



## Will ETS promote appropriate investment in low-emission technologies?

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*Emissions Trading: Getting  
Key Design Elements Right*  
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## A possible answer up-front

- 'Promoting' appropriate investment insufficient given climate challenge unless accept need for other policies to ensure such investments made
  - Changing investment is the 'main game' in energy supply sector
  - ETS generally expected to play a primary role in climate/energy policy
  - Nevertheless, need for other policies accepted wrt energy efficiency (behaviour) , some technology innovation (R&D and demonstration) and renewables? (at least initially?)
  - *What appropriate investment might we expect ETS to be a primary driver for; switch to lower-emission fossil-fuels, offset activities?*
- Evidence to date that ETS can drive appropriate investment in any of our abatement options is mixed
  - *Are failures to date a question of fundamentals or implementation?*
- The challenge for ETS
  - demonstrate quick implementation of schemes that ensure appropriate investment wrt at least some options & play supporting role with others
- A key issue
  - Investment uncertainty from 'Governance risk' – govts proving inadequate to task of implementing schemes that will drive investment



# Some key definitions

## Market

- mechanism allowing people to trade, governed by theory of supply and demand, so allocating resources through price mechanism & bid and ask matching (Wikipedia.org)
- In essence, a form of decentralised decision making

## Technology

- Art of knowing and doing (iiasa.net)
- ‘Orgware’ is key *but can markets deliver?*

**Technology = Hardware + Software + "Orgware"**

(taken from [www.iiasa.net](http://www.iiasa.net))



Hardware: Manufactured objects (artifacts)

Software: Knowledge required to design, manufacture, and use technology hardware

"Orgware": Institutional settings and rules for the generation of technological knowledge and for the use of technologies

Will ETS promote appropriate investment



# Investment decision making

- Formal methods including NPV, IRR, Equivalent Annuity, Real Options
  - Possible limitations including narrow perspective, exclusion of non-financial benefits, short-term emphasis, faulty assumptions re status quo...
- Characteristics of investment in energy supply sector
  - generally lumpy, specific, irreversible, indivisible investments with long time horizon, high fixed / variable costs ...
  - Undertaken in context of shared infrastructure and high political interest
- A wide range of risks; only some can be formally managed
- Key issue of **governance** risk
  - “Process whereby societies or organizations make important decisions, determine whom they involve and how they render account”

(Chatham House, Impact of Climate Change Policy Uncertainty on Energy Sector Investments, 2005)

CATEGORY	TYPES	EXAMPLES
ECONOMIC RISK	Market risk	<ul style="list-style-type: none"> <li>• Inadequate price and/or demand to cover investment and production costs</li> <li>• Increase in input cost</li> </ul>
	Construction risk	<ul style="list-style-type: none"> <li>• Cost overruns</li> <li>• Project completion delays</li> </ul>
	Operation risk	<ul style="list-style-type: none"> <li>• Insufficient reserves</li> <li>• Unsatisfactory plant performance</li> <li>• Lack of capacity of operating entities</li> <li>• Cost of environmental degradation</li> </ul>
	Macroeconomic risk	<ul style="list-style-type: none"> <li>• Abrupt depreciation or appreciation of exchange rates</li> <li>• Changes in inflation and interest rates</li> </ul>
POLITICAL RISK	Regulatory risk	<ul style="list-style-type: none"> <li>• Changes in price controls and environmental obligations</li> <li>• Cumbersome administrative procedures</li> </ul>
	Transfer-of-profit risk	<ul style="list-style-type: none"> <li>• Foreign exchange convertibility</li> <li>• Restrictions on transferring funds</li> </ul>
	Expropriation/nationalisation risk	<ul style="list-style-type: none"> <li>• Changing title of ownership of the assets</li> </ul>
LEGAL RISK	Documentation / contract risk	<ul style="list-style-type: none"> <li>• Terms and validity of contracts, such as purchase/supply, credit facilities, lending agreements and security/collateral agreements</li> </ul>
	Jurisdictional risk	<ul style="list-style-type: none"> <li>• Choice of jurisdiction</li> <li>• Enforcement risk</li> <li>• Lack of a dispute-settlement mechanism</li> </ul>
FORCE MAJEURE RISK		<ul style="list-style-type: none"> <li>• Natural disaster</li> <li>• Civil unrest</li> <li>• Strikes</li> </ul>

Source: World Energy Investment Outlook (IEA 2003)

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# Market design

- All markets exist within a wider social context
  - Regulations, social norms
- Wide range of potential market failures in some areas of decision making
- Relatively recent emergence of ‘*designer*’ markets for decision making formerly undertaken centrally
  - Electricity industry restructuring
  - Environmental markets eg. Renewable Energy Targets, SOx trading
  - **GHG Emissions Trading Schemes (ETS)**
- Only limited experience with ‘designer’ markets to date
  - No clear successes wrt alternatives yet, some evident failures



# Electricity industry restructuring in Australia

- Implemented on an existing EI
  - well established, technically mature & highly secure
  - Clear operational & investment inefficiencies (excess investment)
- Restructuring
  - Process now underway for > decade – *key issue is building ‘orgware’*
  - Four formal decision making regimes
  - *Primary objective is security, market allows v. high price outcomes & centralised override powers*
  - *Important constraints on poor governance ‘keeping lights on’*

Governance regime	<ul style="list-style-type: none"> <li>▪ Formal institutions, legislation &amp; policies</li> <li>▪ <i>Informal social context including politics</i></li> </ul>
Security regime	<ul style="list-style-type: none"> <li>▪ Responsible for core integrity on local or industry-wide basis, with power to override</li> </ul>
Technical regime	<ul style="list-style-type: none"> <li>▪ To allow connected industry components to function as industry-wide machine</li> </ul>
Commercial regime	<ul style="list-style-type: none"> <li>▪ To coordinate decentralised decision-making according to commercial criteria</li> <li>▪ Includes formally designed markets</li> </ul>

# U.S. SOx Emissions Trading

- The reference point of emissions trading globally (CEPS, *The Making of the EU ETS*, 2007)
- Claimed cost reductions wrt 'command & control'
- ...actual performance comparison challenging... but difficult to confirm economic advantages (EC, *Comparison of EU Air Quality Policies...*, 2004)
- Demonstrated impacts reducing technology innovation in FGD within US (Taylor et al, *Law & Policy*, 2005)

SOx - Per Capita Emission:

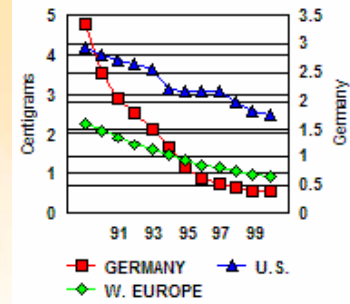


Table 6. Summary of Air Quality Expenditures by Region.

		€ bn	% GVA
EU-15	Industry	7.3	0.4
	Total	7.9	0.1
US	Industry	6	0.4
	Total		
Japan	Industry	2.8	0.1
	Total	10	0.3

(EU, *Comparison of EU Air Quality Policies...* 2004)

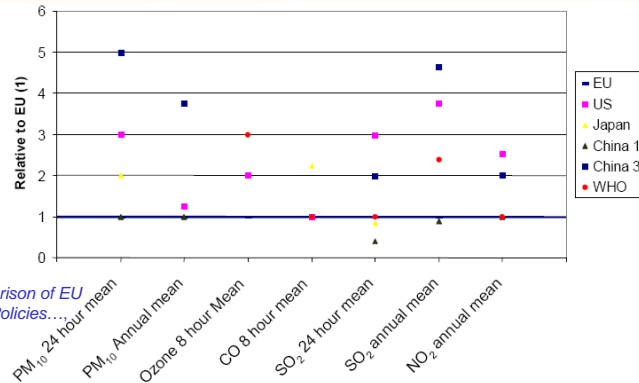


Figure 4. Relative level of comparable air quality standards/limit values by region (Europe = 1)

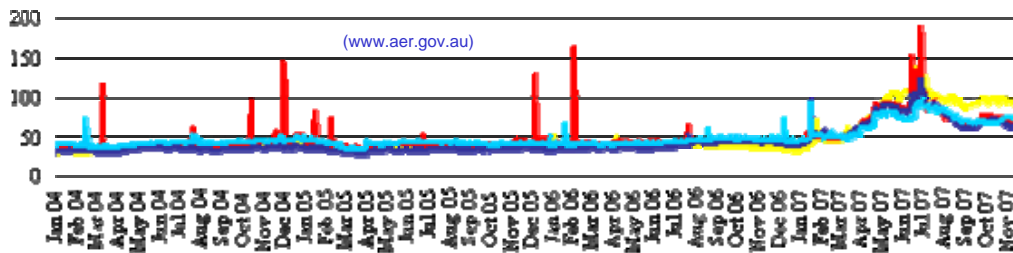
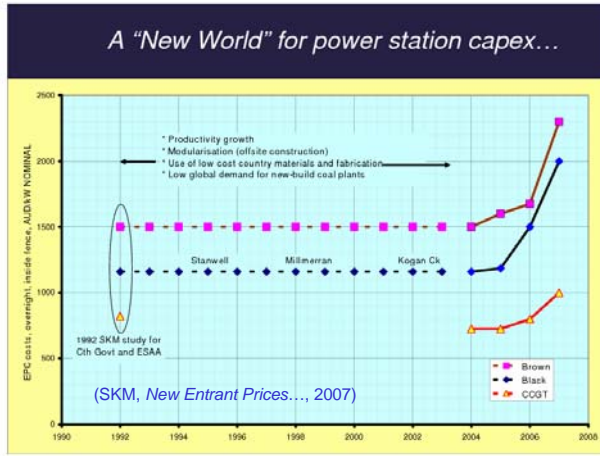
# The EU ETS

- 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)



# EI Investment in Australian context

- Many & seemingly growing sources of uncertainty
  - Possible transition of lowest-cost baseload from coal to CCGT independent of carbon price
- ETS & wider climate policy uncertainty part of larger mix



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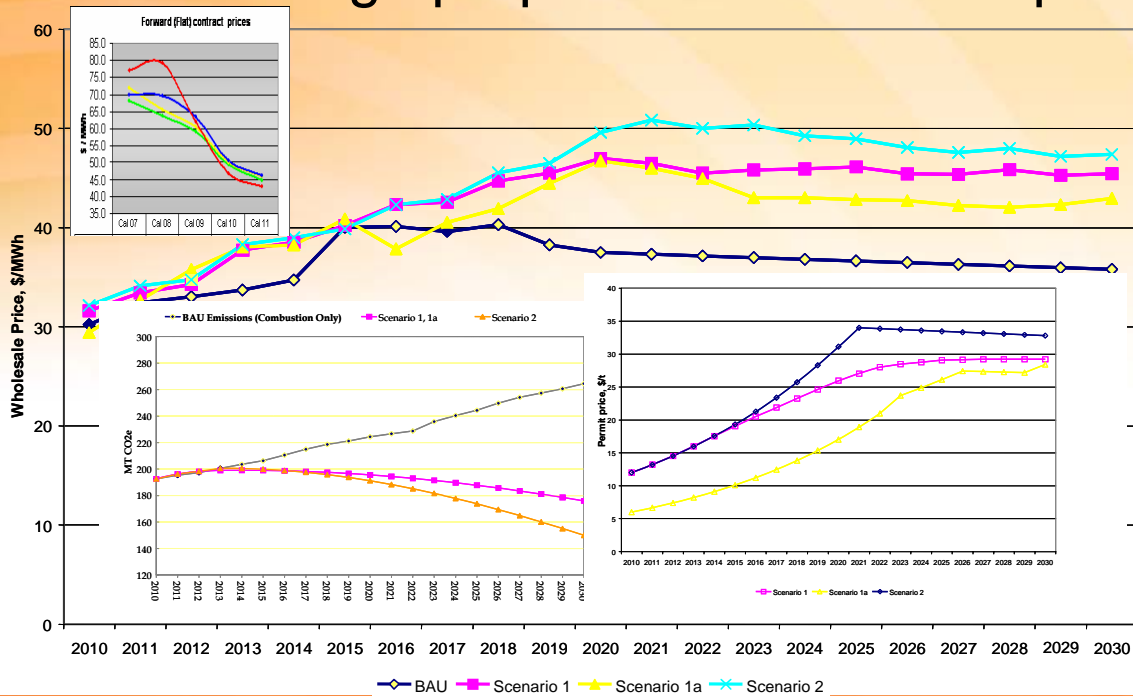
# Australian ETS proposals to date (NETTs and PM Taskgroup)

- Cap and Trade scheme
  - Comment: better termed hybrid given price caps
- Broad coverage– 6 GHGs, all energy related & waste(?) emissions (70-75% of total)
  - Comment: measurability key issue for coverage and offsets; current inventory uncertainty is +/-3% (Aust. Govt. 4<sup>th</sup> Comm. to UNFCCC)
- Likely modest early cap trajectory (10 years out) with low price cap & no 'makegood', wide range of offsets; stated intention to avoid 'price shocks'
  - Comment: current energy emissions trajectory +85% in 2020; a poor investment signal unlikely to drive early significant change; offsets & price caps difficult to 'police' & can reduce environmental effectiveness & market performance; price cap but no floor means asymmetric risk profile for those contemplating investment in abatement options; full banking likely inconsistent with proposed 'glide path' to high carbon prices
- Compensation for large emitters & energy intensive industry
  - Large, free once-off up-front permit allocations; Credit for 'early action'
  - Comment: difficult to justify ( possible exception of energy intensive industry); reflects 'stakeholder' clout rather than good policy; front-loads allocation uncertainty ensuring highly political & contested implementation of scheme
- Encourage international linkages where possible
  - Comment: key issue is integrity of Australian/other scheme design

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# NETTS design proposal: Indicative caps



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# Possible policy conclusions wrt driving investment

- ETS should play a key role however performance of schemes to date generally poor wrt effectiveness, efficiency + equity
- Some other climate policies far more successful to date
  - eg. Renewable energy policy in countries with intent & supporting frameworks
- Market-based approaches offer great flexibility to ‘designers’ **however**
  - Hard to predict performance, poor choices greatly impact effectiveness
  - *Few constraints on poor governance ... to begin anyway*
- Rigorous + transparent design process required wrt stakeholders
  - Incumbency, information asymmetry + potential gaming of design
  - *With poor governance “Those not at the table are probably on the menu”*
- Need transparent, liquid + efficient markets for appropriate price discovery, risk management & hence investment
  - derivative mkts have vital role in bridging short to longer term decision making
  - *Where is some measure of certainty that abatement investment has future value? A possible role for government backed ‘options’*
- **Key uncertainty at present appears to be ‘governance risk’**
  - *Australian governments risk making ‘promises’ wrt modest ETS targets & major compensation that they probably can’t and certainly shouldn’t be allowed to keep*
  - *Poor government policy making clearly inadequate to scale & urgency of the climate challenge a recipe for deferred abatement investment & pressure for ‘government’ guarantees that don’t eliminate risks, merely transfer them to the public*

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