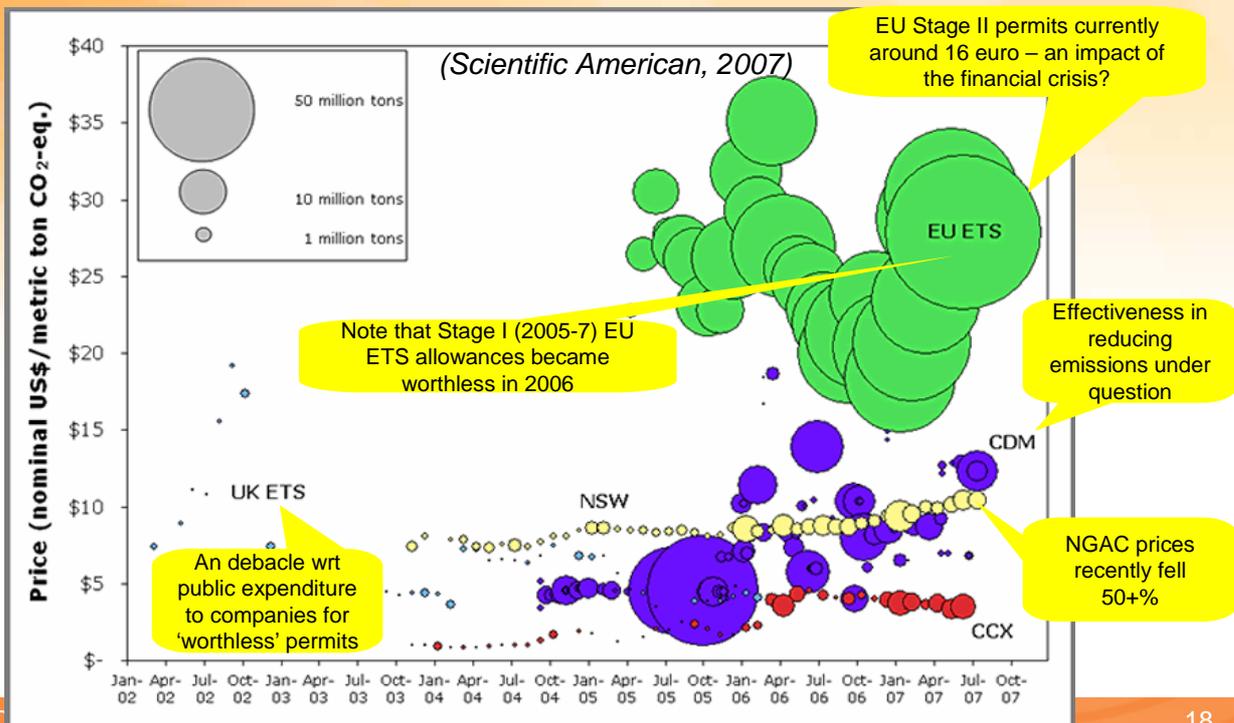


Treasury modelling: international permit trade, elec. prices

Chart 6.27: Average Australian wholesale electricity prices



Carbon market performance to date mixed



Current market status

(Ecosystem Market Place and New Carbon Finance, 2009)

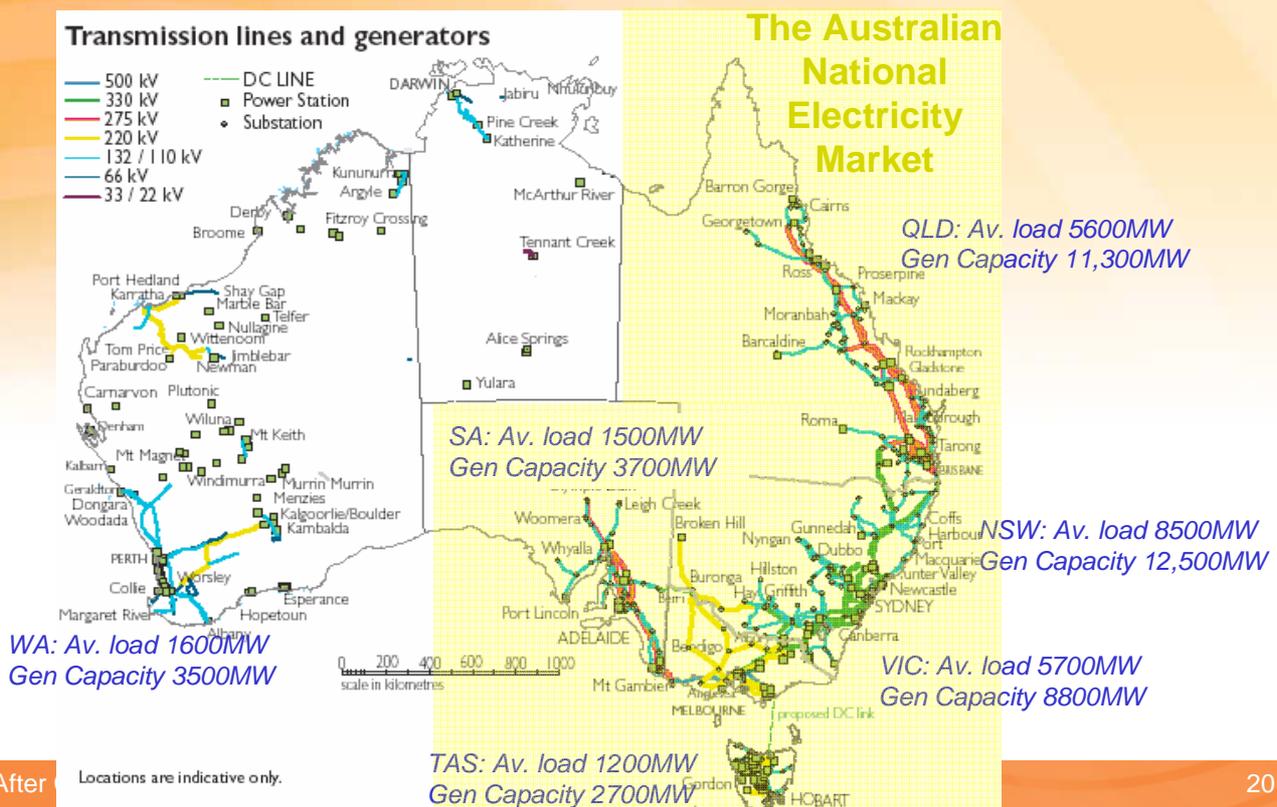
Transaction Volumes and Values, Global Carbon Market, 2007 and 2008

Markets	Volume (MtCO ₂ e)		Value (US\$ million)	
	2007	2008	2007	2008
Voluntary OTC	43.1	54.0	262.9	396.7
CCX	22.9	69.2	72.4	306.7
Other exchanges	0	0.2	0	1.3
Total Voluntary Markets	66.0	123.4	335.3	704.8
EU ETS	2,061.0	2,982.0	50,097.0	94,971.7
Primary CDM	551.0	400.3	7,426.0	6,118.2
Secondary CDM	240.0	622.4	5,451.0	15,584.5
Joint Implementation	41.0	8.0	499.0	2,339.8
Kyoto [AAU]	0.0	16.0	0.0	177.1
New South Wales	25.0	30.6	224.0	151.9
RGGI	-	27.4	-	108.9
Alberta's SGER ^(a)	1.5	3.3	13.7	31.3
Total Regulated Markets	2,919.5	4,090.0	63,710.7	119,483.4
Total Global Markets	2,985.5	4,213.5	64,046.0	120,188.2

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NEM: Our largest environmental (externalities) market



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NEM's large & growing emissions – it's about coal

(Australian figures – NEM has higher per-capita emissions & intensity)

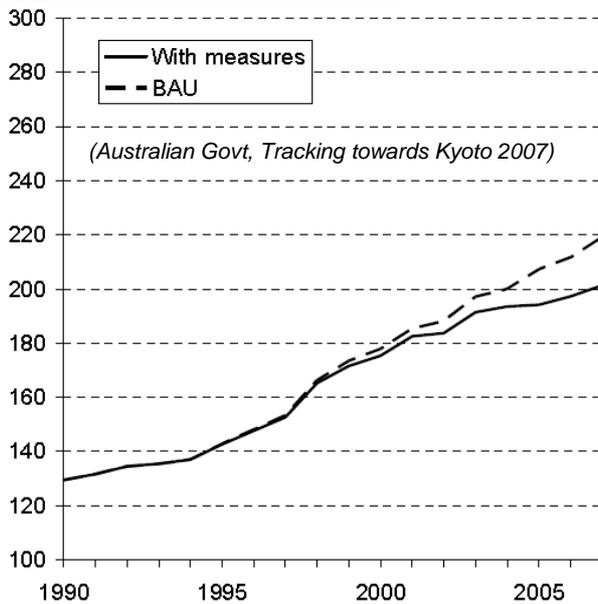


Figure 7.9 Per capita emissions due to electricity, 2005

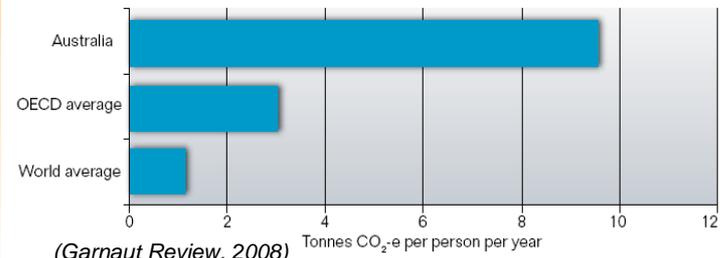
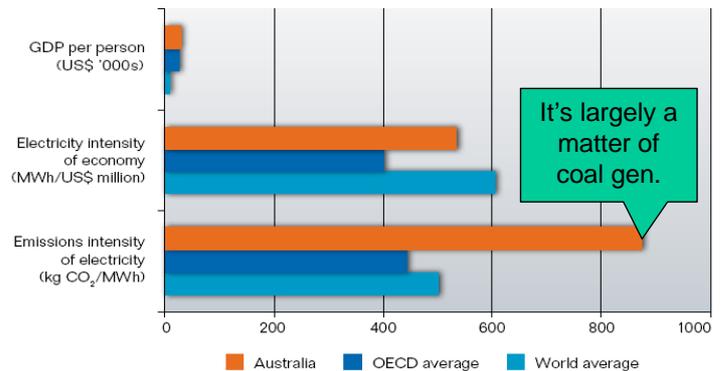


Figure 7.10 Factors underlying per capita electricity emissions, 2005



Source: IEA (2007a).

After Copenhagen: The Future of the Carbon Pollution

Possible CPRS impacts on electricity industry

- CPRS may drive little significant change to at least 2020
 - Proposed weak reduction targets, especially -5%
 - Proposed CPRS design with borrowing, price cap, unlimited use of international CDM credits, forestry opt-in, ongoing subsidies to large EITE, significant so-called 'compensation' to large electricity industry emitters subject to ongoing contribution to 'reliability', very limited targeted assistance to drive efficiency improvements or bring in low emission technologies, initial subsidies to offset fuel price increases...
 - Electricity Industry seen as the key sector for CPRS impact, however Government White Paper acknowledges CPRS unlikely to have major impacts to 2020 beyond changing new investment to lower emission options
 - Only limited opportunities for such investment if CPRS doesn't drive exit of high emitting activities and plants... will only drive exit if destroys value of large emitters – is there political will for this?

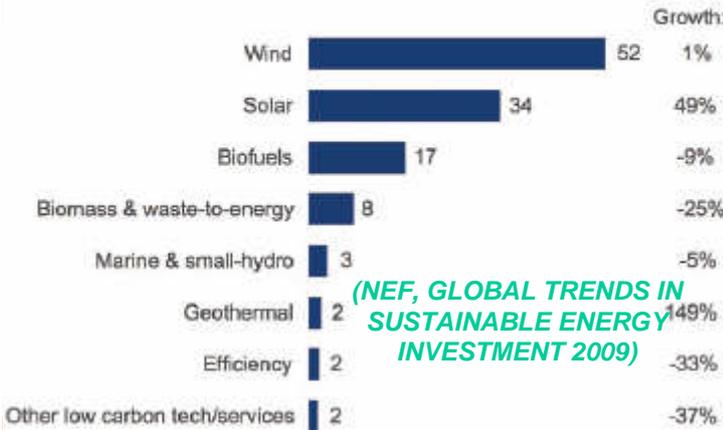


Meanwhile, renewable energy markets worldwide taking off... *will Australia be there?*

2008 was the first year that new power generation investment in renewables was greater than investment in fossil-fueled technologies



Figure 8: Financial new investment by technology, 2008, and growth on 2007, \$ billions



(NEF, GLOBAL TRENDS IN SUSTAINABLE ENERGY INVESTMENT 2009)

After Copenhagen: The Future of the Carbon Pollution Reduction

China launches green power revolution to catch up on west

- Plan to hit 20% renewable target by 2020
- \$30bn for low-carbon projects

[阅读中文](#) | [Read this in Chinese](#)

Julian Borger and Jonathan Watts in Beijing
The Guardian, Wednesday 10 June 2009



China's ambitious wind and solar plans represent a direct challenge to Europe's claims of world leadership on cutting carbon emissions. Photograph: Keren Su/Getty

China is planning a vast increase in its use of wind and solar power over the next decade and believes it can match Europe by 2020, producing a fifth of its energy needs from renewable sources, a senior Chinese official said yesterday.



Thank you... and questions

Many of our publications are available at:

www.ceem.unsw.edu.au