



Centre for Energy and
Environmental Markets

UNSW
THE UNIVERSITY OF NEW SOUTH WALES
SYDNEY • AUSTRALIA



Emissions trading scenarios for Australia

Dairy Manufacturers Sustainability Council Meeting

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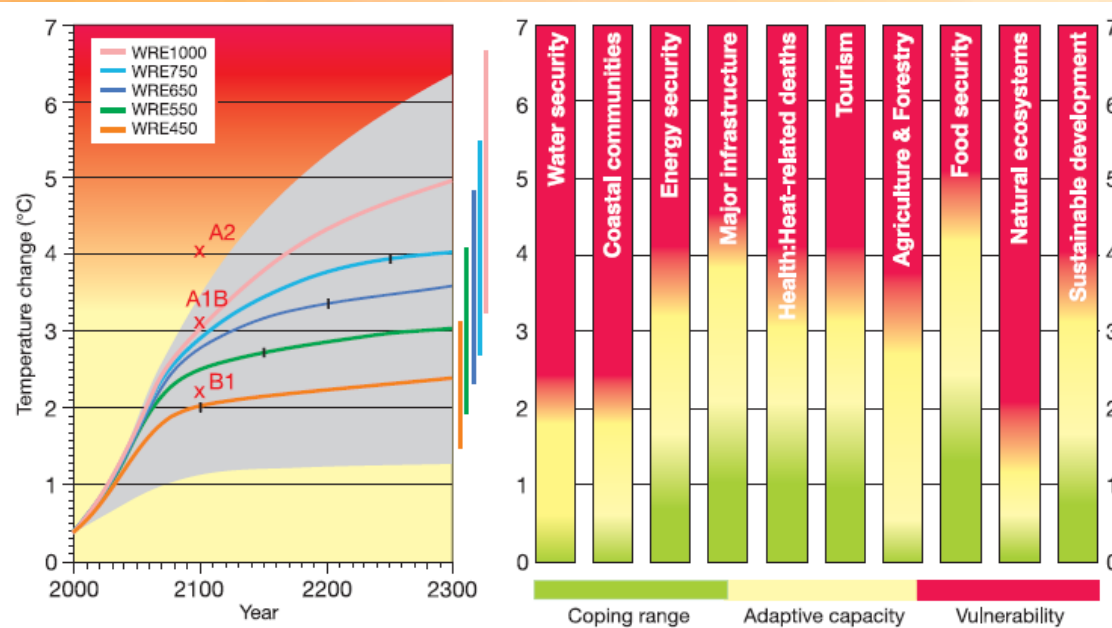
Sydney, April 2008

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The evolving climate change context

Australian/NZ assessed climate vulnerabilities



Increasingly likely that IPCC FAR significantly under-estimates emission reductions required to avoid dangerous tipping points (eg. Hansen, 2008)

<u>Phenomenon</u>	<u>Target CO₂ (ppm)</u>
1. Arctic Sea Ice	300-325
2. Ice Sheets/Sea Level	300-350
3. Shifting Climatic Zones	300-350
4. Alpine Water Supplies	300-350
5. Avoid Ocean Acidification	300-350

→ Initial Target CO₂ = 350* ppm

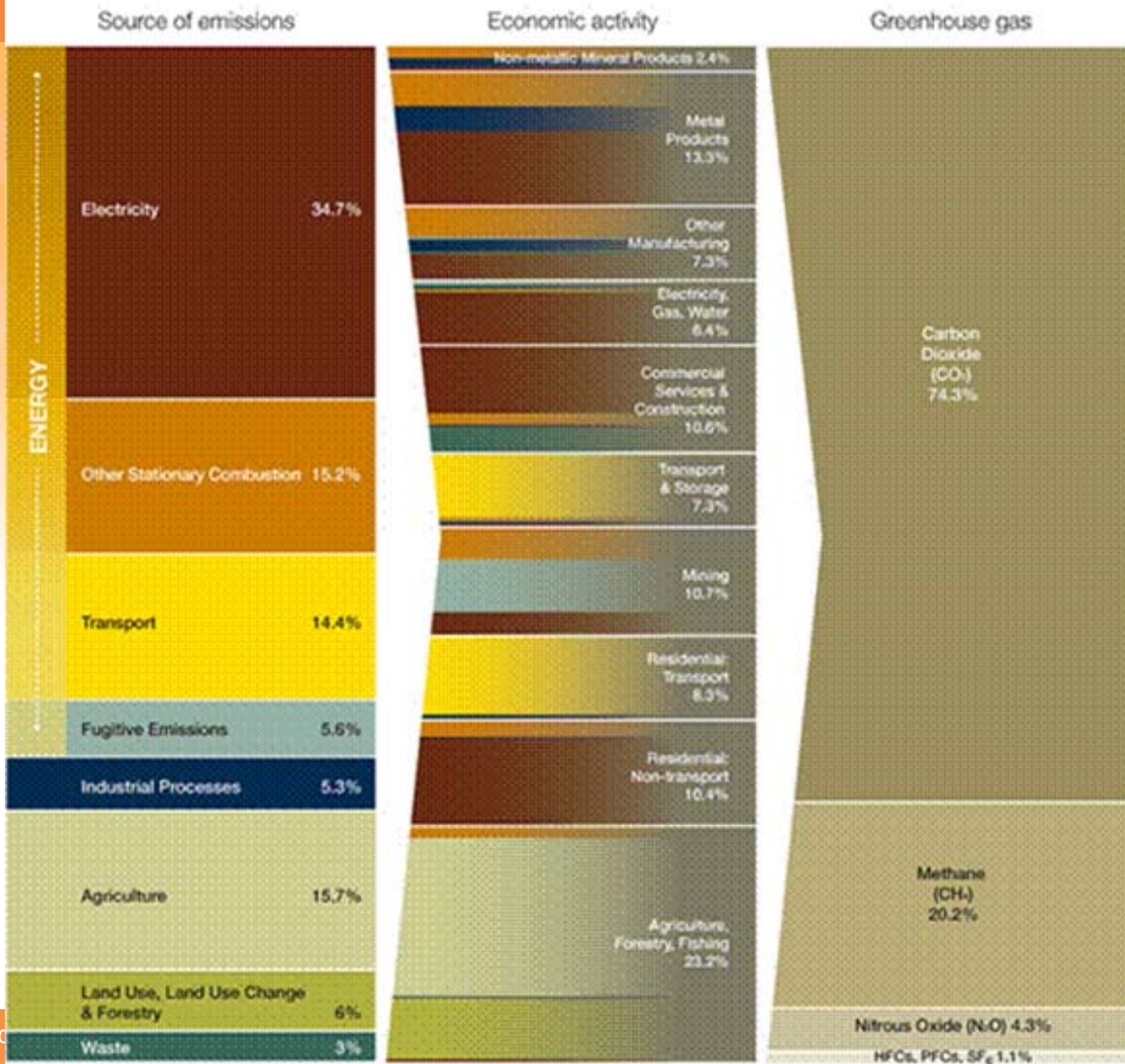
*assumes CH₄, O₃, Black Soot decrease

1.5: Characteristics of post-TAR stabilization scenarios [Table TS 2, 3.10]^{a)}

Radiative Forcing	CO ₂ Concentration ^{c)}	CO ₂ -eq Concentration ^{c)}	Global mean temperature increase above pre-industrial at equilibrium, using "best estimate" climate sensitivity ^{b), c)}	Peaking year for CO ₂ emissions ^{d)}	Change in global CO ₂ emissions in 2050 (% of 2000 emissions) ^{d)}
(W/m ²)	(ppm)	(ppm)	(°C)	(year)	(%)
2.5 – 3.0	350 – 400	445 – 490	2.0 – 2.4	2000 - 2015	-85 to -50
3.0 – 3.5	400 – 440	490 – 535	2.4 – 2.8	2000 - 2020	-60 to -30
3.5 – 4.0	440 – 485	535 – 590	2.8 – 3.2	2010 - 2030	-30 to +5



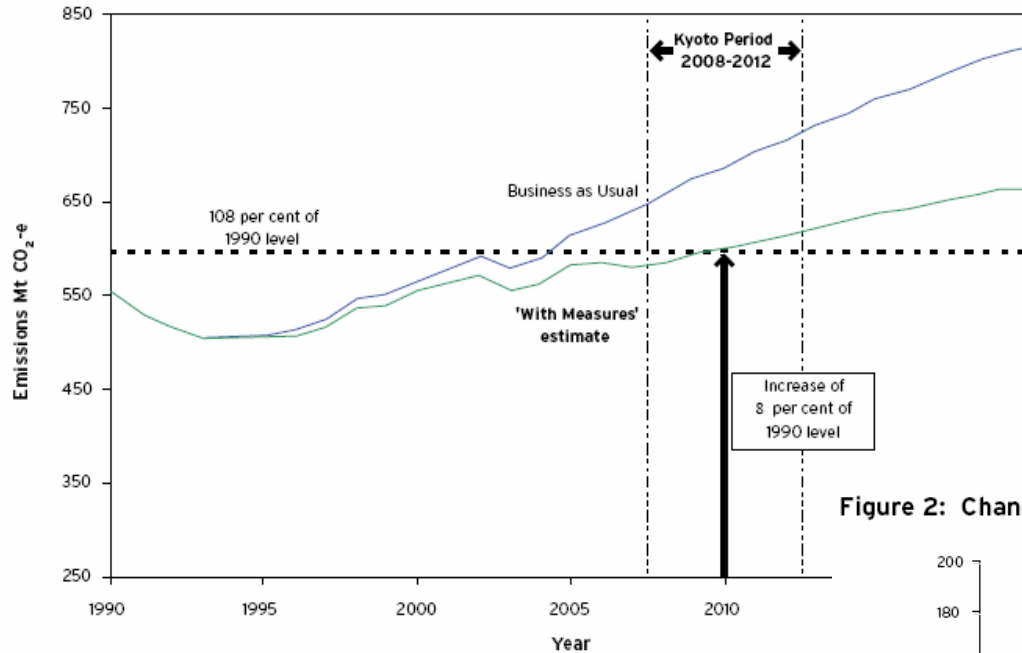
Allocation of greenhouse gas emissions by source, economic activity and greenhouse gas, Australia, 2005





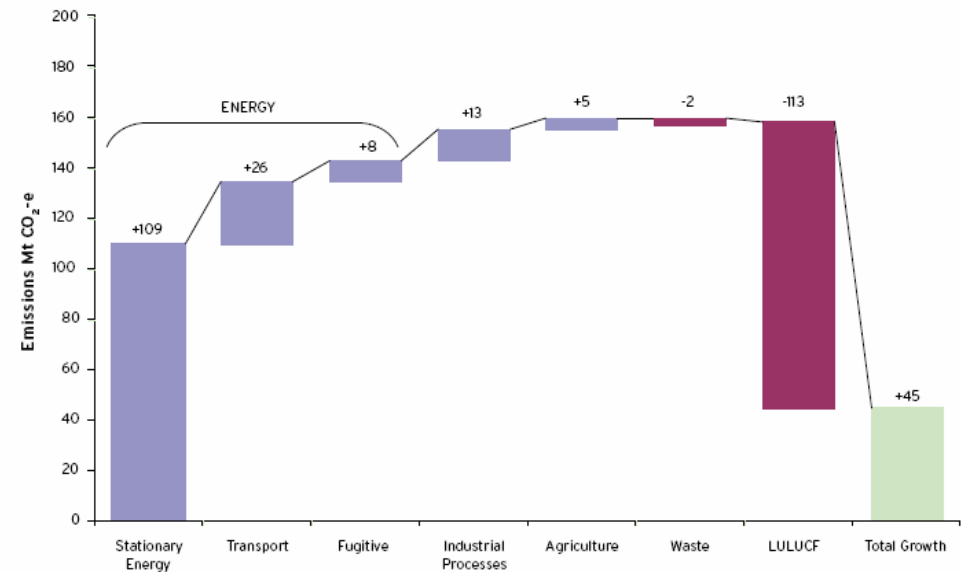
A challenging context for climate policy

Figure 1: 'Business as Usual' and 'With Measures' emissions estimates



- Energy-related emissions expected to grow +50% despite policy efforts
- Agriculture emissions expected to grow +6% with almost no current policy measures

Figure 2: Change in emissions by sector: 1990 to 2008-12





Emissions Trading

- Set a cap on emissions and then allow trade of permits between emitters who will buy and sell according to their benefits and costs of emitting
 - In theory, assuming idealised markets, the only policy required
 - In practice, may play useful role within comprehensive policy framework
- Key design questions:
 - What gets priced?
 - How much?
 - Why pays and to whom?
 - Integration within a coherent policy framework?
- Assessment criteria
 - Environmentally effective?
 - eg. low target, poor measurability, inappropriate offsets
 - Economically efficient?
 - eg. low target, high overheads, poor investment signals
 - Equitable?
 - eg. Grandfathering favoring incumbents, transition strategies



Australian moves to ETS

- 1999: AGO efforts including 4 discussion papers
- 2002: CoAG Energy Market Review – calls for ETS
- 2003: NSW GGAS commences
 - Also, “At a cabinet meeting last Tuesday, the Prime Minister, John Howard, is said to have rejected advice from Treasury and the Department of Environment to establish a national carbon trading system.” *SMH*, 1/9/2003
- 2004: State and Territory governments NETT process
 - Discussion paper in 2006 with design proposals
- 2007: PM Taskgroup report
 - Scheme design proposals largely based on NETT outcomes
 - Garnaut Review initiated by State Governments & Federal Opposition
- 2008: New Federal Govt commitment to introduce ETS in 2010
 - Current processes include reporting, incentives for pre-ETS abatement
 - Garnaut outputs an ‘input’ into Government decision making
 - ETS design proposal due mid 2008, draft exposure bill end 2008



What to price?

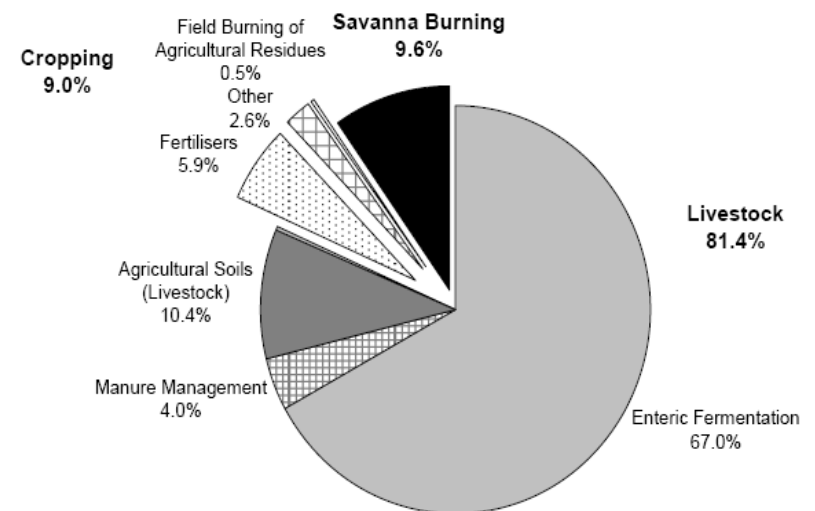
- Range of greenhouse gases from range of activities
- Can only properly price what you can measure
- Greater coverage likely to offer higher efficiency in finding lowest cost abatement
- *Proposed Coverage Penny Wong, 01/2008*
 - “.. wide agreement that over 70 % of national emissions can be practically covered by ET and we will proceed towards scheme design on this basis. We will consult with the agriculture and forestry sectors on question of their inclusion in the system and timeframe for that inclusion.”
- *Large emitters will participate directly, smaller emitters through upstream (fuel supply) providers*
- *Unclear what role for domestic offset projects – measureability still an issue*

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%. (Australian Govt, 2005)

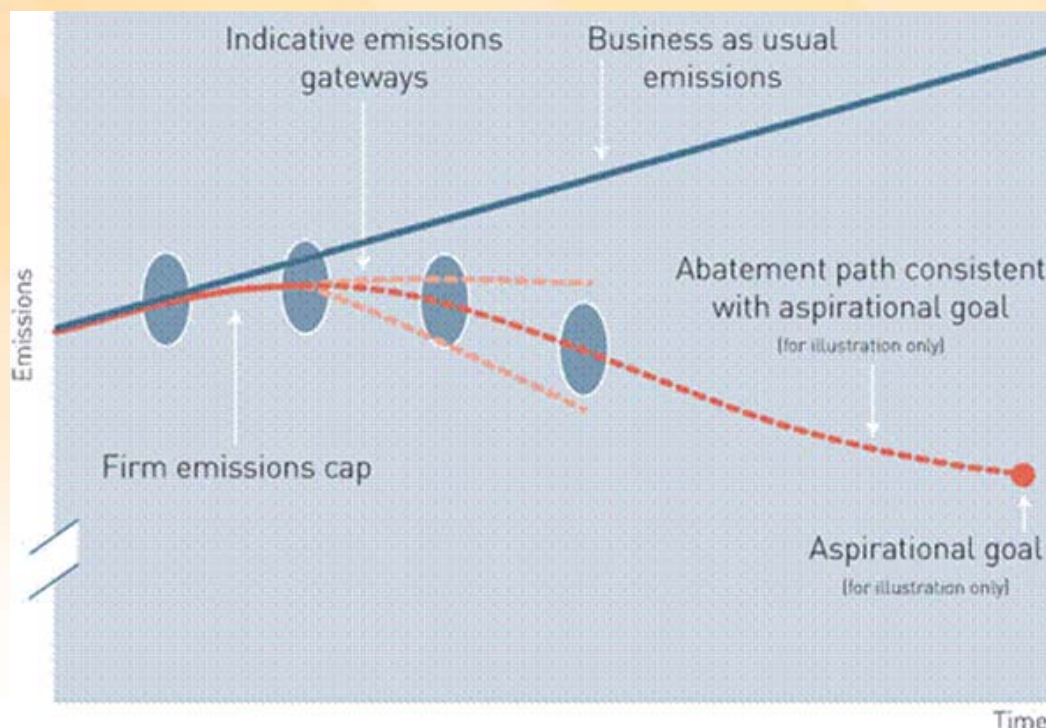
The estimated uncertainty surrounding the aggregate inventory estimate for 2003 is ±5%.

Figure 1.1 Components of agriculture emissions, 2005 NGGI



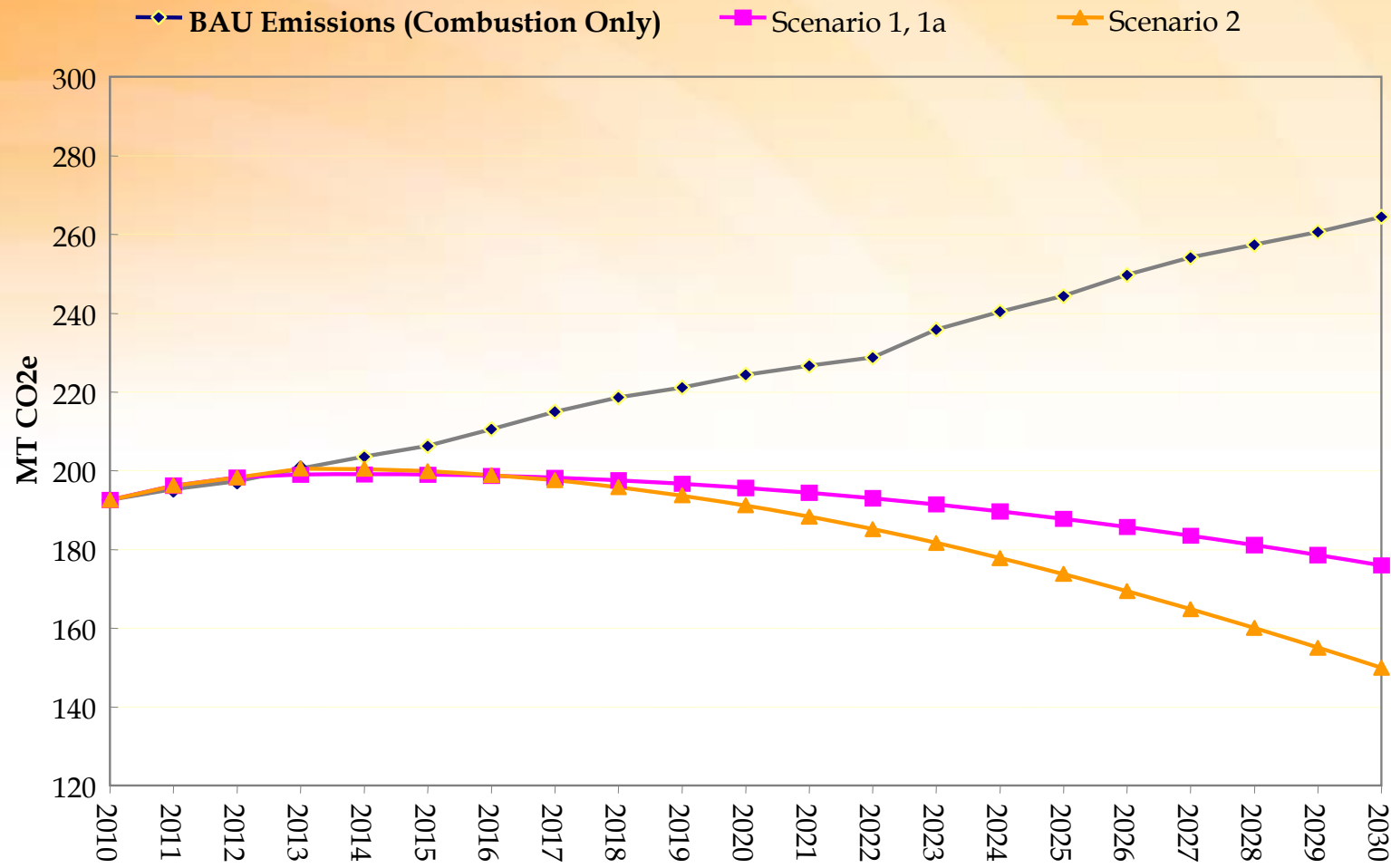
How much?

- In theory set price
 - where additional mitigation = social cost of carbon
- However, in practice
 - Dynamics + uncertainties
 - National schemes within incoherent international context
- Instead
 - Set emissions cap and allow market to set price **w.r.t. emission caps, covered sectors, possible price caps, allowable offsets...**
- *PM Task Group*
 - *Modest short-term caps allowing some emissions growth & medium-term gateways, low early price cap, maximum possible offsets*
- *Garnaut Review*
 - *Multiple possible caps including major 2020 emission reduction scenario, no price cap, unlimited domestic offsets'*



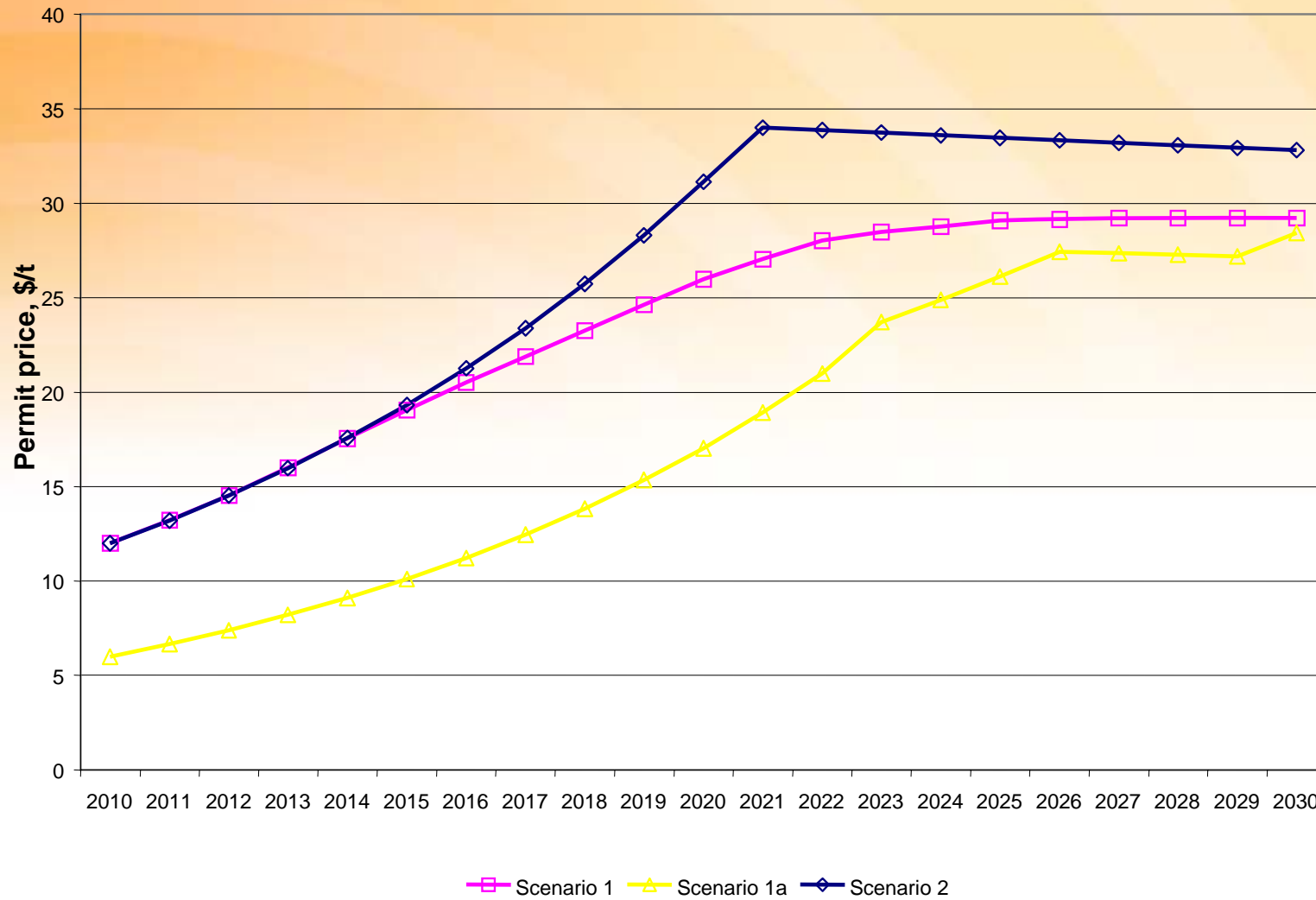


NETTS design proposal: Indicative caps for electricity sector



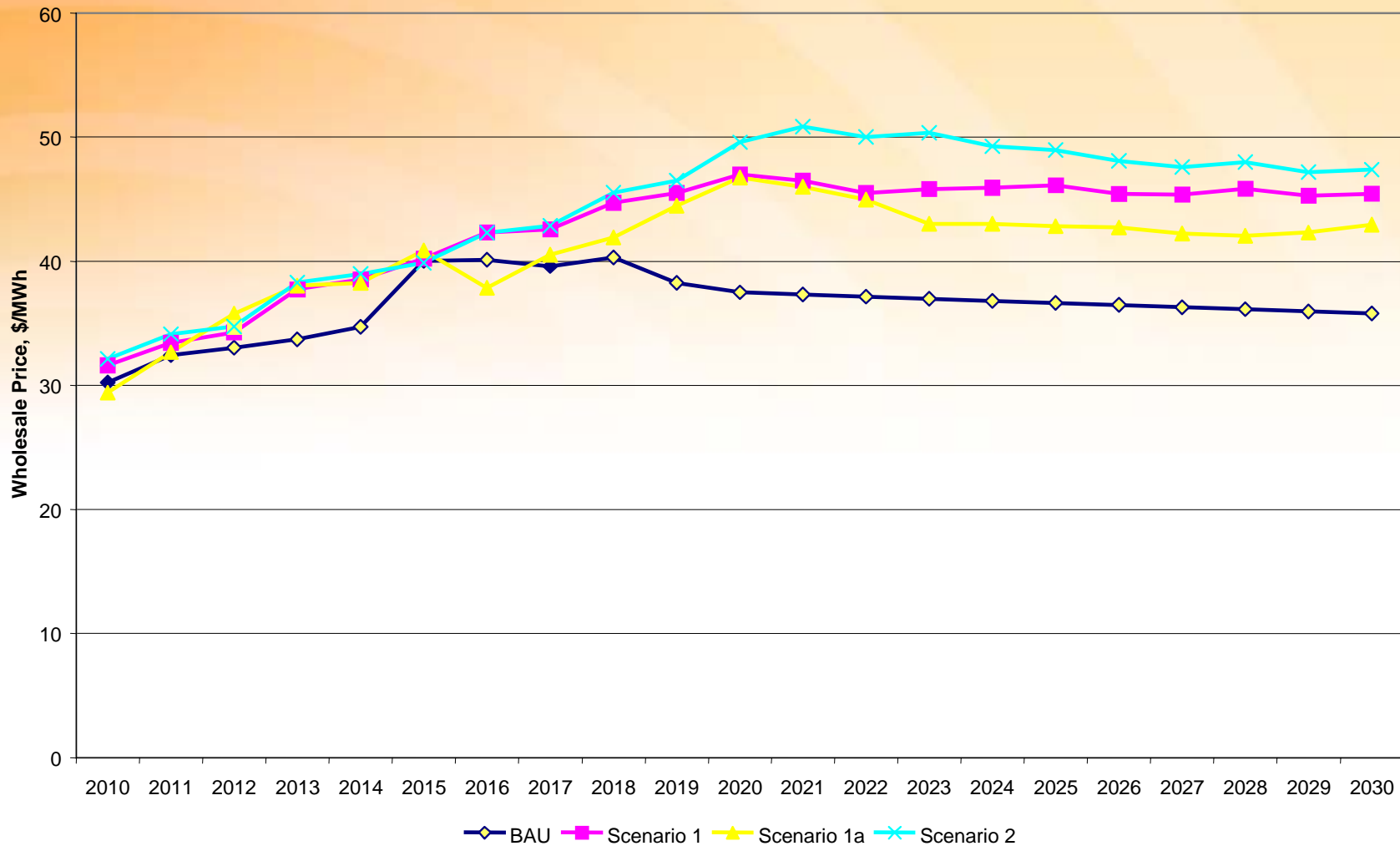


Estimated permit prices

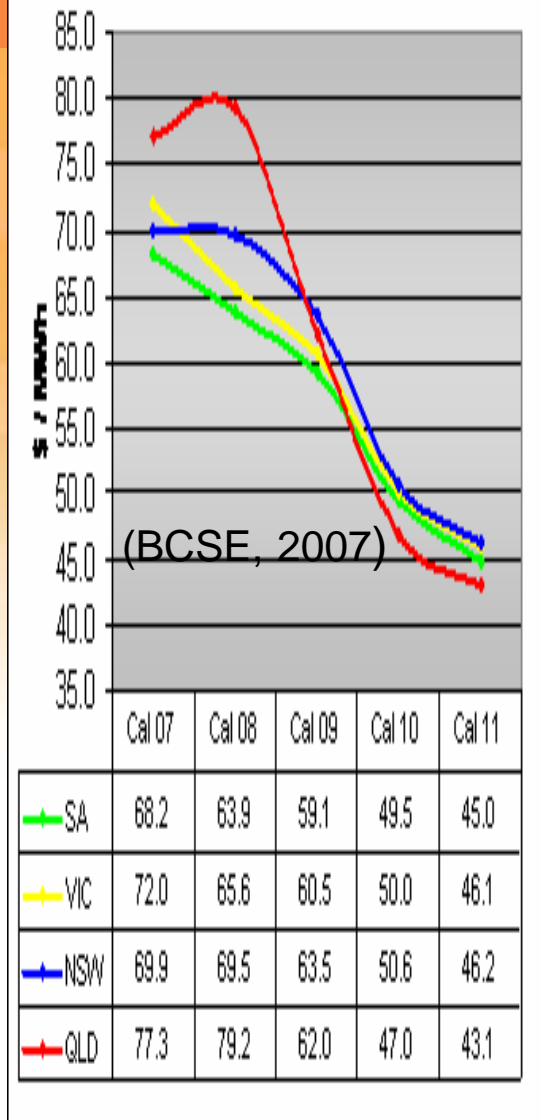




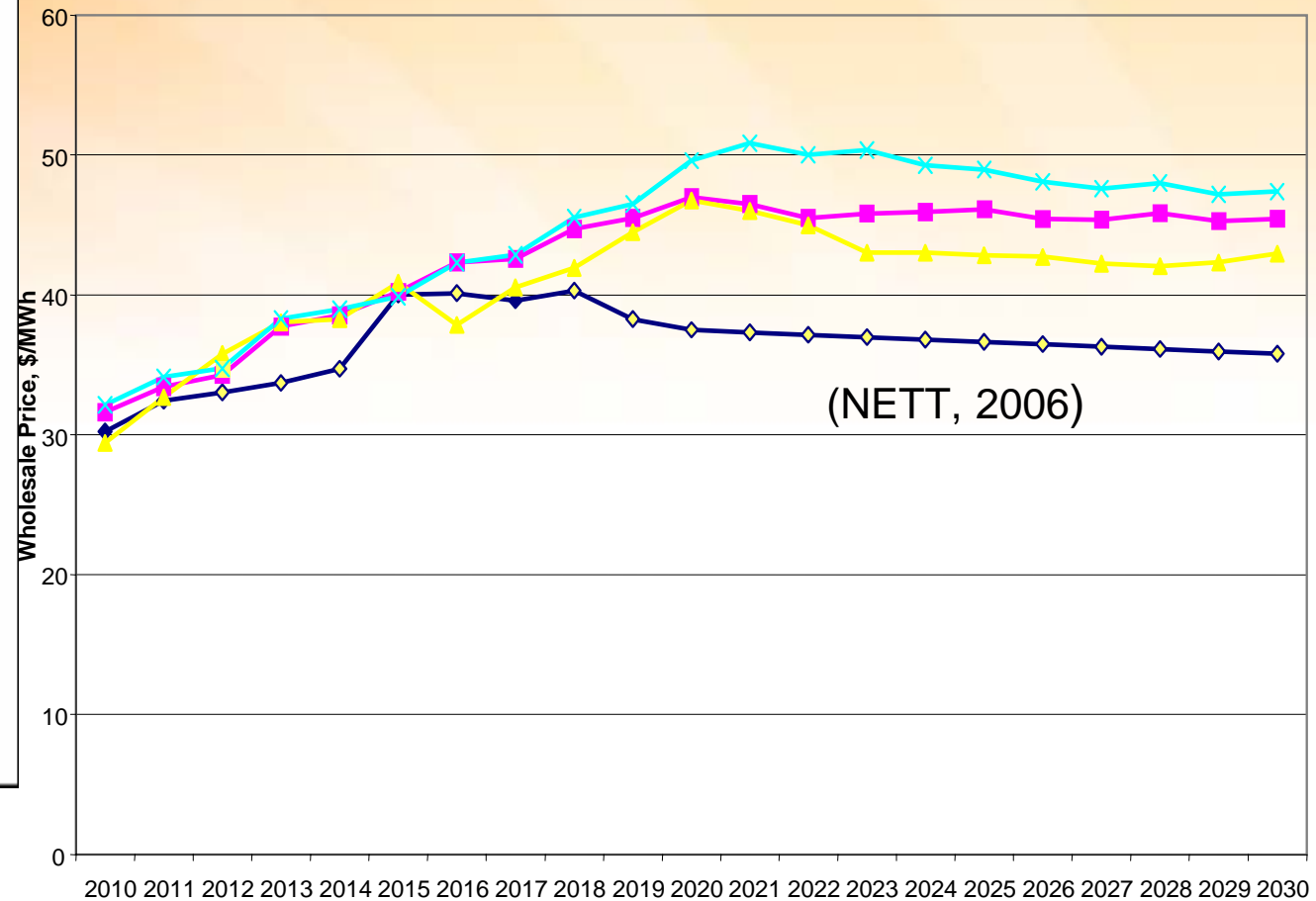
Estimated impacts: Wholesale prices (NEM)



Forward (Flat) contract prices



Most modelling not particularly helpful





Who pays whom?

- Two approaches for externalities
 - Beneficiary pays or ‘polluter pays’
 - Theory + experience support ‘polluter pays’
- ETS schemes to date have unreasonable focus on ‘polluter gets paid’ via free permit allocation to large emitters + energy intensive industry
 - Aid structural adjustment? **X** (goes to shareholders)
 - Reduce price impacts? **X** (prices passed through anyway)
 - Compensation for loss of value? **X** (very weak case as carbon risk should already be priced into shares / govt ownership)
 - International trade competitiveness? **?** (in some circumstances) (Hatfield Dodds, 2006)
 - **Stakeholder clout!**
- 100% auctioning is efficient, equitable, automatically deals with incentives for early action, provides revenue to support vulnerable parties within society, aid economic transition to low-carbon future
- A case for supporting TEEI industries may exist where
 - industry is particularly emissions intensive
 - industry is particularly trade exposed
 - this trade exposure is in particular to competition from countries with no emissions caps or related policies imposing carbon price on industry, and which don’t have inherently lower emissions intensity of production
 - These conditions also may apply to some industries supplying the domestic market if they face competition from imports



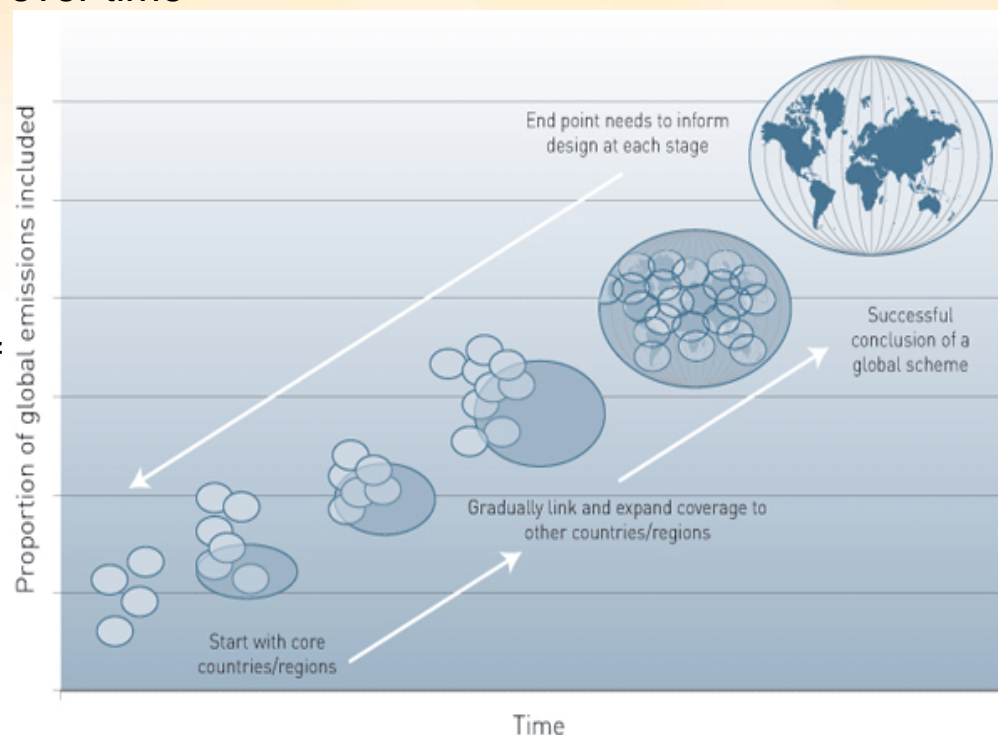
Allocation proposals

- PM Taskgroup
 - One-off up-front compensation for ‘disproportionate burden’ on emitters
 - However, requires contestable + untestable modelling wrt economy-wide impacts, firm impacts, value of permits over time
 - Ongoing free permits to cover carbon costs for existing and new TEEI
- Garnaut Review
 - All permits auctioned (some may be used in lieu of cash in providing transitional assistance to TEEI firms at risk)
- Federal Government
 - “In addressing competitiveness concerns during this phase, attention will also need to be paid to ensuring that incentives remain for these industries to adjust their emissions profiles consistent with an emerging global carbon constraint. The Government recognises that not only emissions-intensive trade-exposed industries would be affected by a carbon price. The scheme will also address the impact on strongly affected industries. Finally, measures will be developed to assist households – particularly low income households – to adjust to the impact of carbon prices.” Wong (2008)



Possible ETS linkages

- Offers potential efficiency advantages and reduced market power however risks to environmental integrity depending on linked schemes
- Unilateral & bilateral approaches both possible
- PM taskgroup approach - 'evolving' a global ETS
 - Developed countries taking lead with domestic ETS while providing international project 'credit' linkages + expanding coverage over time
- Federal Government
 - "Kyoto opens range of carbon trading opportunities for Australian businesses, and links us to \$billion international market. ETS gives us much greater capacity to add momentum to global carbon market. Design needs to balance desirability of international linking with need to meet Australian objectives, particularly in early stages." Wong (2008)
- Garnaut Review
 - Direct limited links to CDM, explore options for linkage with NZ, PNG & Indonesia, EU, later opportunities with North America and high-income Asia





ETS role in coherent climate + energy policy framework

- PM Task group
 - Complementary R&D&Demonstration & Energy Efficiency policy needs, however, end MRET
- Federal Govt: ETS proposed to form part of broader suite of programs designed to reduce GHG emissions + operated at Federal & State levels.
 - Adopt **Mandatory Renewables Target** of 20% by 2020, 45,000GWh. Target to be phased out 2020-2030
 - \$500M **Renewable Energy Fund** intended to develop, commercialise and deploy renewable energy.
 - Establish \$90M **Green Building Fund** for 50% of the cost of retrofitting commercial buildings.
 - Drive **efficiency gains in national commercial building standards**. Require **disclosure of energy /env ratings** at point of sale/lease.
 - Establish \$75M **Climate Ready Program** to support development and commercialisation of clean, green technologies.
 - Develop \$150M **Energy Innovation Fund** for early stage research into solar thermal, PV, energy efficiency, energy storage & H2.
 - Invest \$500M under **National Clean Coal Fund** to finance deployment of clean coal technologies. (Energetics, Dec. 2007)
- Garnaut Review
 - Highlights need for complementary R&D and Demonstration and supply-side infrastructure policy support



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