Centre for Energy and Environmental Markets

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Carbon pricing: context, Australian experience + prospects

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Protecting the climate – what will it take?

- Environmental effectiveness
  - Impact risks grow rapidly with temperature rise
- Cost effectiveness
  - wrt adaptation + mitigation… many uncertainties
- Equity
  - Australia's per-capita emissions 2X developed world av.

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

(FAR WGIII, 2007)

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

Demands a coherent policy framework

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

(Grubb, 2006)

What policy role can carbon pricing play?

- In theory, assuming idealised markets,
  - All that is required
  - any additional climate change policies beyond ETS can only increase the costs while not changing its environmental effectiveness
- In practice, carbon pricing + energy markets they interact with
  - 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

=> Carbon pricing necessary but not sufficient

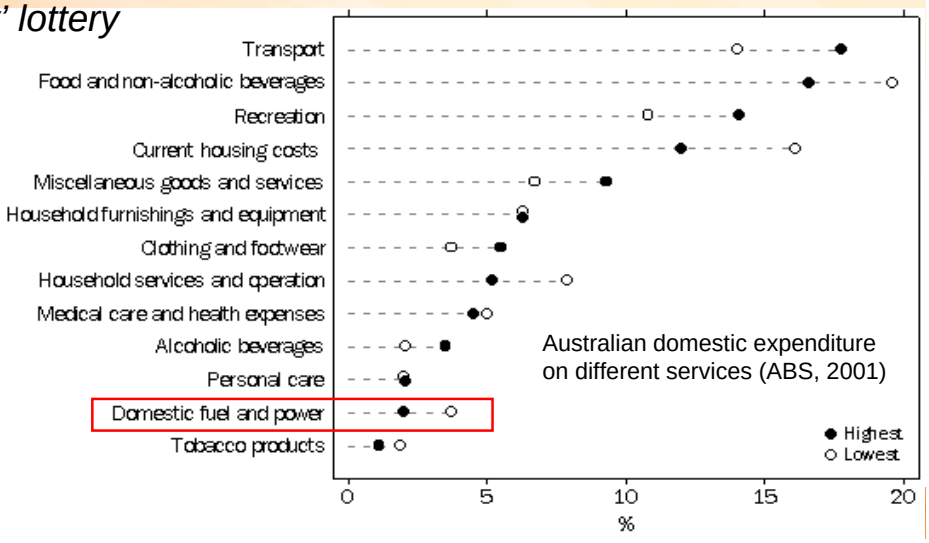
Other policies will be required

- *Regulation + behavioural*
- *Innovation*

..but necessary, especially wrt fossil fuels

low direct but high external costs…

For the 'golden billion(s)', never have so many had so much energy so cheaply
finding fossil fuels equivalent to winning the 'energy' lottery



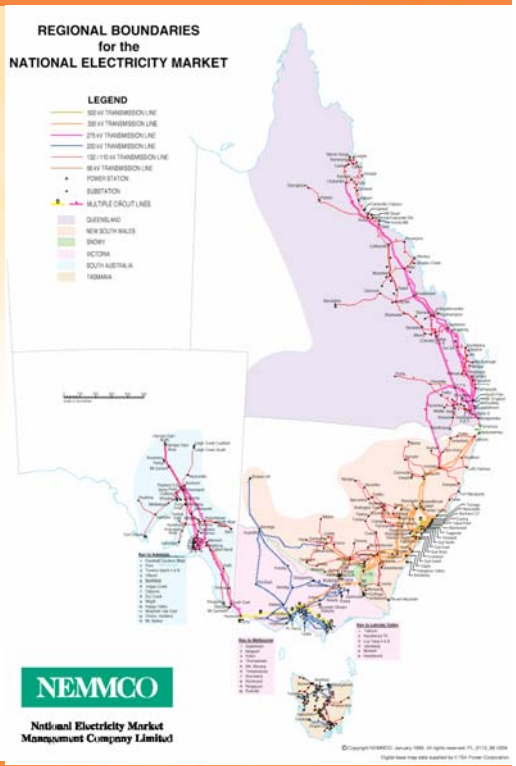
What now for prices…

- Global energy security concerns grow
  - …but unlikely to run out of fossil fuels for some time
    - at least while energy wealth remains concentrated amongst rich
- Climate change the real driver away from BAU
  - Current prices wrt CO2 emissions variable but generally low
    - US$60/Barrel oil => ~400kgCO2 = ~$150/tCO2 emitted
    - US$50/t Coal => ~2.5tCO2 = ~$20/tCO2 emitted
    - US$3/GJ Gas => ~50kgCO2 = ~$60/tCO2 emitted
  - A useful role for pricing current emission externalities, **but**:
    - What gets priced?
    - How much?
    - Why pays and to whom?
    - How implemented?

Some Australian lessons for institutional arrangements, governance + regulation?

- Assess performance to date, consider future performance of existing schemes
  - effectiveness – *objective achieved?*
  - efficiency – *at least cost (dynamic efficiency the most important)*
  - Equity – *fairness, impacts on other societal objectives*
- Reasons for this performance
  - **design:** the rules *(regulation + governance)*
  - **design process:** for making the rules *(governance, institutional arrangements)*

NEM - Australia's largest environmental market



Australian energy policy

- COAG has agreed to the following national energy policy objectives: (COAG ENERGY POLICY DETAILS: 8 JUNE 2001)
  - Encouraging efficient provision of reliable, competitively-priced energy services to Australians, underpinning wealth and job creation and improved quality of life, taking into account the needs of regional, rural and remote areas;
  - Encouraging responsible development of Australia's energy resources, technology and expertise, their efficient use by industries and households and their exploitation in export markets; and
  - **Mitigating local and global environmental impacts, notably greenhouse impacts, of energy production, transformation, supply and use.**

National Electricity Law: *Overall objective for the National Electricity Market (NEM)*

- *NEL Section 7:*
  - *The national electricity market objective is to promote efficient investment in, and efficient use of, electricity services for the long term interests of consumers of electricity with respect to price, quality, reliability and security of supply of electricity and the reliability, safety and security of the national electricity system*
- *Where are the environmental objectives?*

Perhaps not required? …or done elsewhere?

- NEM widely considered to have been successful wrt economic efficiency + energy security
- Expectation by some that Australian Electricity Industry restructuring would also help reduce emissions (14 MtCO2 reduction from BAU in 2010):
  (Commonwealth Govt, *Climate Change: 2nd Communication to IPCC,* 1997)
  - Efficient competition in supply by cogen + renews
  - More sensible patterns of energy use through incentives for investment in EE
  - Greater penetration of natural gas

In practice?

- Instead, later projections that it has increased emissions from BAU (0.1MtCO2 above BAU (CoAG, 2002)
  - Low cost of coal fired generation in Australia
  - Excess electricity capacity that has depressed prices
  - Relatively immature and inflexible gas market
  - Reduced emphasis on EE from lower prices
  - Market design and regulation that favours incumbents (eg. advantages coal against new entrants like DG)
  - Supply-side orientation of reforms to date
  - ***Failure to price greenhouse emissions elsewhere in policy framework***

Mandatory Renewable Energy Target

Renewable Energy (Electricity) Act 2000

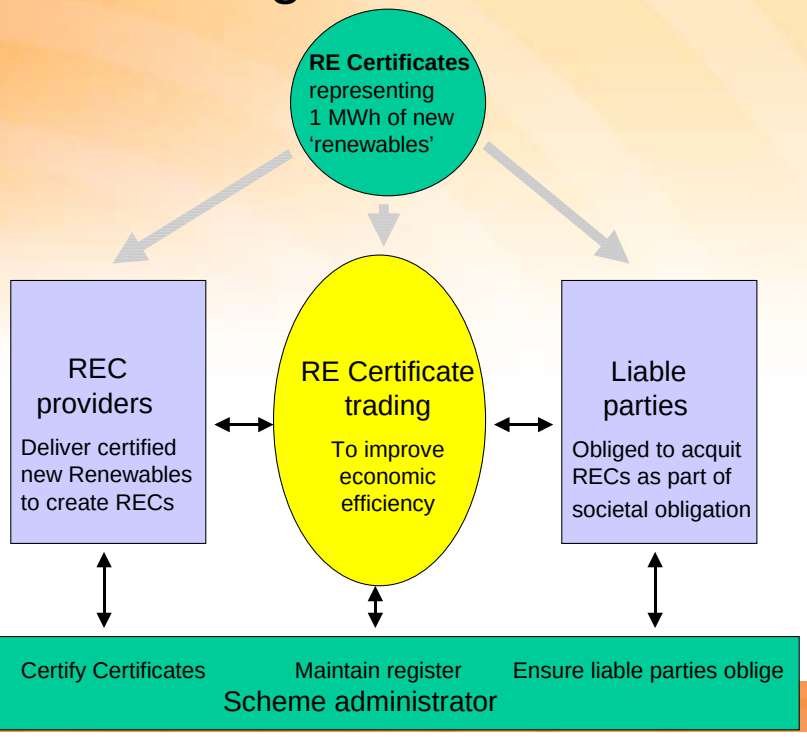
The objects of this Act are:

(a) to encourage the additional generation of electricity from renewable sources; and

(b) to reduce emissions of greenhouse gases; and

(c) to ensure that renewable energy sources are ecologically sustainable.

MRET – a 'designer' env. market



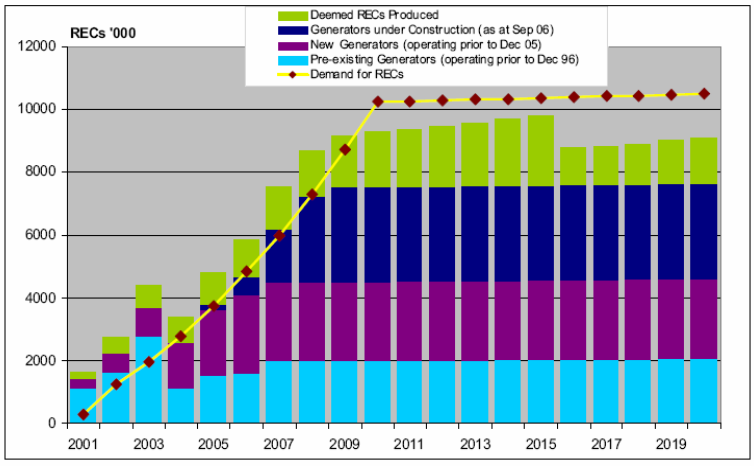
MRET performance – the good

- Ramping target easily met
- Considerable new investment
- Apparent efficiency – highly competitive RECs market with low project costs by international standards
  - Most cashflow going to appropriate 'new' renewables
- Technology flexibility has proved valuable
  - eg. wind vs biomass
- Facilitates integration of renewables into NEM
  - Project developers see locational, temporal energy market signals as well as renewable MWh support
- Costs moderate+ reasonably well-shared amongst end-users
  - High transparency on REC prices
- **However, some challenges**

Some issues

- Windfall profits due to poor baselines for old-hydro
- Target now likely to be far less than 2% new renewables
- Boom + bust investment cycle
- Poor disclosure of REC creation (didn't have to register within time limit)
- Considerable regulatory uncertainty during formal review processes

Figure 2.6 - RECs available to meet Demand (without new Project Commitments)



An example of process failure?

- Old hydro baselines in MRET Issues Paper (RTWG, 1998)
  - "stated intent of measure to encourage new renewables additional to existing renewable generation but important not to discriminate against increased output from existing renewables"
- Final RTWG report unable to form consensus. Instead, 3 options
  - i) don't include any renewable energy projects operating before 1997
  - ii) provide regulator with discretion to decide
  - iii) existing generators eligible for RECs for their production above *specific target equal to x per cent of their baseline energy output averaged over an appropriate time frame with 'x' determined through the political process*.
- Those in favour
  - i) Federal Govt. + Western Australia
  - ii) Queensland
  - iii) Tasmania
- Final decision: **iii**. ***A failure of governance***

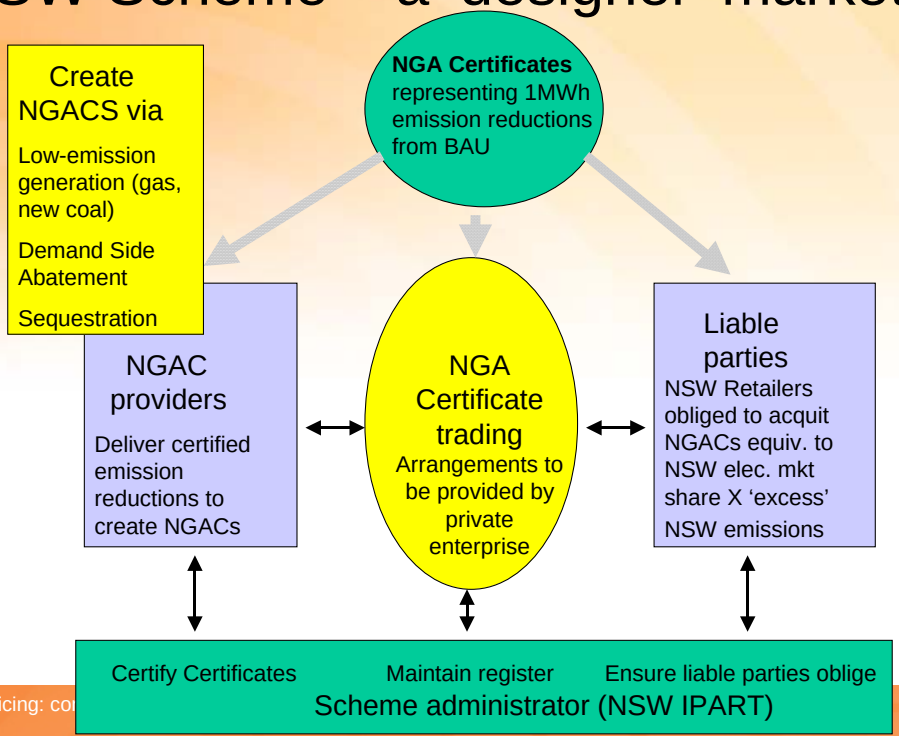
VRET, NRET….

- More significant targets so greater price impacts
  - However still likely to be modest for energy users
  - Particularly given other cost drivers including network expenditure, drought…
- Potential to improve designs over MRET
  - better baselines + less windfall profits
  - *Key equity question:* will all energy users be contributing to pay for these renewables?

NSW Greenhouse Scheme

- Policy intent
  - "reduce greenhouse gas emissions associated with the production and use of electricity..."
    (Overview to the Electricity Supply Amendment Bill, 2002)
- Implementation
  - State per-capita greenhouse gas emissions targets for the NSW Electricity Industry via Retailer Licence Conditions
    (NSW Electricity Supply Act, 1995)
  - Baseline+credit 'emissions reductions' trading

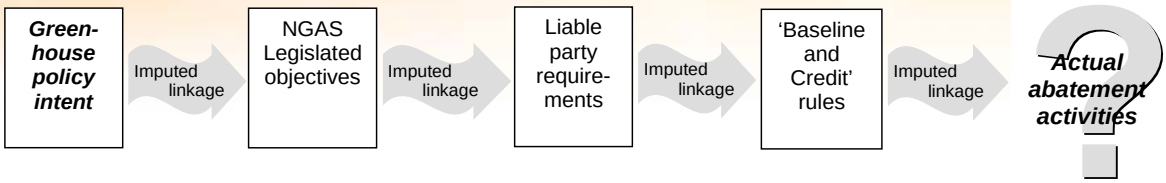
NSW Scheme – a 'designer' market



Environmental performance - abstraction

- Schemes can physical caps targets (similar to 'cap and trade' with grandfathering)

  …or more abstracted ones (eg. NSW GAS)



Environmental performance – fungibility?

- *"Greenhouse tonnes ain't greenhouse tonnes"*

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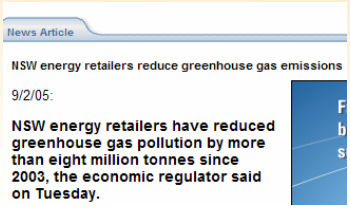


Physical, measurable emissions from fossil-fuel consumption

Estimated net CO2 fluxes from select ecosystems

Hypothetical estimates of emission reductions from counter-factual BAU baselines

Environmental performance - baselines

- Q – What's the easiest way to save?
- A – By spending!
  - "By some kind of financial alchemy – saving has become something we do while we're spending"
    - Ross Gittins, quoting Hamilton and Denniss, *Affluenza*

- *And the easiest way to save greenhouse emissions?*

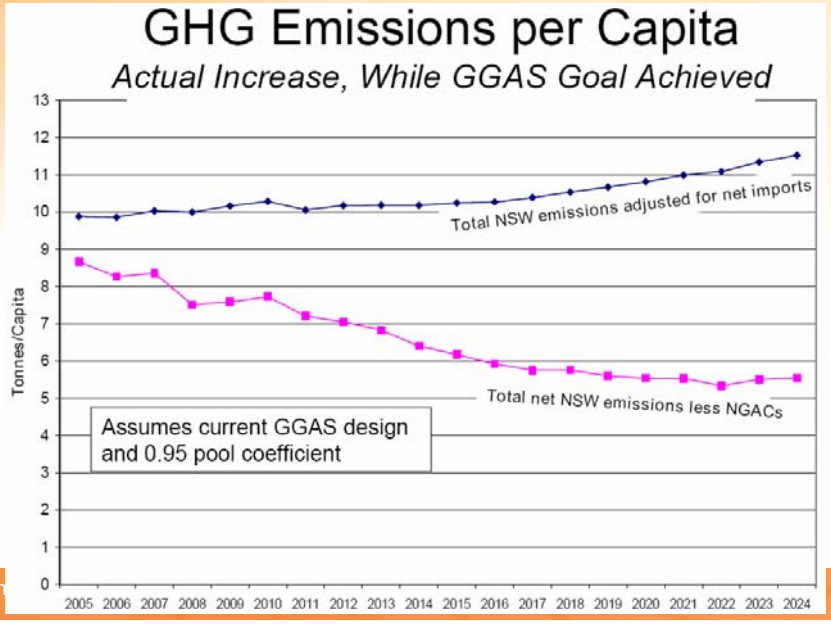
Example: Hazelwood Power Station

- "Hazelwood is spewing out an astonishing **1.58 Mega tonnes of carbon per TWh (over 17 Mt/a)** and is the **most polluting** of the major coal-fired power stations WWF has come across in the OECD, and possibly the world!
- Not only is it the most polluting power station we've been able to find, but it's actually getting worse. A recent study found that between 1998-2004 Hazelwood's emissions intensity trend increased 2.7%..."

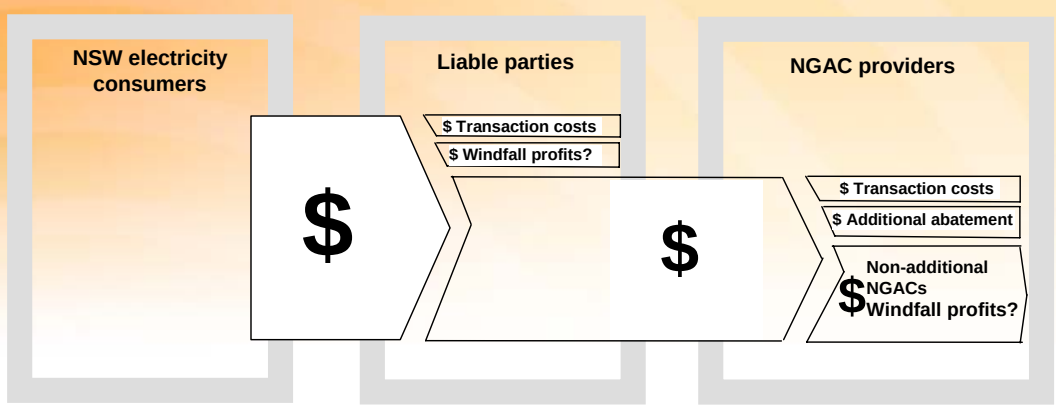
- Hazelwood also accredited abatement certificate provider under NSW GAS + earned 250,000 NGACs in 2003
  - (through actions undertaken through *Generator Efficiency Standards*)

Environmental effectiveness?

- Example: A scenario of NSW GAS performance to 2025 (Nemtzow, NSW Power and Gas Conference, 2005)



Efficiency + equity?



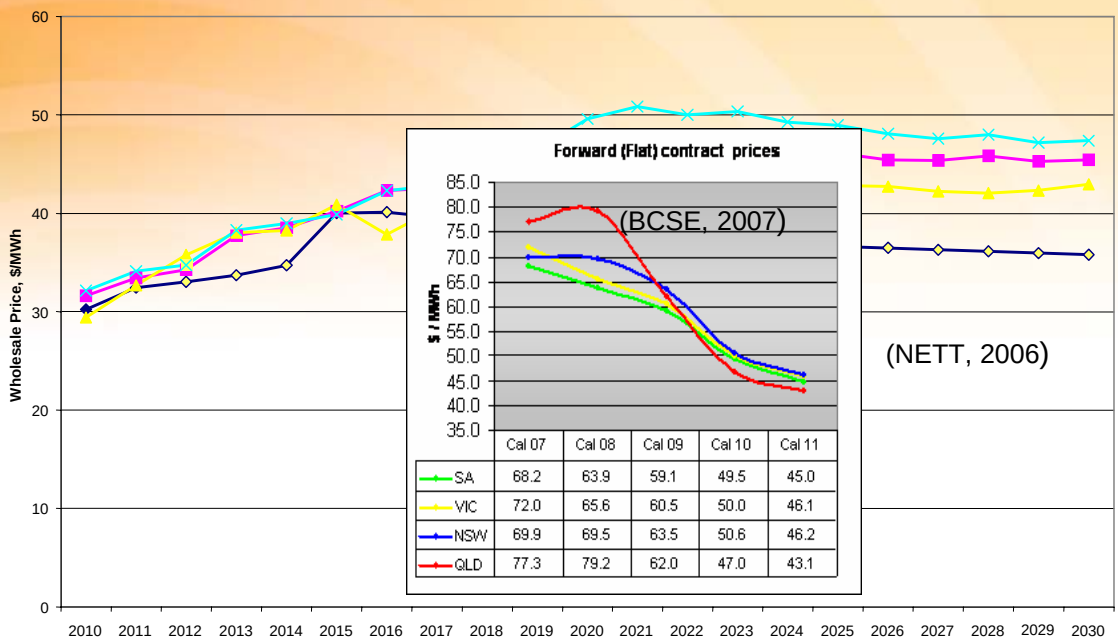
- Low env. effectiveness means low efficiency
- Considerable inequity implications
  - Energy end-users paying for considerable non-additional NGACS

Now

- Proposed multi-state scheme
- PM Joint Govt-Industry Task Group

- Shared design outlines
  - 'Cap and trade' rather than 'baseline + credit' (NSW GGAS)
  - Moderate targets + low initial prices
  - Compensation for large polluters
  - Use of offsets

Price - most modelling not particularly helpful



	Cal 07	Cal 08	Cal 09	Cal 10	Cal 11
SA	68.2	63.9	59.1	49.5	45.0
VIC	72.0	65.6	60.5	50.0	46.1
NSW	69.9	69.5	63.5	50.6	46.2
QLD	77.3	79.2	62.0	47.0	43.1

Who pays whom?

- Two approaches for externalities
  - Beneficiary pays or 'polluter pays'
  - Theory + experience support 'polluter pays'
- However, with proposed Australian schemes….
  - Unreasonable focus on 'polluter gets paid'
    - 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)
    - **Stakeholder clout!** (Hatfield Dodds, 2006)

Experience with carbon pricing to date

- Oil price shocks of early + late 1970s
  - had considerable yet 'messy' impact on consumption
- Emissions trading
  - EU ETS
  - NSW GGAS
  - CDM
- EU ETS/NSW GGAS have exhibited:
  - Low environmental effectiveness
    - Have emissions been reduced at all/significantly to date?
  - Poor cost effectiveness
    - follows from env. failures, high transaction costs
  - Highly adverse equity outcomes
    - Including windfall profits to large polluters

Failures of governance

- Governance: Policies + procedures that define who gets power, how decisions taken, how accountability rendered
- Principles of Good Governance (UNDP)
  - Legitimacy and Voice for all stakeholders
    - *PM Joint Govt-Business Task Group on Emissions Trading?*
  - Direction and strategic vision
    - *Terms of reference for PM Task Group: "Australia enjoys major competitive advantages through the possession of large reserves of fossil fuels and uranium. …. these advantages must be preserved."*
  - Performance – meet needs effectively + efficiently
  - Accountability for decision makers, transparency
    - *Setting trajectories, determining compensation on the basis of "modelling"?*
  - Fairness
    - *Compensation for large polluters?*

Implications for carbon pricing

- Key question
  - What's worse wrt climate policy than BAU?
  - A: BAU with a government guarantee
- Key issue
  - How is risk assigned for society, private decision makers
- Key choice: Carbon taxes vs emissions trading
  - Tax likely to provide better investment signals (price floor)
  - Emissions trading inevitably complex, abstracted
    - Many opportunities for large stakeholders to game the design process, the design and the settings
    - Many opportunities for policy makers to let them
- Other policy efforts vital – regulation + innovation
- Good Governance is the key
  - Open transparent policy processes with all stakeholders involved
    - "if you're not at the table, you're probably on the menu"

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Thank you… and questions?

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