Centre for Energy and Environmental Markets

UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA



The promise and pitfalls of market-based environmental regulation: some lessons from the Australian experience

Dr Iain MacGill

Joint Director, CEEM

IIT Seminar

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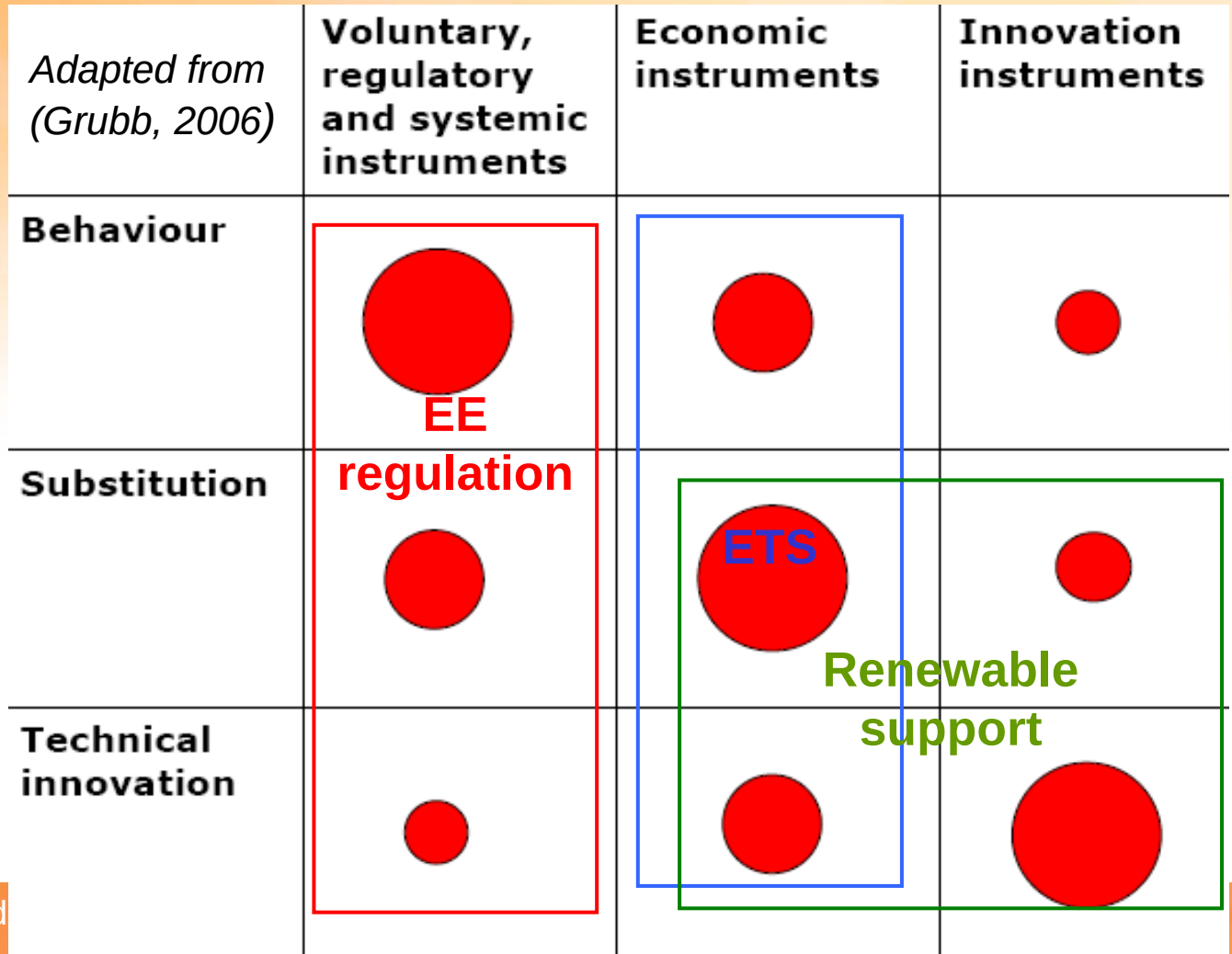
CEEM established …

- *to formalise* growing shared research interests + interactions
  - Faculties of Engineering, Business (Economics and Management), Arts and Social Sciences, Science, Institute for Environmental Studies...
- *through UNSW Centre*
  - aiming to provide Australian research leadership in interdisciplinary analysis + design of energy and environmental markets
- *Current research efforts (grant and consultancy funding)*
  - Facilitating wind integration in the NEM
  - Renewable energy policy support options in restructured industries
  - Market design for restructured electricity industries – new focus on retail mkts
  - Emissions Trading Schemes + options for Australia
    - Interactions between emissions trading and the Australian NEM
  - Technology assessment for sustainable energy options
    - including energy efficiency, cleaner fossil fuels, renewables, nuclear & **CCS**
  - Sustainable energy services delivery in developing countries
  - Economic modelling of Distributed Energy – demand-side participation & DG
  - Energy efficiency policy – regulation, financial mechanisms

A coherent sustainable energy policy framework



Market-based environmental regulation

- Australia an early & enthusiastic adopter of energy industry restructuring
- …and Market-based environmental instruments
  - A subset of **financial** environmental regulation which 'changes' the price of different decisions, rather than directly regulating them
  - One approach is to establish **markets** in tradeable instruments reflecting desired environmental outcomes
    - Pollution permits
      - eg. Emissions Trading Schemes
    - Environmentally related credits
      - eg. Renewable Energy Certificates, CDM Certified Emissions Reductions, Biodiversity Credits…

Potential advantages wrt climate change

- Reasons to be skeptical about voluntary restraint and govts' ability to cost-effectively regulate decisions directly
- A good fit with restructured energy industries – the key sector in any effective response
- Market-based environmental markets can
  - Take advantage of existing competitive pressures on participants
  - Offer considerable flexibility in how they respond: Regulators 'set (target) and forget' by transferring decisions making & risks to 'better' informed parties
  - avoid perverse interactions b/n different policy measures (price impacts 'stack up' to drive multi-objective decision making)
  - Offer a politically manageable way to reduce value of high emission assets owned by key stakeholders – allow competitors to take this value away
  - ***Considerable design flexibility for policy makers***

Potential challenges wrt climate change

- Share many of usual policy challenges with any regulatory approach + potentially add new ones
  - All markets exist within a wider social context - regulations, social norms… do we understand these
  - Wide range of potential market failures in some areas of decision making
  - 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 drive env. outcomes
  - 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 the rule design process rather than competing in good faith within market arrangements*

What lessons have been learnt for institutional arrangements, governance + regulation?

- Assess performance to date, consider future performance of existing schemes
  - effectiveness – *objective achieved?*
  - efficiency – *at least cost (dynamic efficiency of investment + innovation 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)*

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)

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

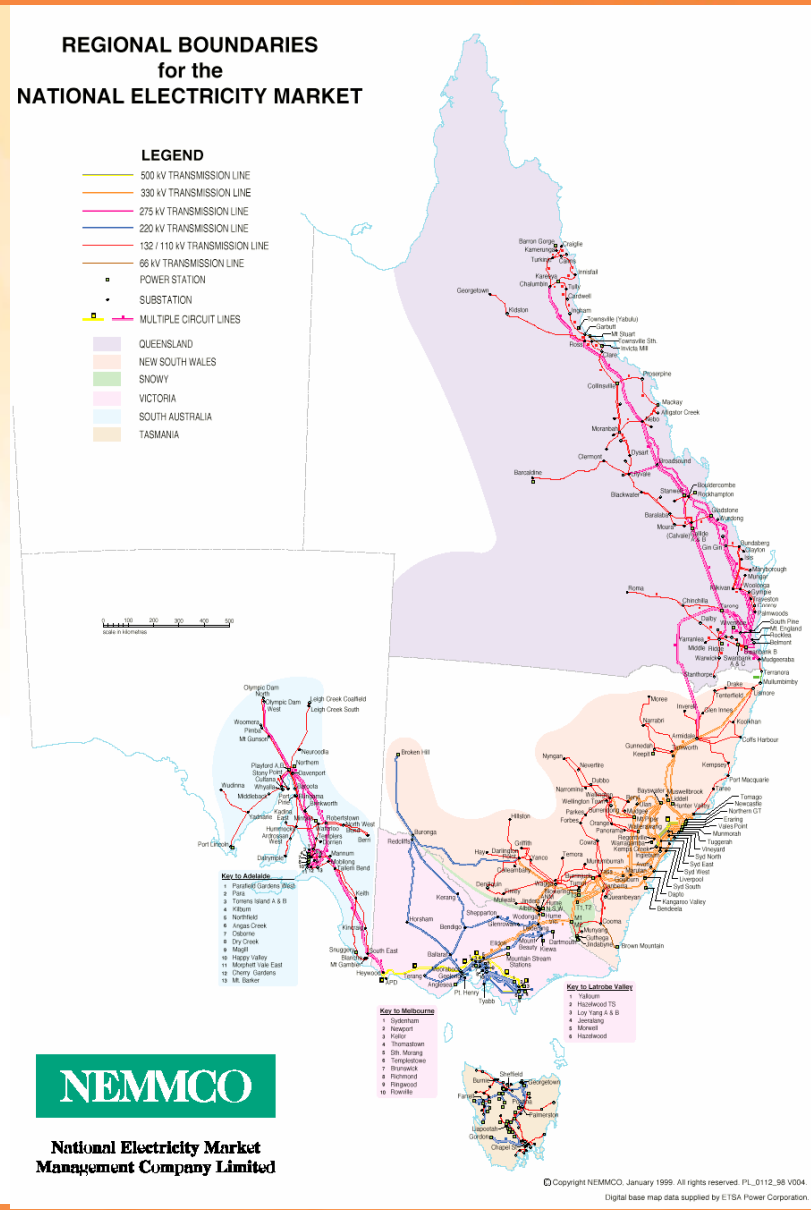
....

- Institutions
  - structures and mechanisms of social order + cooperation
    - Social purpose + permanence transcending individual intentions
    - Make + enforce rules governing cooperative human behavior
- Governance
  - Process whereby societies or organizations make important decisions, determine whom they involve and how they render account
  - “Processes hard to observe so focus on governance *system* or framework upon which it rests - agreements, procedures, conventions or policies that define who gets power, how decisions are taken and how accountability is rendered.”

Some key Australian env. markets

- The National Electricity Market
- Mandatory Renewable Energy Target
- NSW Greenhouse Gas Scheme
- Queensland 13% Gas Scheme
- Moves towards National Emissions Trading

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*
- ***Now?***
  - ***Tightening capacity, gas market developments (increasing supply but LNG East Coast?, increasing prices, greater policy focus on demand-side participation + DG, coming ETS and 20% 2020 renewable energy target***

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	▪ Formal institutions, legislation & policies ▪ *Informal social context including politics*
Security regime	▪ Responsible for core integrity on local or industry-wide basis, with power to override
Technical regime	▪ To allow connected industry components to function as industry-wide machine
Commercial regime	▪ To coordinate decentralised decision-making according to commercial criteria ▪ Includes formally designed markets

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.

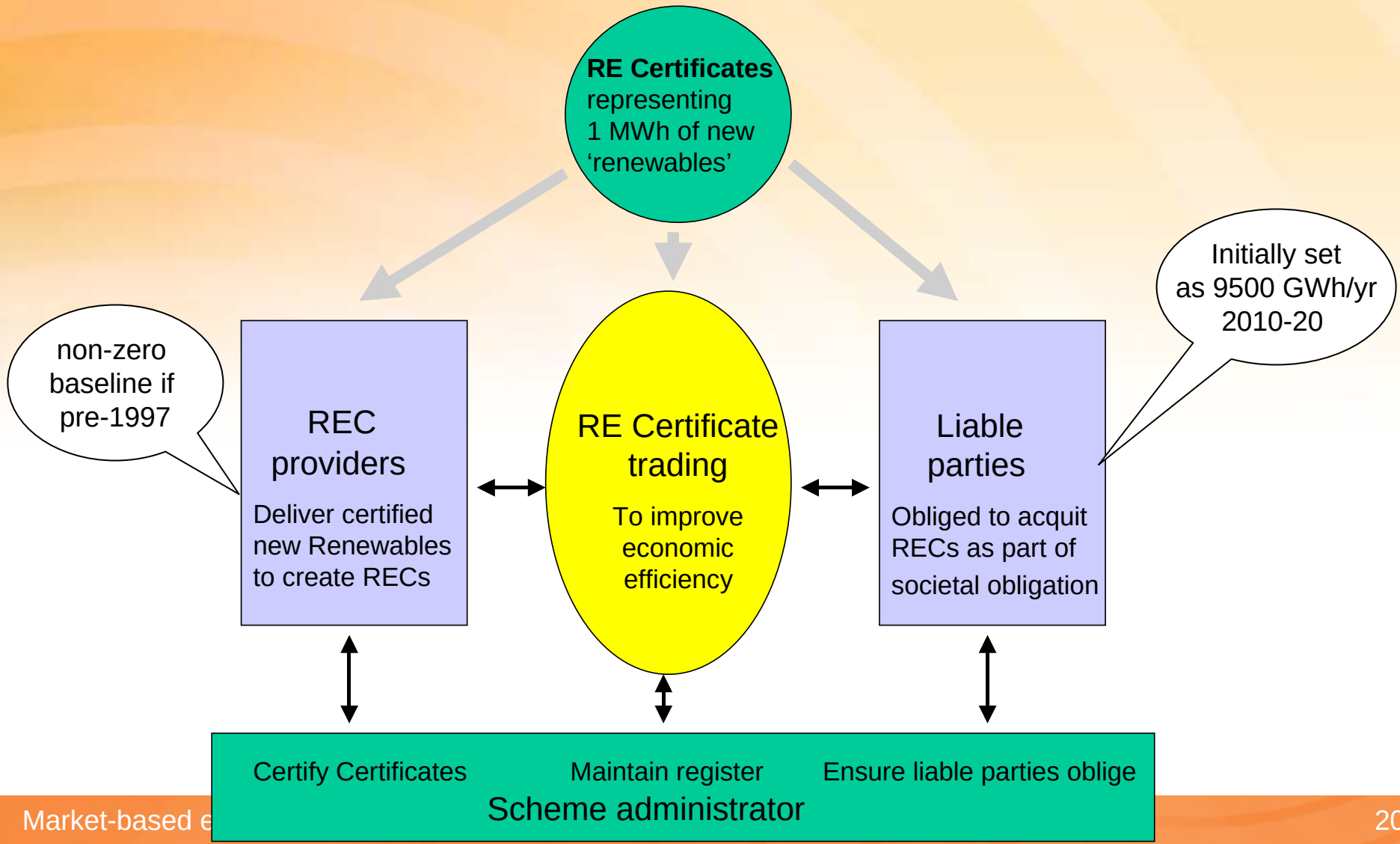
Renewable energy's diverse values

- Energy
  - depends on investment + operational costs compared against benefits of energy provision + alternative supply options
  - *significant temporal + locational variability + uncertainty determined by desired energy services, combined investment + operational characteristics of all demand + generation*
- Environmental
  - greenhouse emission reductions – depends on other generation options and has relatively little temporal + locational variation
  - Potential regional air + water benefits, amenity costs
- Social
  - possible investment + job outcomes with industry development

The renewable energy facilitation challenge

- Maximise total energy, environmental + social values of renewables
- For high 'intermittent' renewable penetrations such as wind, maximising energy value becomes more challenging
  - 'best' windfarm sites taken early
  - Increasingly significant integration costs
    - *network connection* + *management*; match of wind with existing Tx + Dx
    - *security*; particularly wrt possible large + unexpected aggregate regional or system-wide swings in wind power production
    - *economic operation* + *investment*; implications for other generation of highly variable + somewhat unpredictable low-operating cost wind power
- Key electricity industry issues
  - How well do industry arrangements mesh underlying economic energy value with commercial signals to market participants?
  - *…and in particular, wrt new technology + participants*
    - *Wind the first significant generation with a highly variable, somewhat unpredictable + non-storable primary energy source*
    - *Now testing the adequacy of industry arrangements around the world*
  - **Interactions with specific renewable policy support measures**

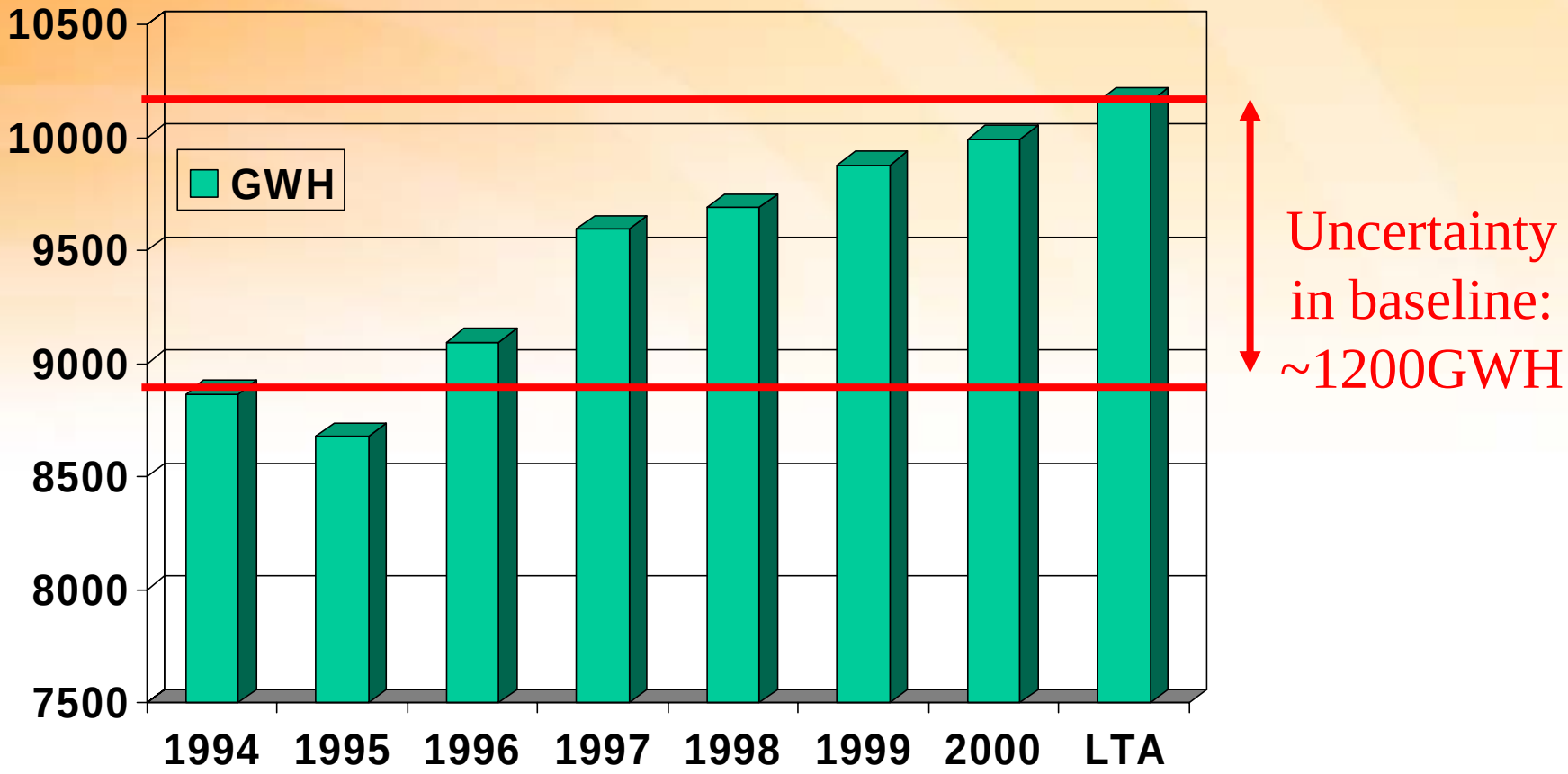
MRET – a 'designer' market



MRET performance

- The good
  - Facilitates integration of renewables into NEM
    - Provides additional revenue above energy mkt revenue; for existing projects typically order of 50% of cashflow is from RECs
  - Modest ramping target easily met + considerable new investment
  - Apparent efficiency – highly competitive RECs market with low project costs by international standards
  - Technology flexibility has proved valuable
    - eg. biomass an expected winner but slow uptake in practice => wind + others filled the gap
- **However**
  - Inappropriate baselines for 'old hydro'
    - Windfall RECs due to natural demand growth + annual variability 'ratchet' above confidential baselines
  - Boom + Bust cycle due to fixed end-date (2020)
  - Market for RECs has low transparency and liquidity
  - Considerable regulatory uncertainty has significant price impacts

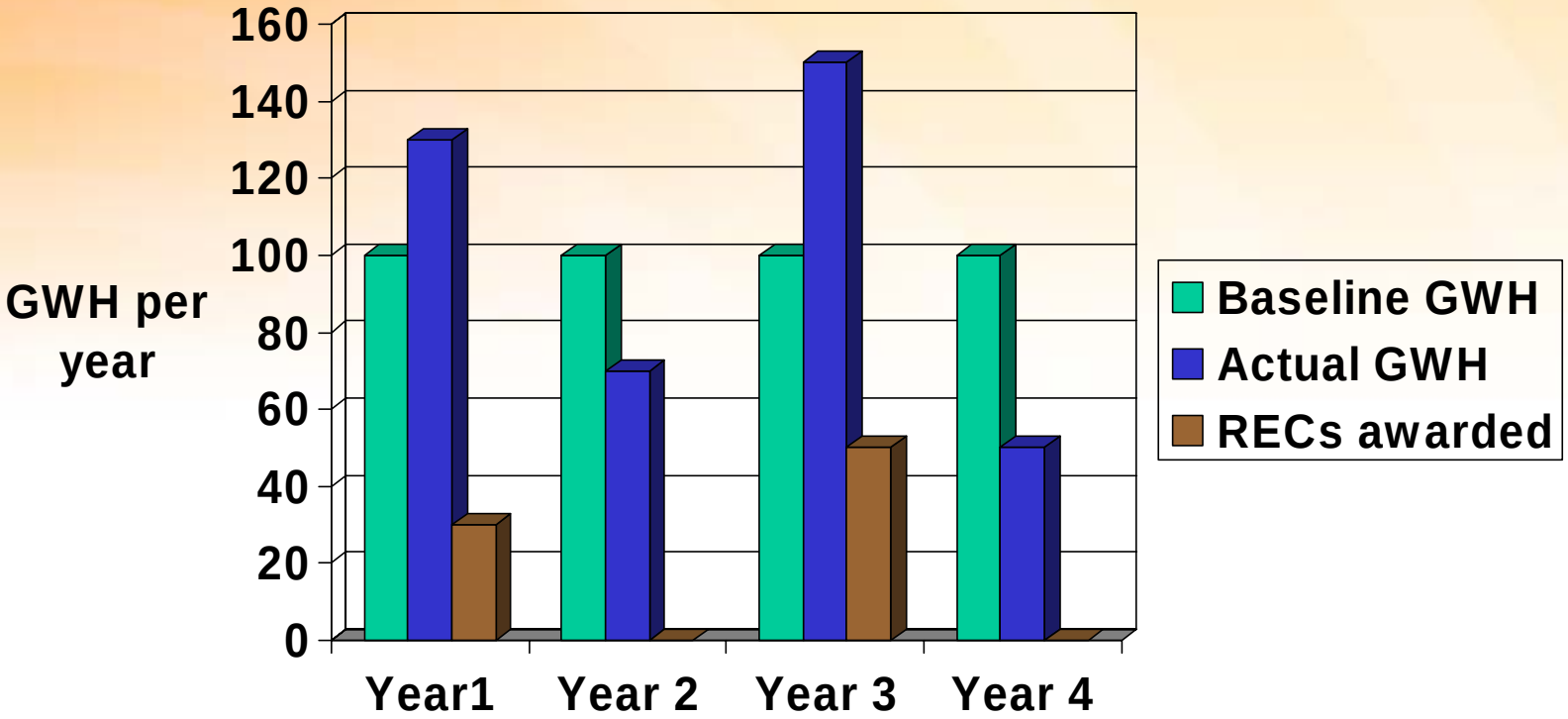
Hydro baselines for pre-1997 plant uncertain…



Note: Estimates only; actual baseline is confidential

… and ratchets

RECs awarded above baseline but not "clawed back" below it



Rewards those generators with above-zero baseline & high annual variability (here 80,000 RECs over 4 years although ave. output = baseline)

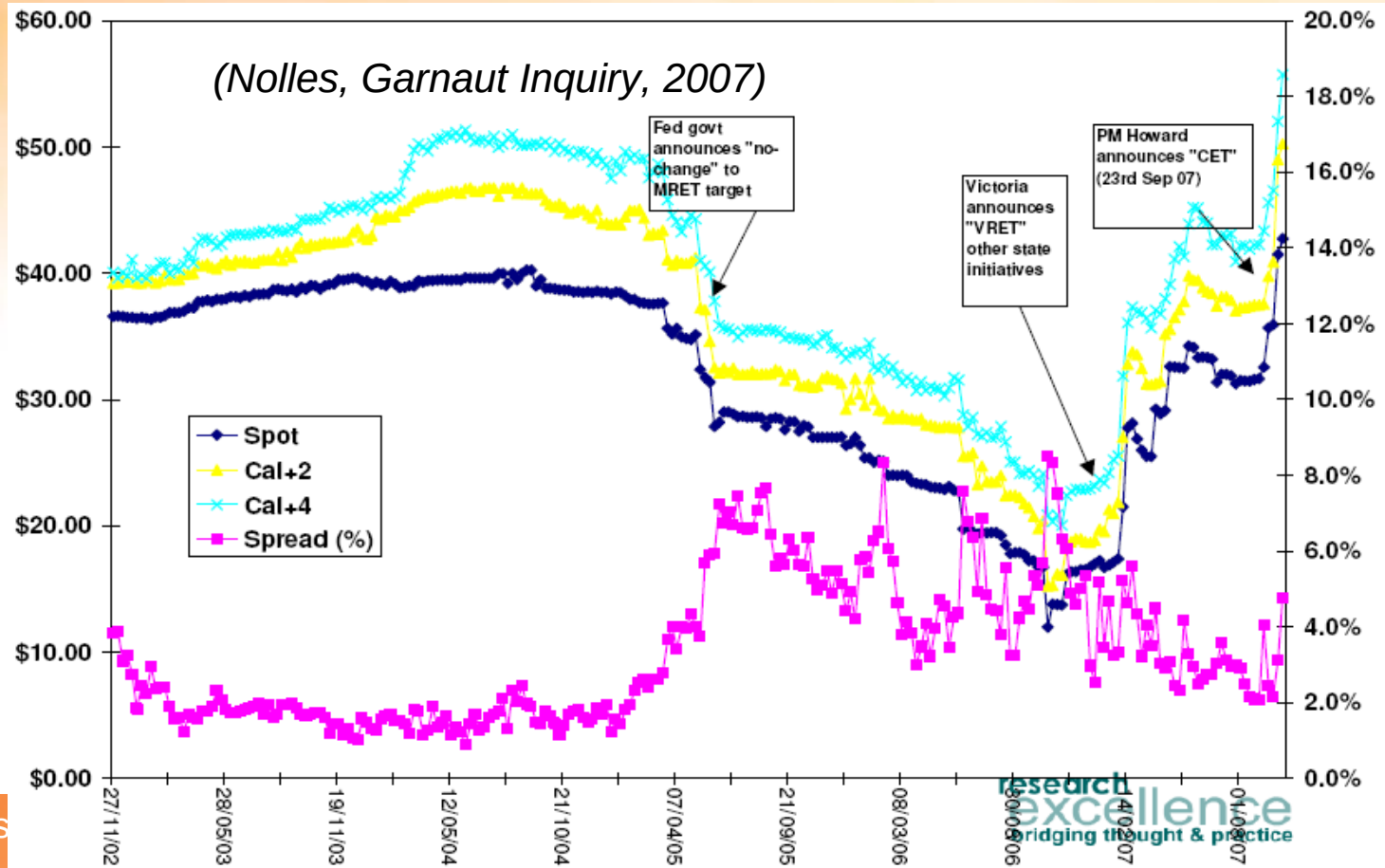
An example of process failure?

- 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**. ***Why + who takes accountability?***

The REC market

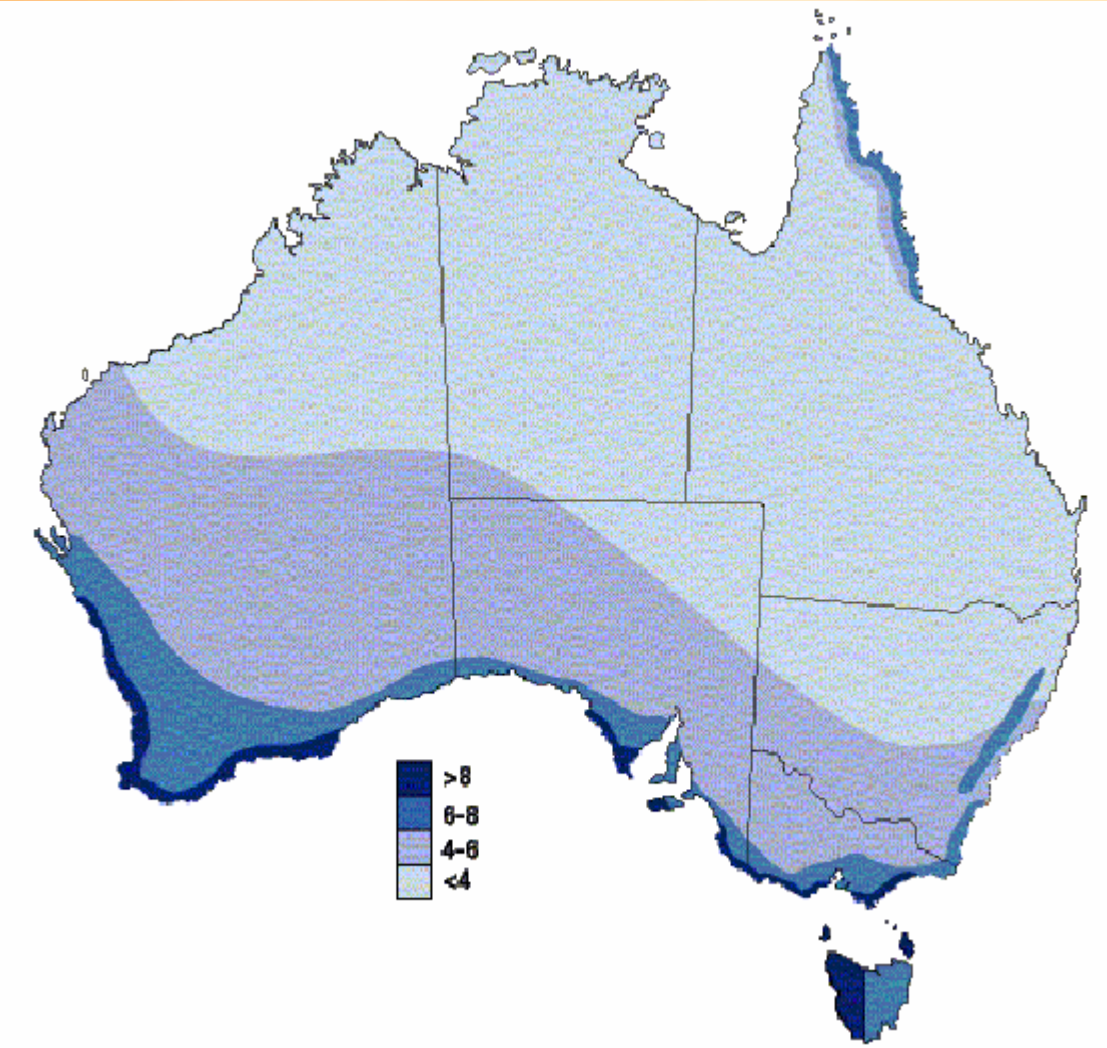
- Little liquidity (+ hence price discovery) for forward prices through trading
  - Most projects financed via PPAs or other direct contracts
- Prices vulnerable to regulatory change

  => *potential challenges in driving investment & industry development*



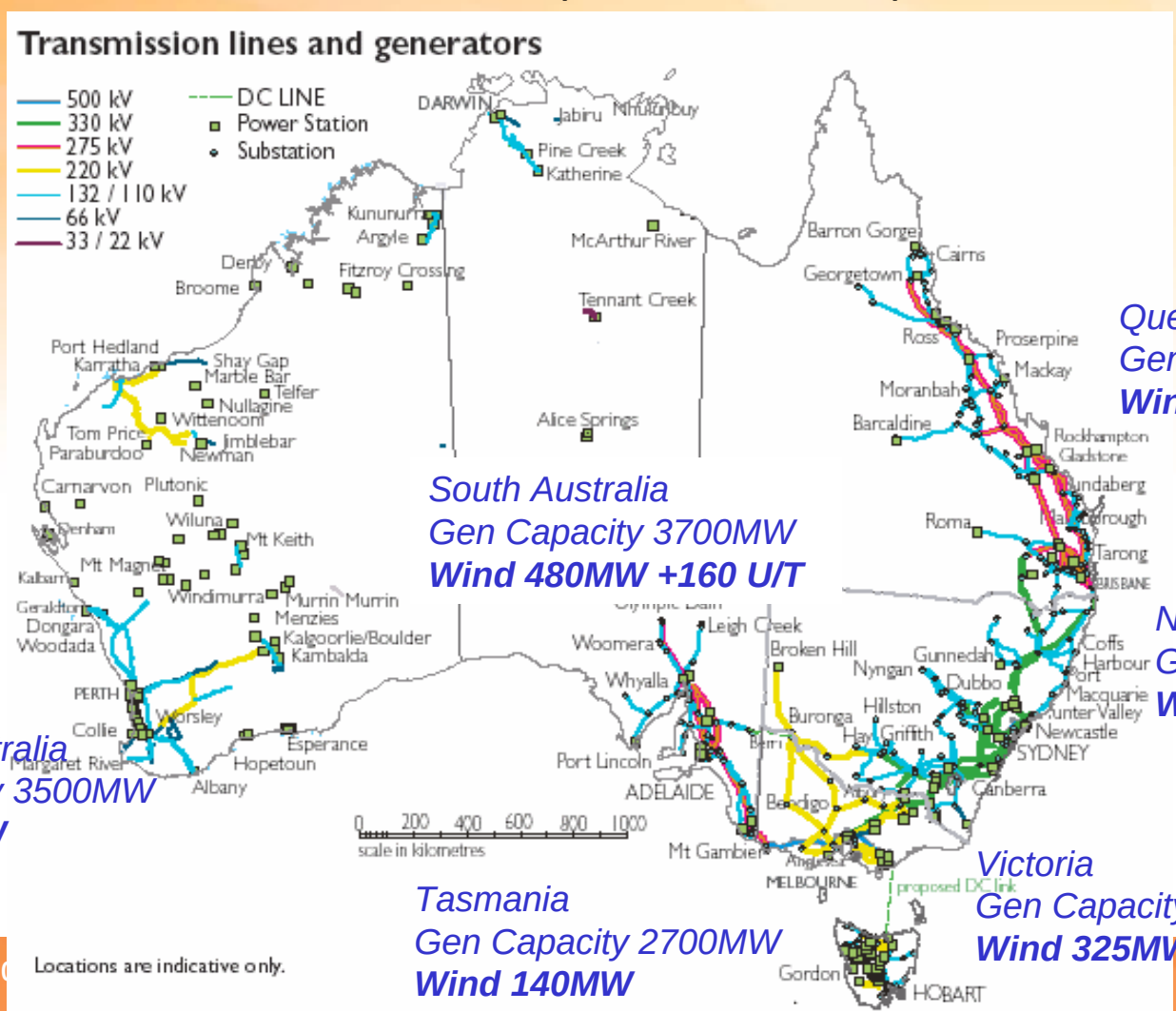
The Australian wind resource

(Simple estimates of background wind – Australian Greenhouse Office)



Current status of Australian wind generation

Recent estimates of state average load, total installed generation capacity and wind installed or under construction (ausWEA, ESAA)



Queensland
Gen Capacity 11,300MW
Wind 12MW

South Australia
Gen Capacity 3700MW
Wind 480MW +160 U/T

New South Wales
Gen Capacity 12,500MW
Wind 17MW

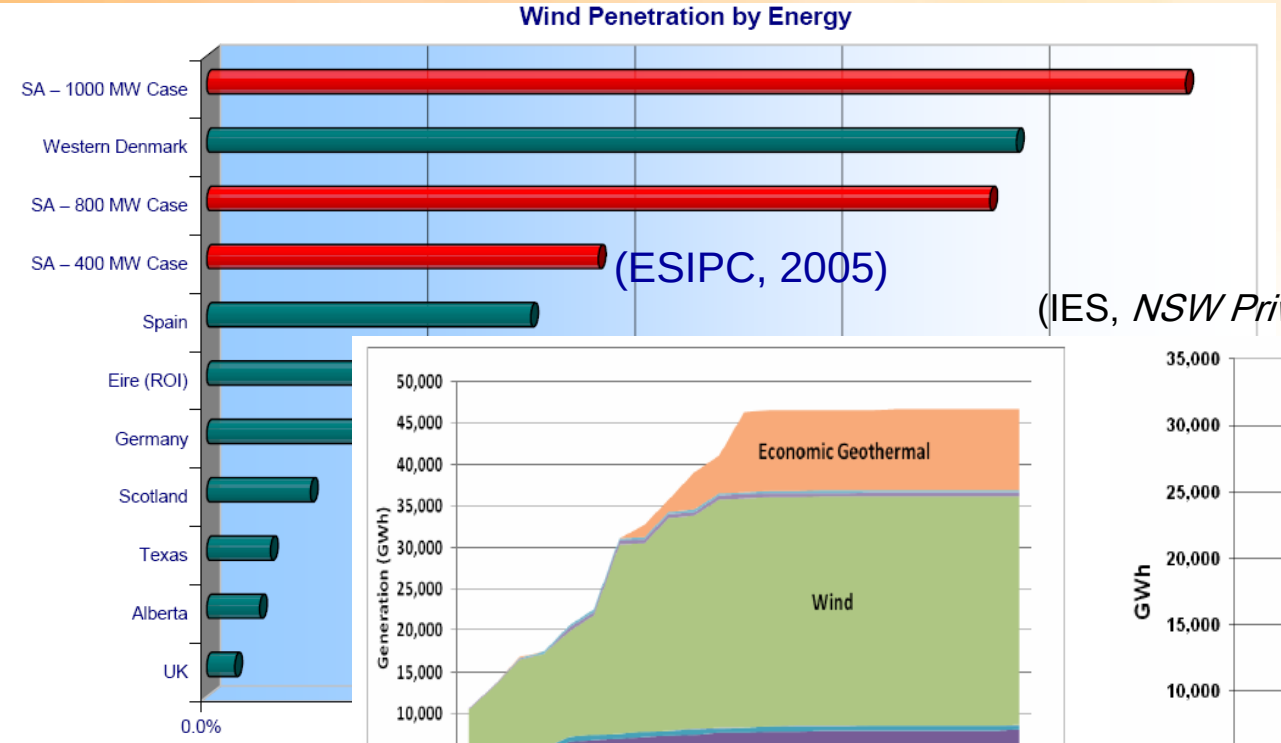
Western Australia
Gen Capacity 3500MW
Wind 200MW

Victoria
Gen Capacity 8800MW
Wind 325MW +165 U/T

Tasmania
Gen Capacity 2700MW
Wind 140MW

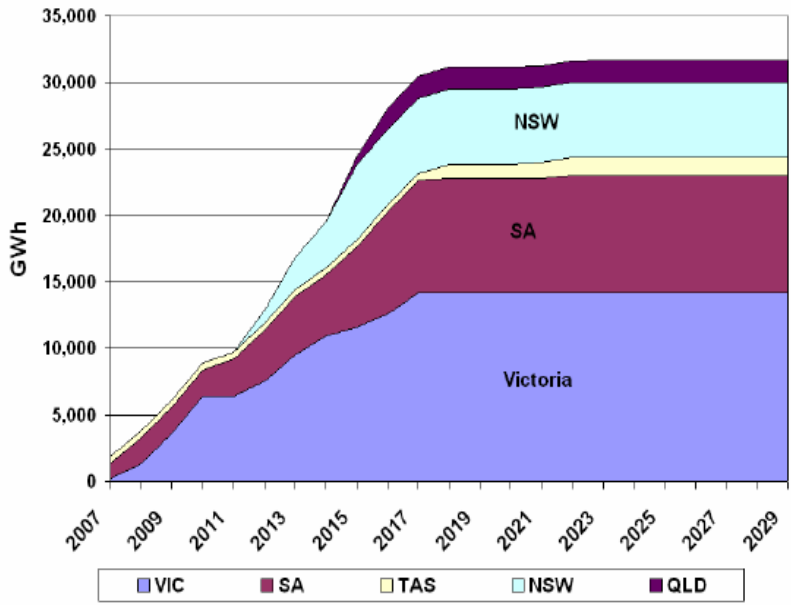
Now, wind penetrations set to rise significantly

- New Renewable Target of 20% by 2020 might see 10GW of wind
  - Note that scheme expansion rules still to be finalised
  - Possible very high penetrations in SA + Vic; a major challenge for NEM



(ESIPC, 2005)

(IES, *NSW Privatisation Conference*, 2008)



Renewables markets world-wide performing well under wide range of support measures

Figure 5. Global Investment in Sustainable Energy by Technology, 2006

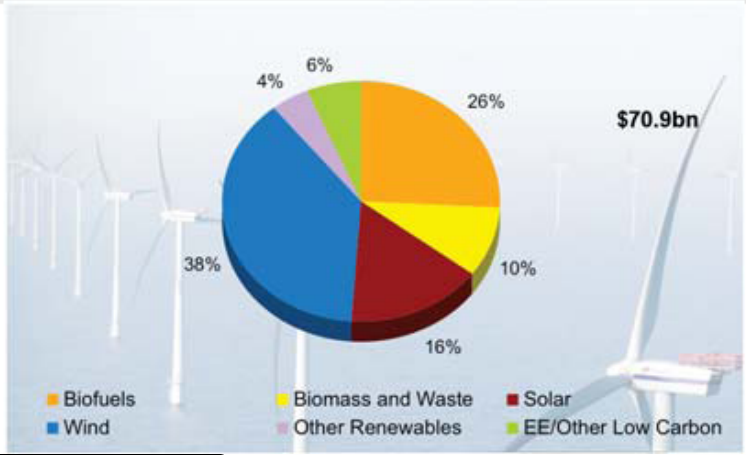
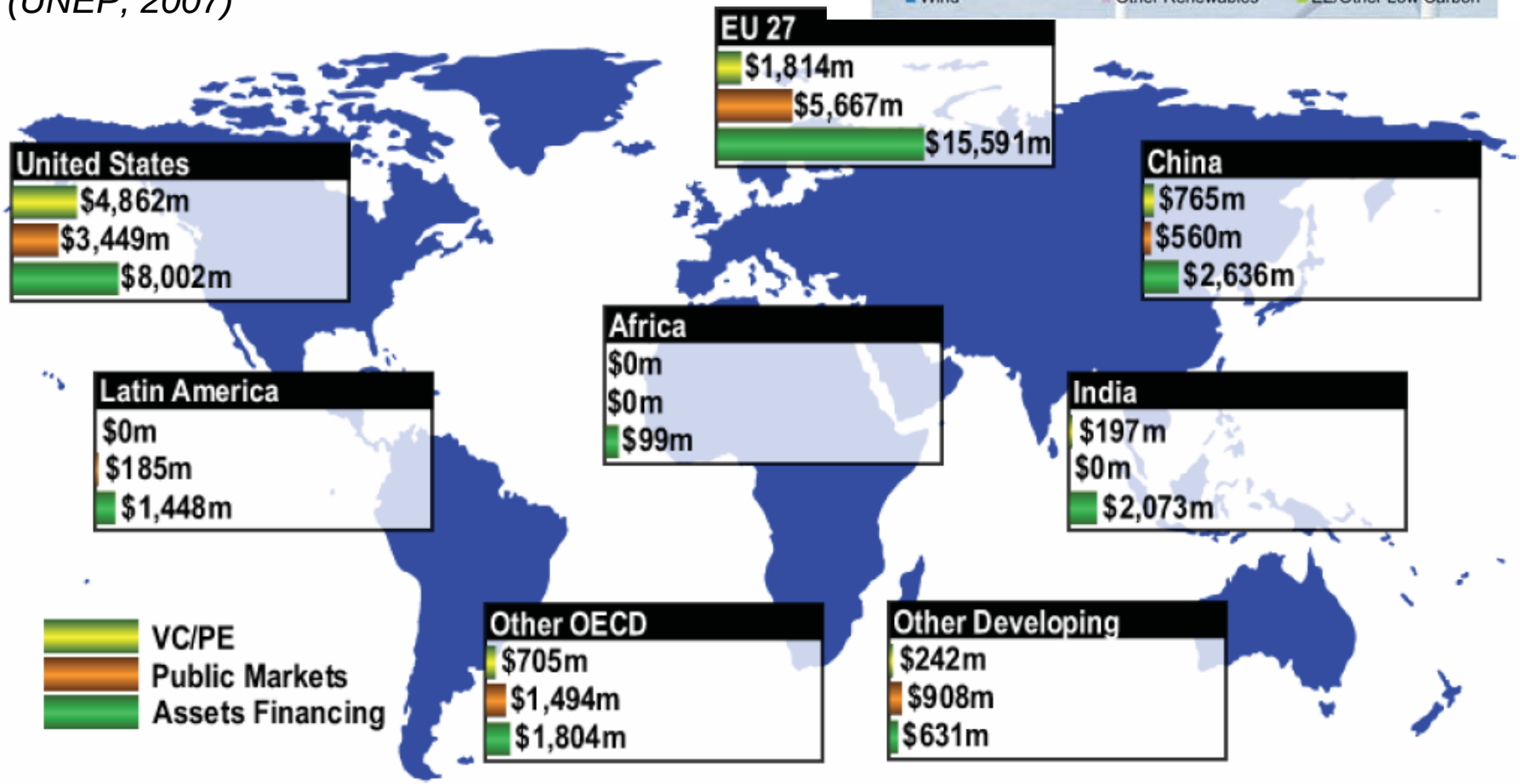


Figure 11. Global Investment in Sustainable Energy, by Type and Region, 2

(UNEP, 2007)



Need financial support… but much more

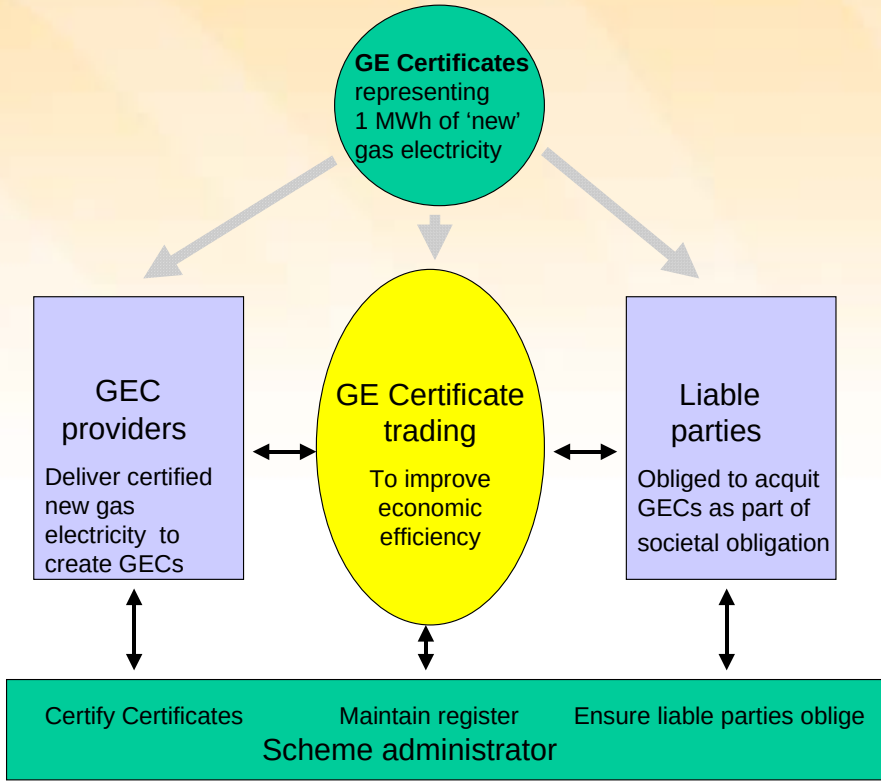
(Ernst & Young, Renewable Markets Country Attractiveness Index, 2007)

Ranking**		Country	All Renewable	Wind Index	Onshore Wind	Offshore Wind	Solar	Biomass/ Other
1	(1)	US*	72	73	80	58	75	64
2	(2)	India	64	65	75	43	61	55
2	(2)	Spain	64	64	71	48	72	58
2	(5)	UK	64	65	63	69	50	58
5	(4)	Germany	63	63	62	64	73	61
6	(6)	China	61	64	67	56	45	42
7	(7)	Canada	58	61	66	48	42	47
8	(8)	Italy	57	57	63	43	68	53
8	(8)	France	57	57	59	53	59	54
8	(8)	Portugal	57	58	63	46	62	49
8	(8)	Greece	57	59	63	49	59	44
12	(12)	Ireland	55	57	58	55	36	46
13	(13)	Sweden	52	52	52	52	44	53
14	(14)	Australia	50	50	53	42	59	45
14	(14)	Denmark	50	51	47	60	44	46
14	(14)	Belgium	50	52	50	57	36	36

- Electricity market regulatory risk – 29%: Markets that are fully deregulated score higher, as they have experienced the 'market shock' on underlying wholesale prices that this transition may exert. While this may not affect current projects, these effects are particularly important when considering long-term investment prospects.
- Planning and grid connection issues – 42%: Favorable planning environments (low failure rates and strong adherence to national targets) score highly. Grid connection scoring is based on the ease of obtaining a grid connection in a cost-effective manner. The score also takes account of the degree of grid saturation for intermittent technologies.
- Power offtake attractiveness – 19%: This includes the price received, the potential price variation, and length of PPAs granted. Higher scores are also achievable if the government guarantees the power offtake rather than merchant offtakers.
- Tax climate – 11%: Favorable, high-scoring tax climates that incentivize renewable energy generation can exist in a variety of forms and/or structures. The most successful incentives and structures have been direct RE tax breaks or brown energy penalties, accelerated tax depreciation on RE assets, and tax-efficient equity investment vehicles for individuals.
- Grant/soft loan availability – 9%: Grants can be available at local, regional, national, and international levels; and may depend on the maturity of a technology as well as the geographical location of the generating capacity. Soft loans have historically been used in pioneering countries of RE technologies to kick-start the industry. High scores are achieved through an array of grants and soft loans.
- Market growth potential – 18.5%: This considers current capacity compared to published targets. Higher scores are given if ambitious targets have been made and policy framework is in place to accelerate development. The realism of targets is also taken into account as well as the seriousness with which they are being pursued (e.g., penalties in place for non-compliance).
- Current installed base – 8%: High installed bases demonstrate that the country has an established infrastructure and supply chain in place, which will facilitate continued growth and in particular encourage the re-powering of older projects.
- Resource quality – 19%: For example wind speeds and solar intensity.
- Project size – 15.5%: Large projects provide economies of scale and a generally favorable planning environment, which facilitates project development financing.

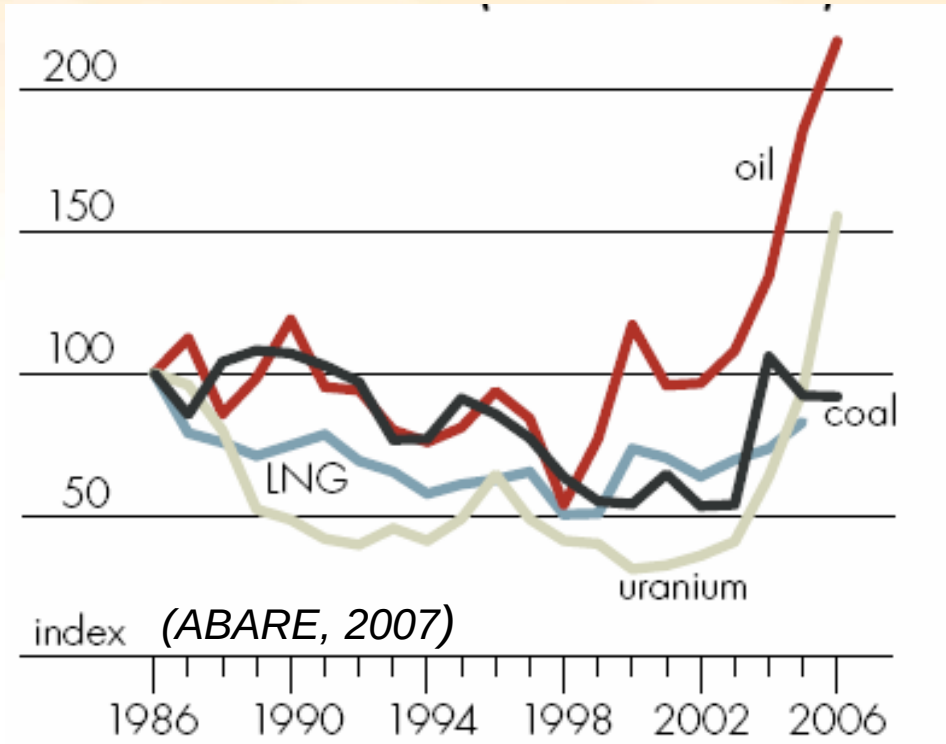
Qld 13% Gas Scheme

- Motivation
  - High coal dependence
  - Qld Government concerned
    - "vulnerability of State's economy to the introduction of any national and international greenhouse gas abatement measures (such as the introduction of ETS)"
- Implementation
  - Retailers obliged to source >13% of elec. from 'new' gas-fired gen. from 2005
- Performance to date
  - Has driven considerable gas-fired generation + associated supply infrastructure in QLD
  - Highly concentrated supply + demand
    - Effectively 2 major buyers and sellers
  - Govt. commitment to expand to 18% target in 2020



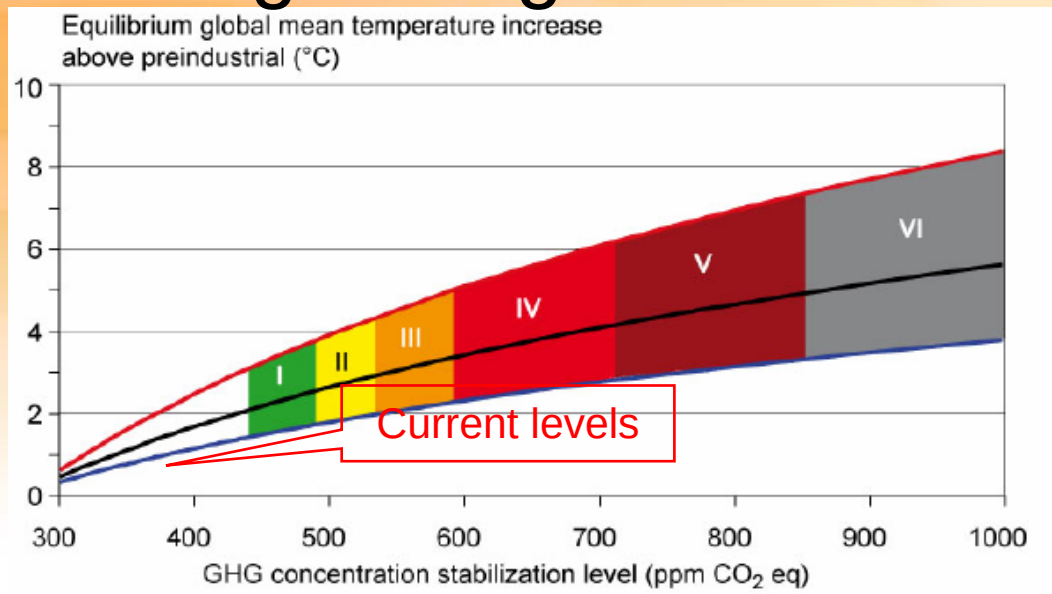
Emissions Trading: putting a price on carbon

- Energy highly valuable so already a price on carbon
  - Production costs, royalties, economic rents… also subsidies
  - *Many costs/benefits are externalities unless addressed by govt*
- Greenhouse emissions the latest externality
  - Underlying prices wrt CO2 variable but generally low
  - US$120/Barrel oil => ~400kgCO2 = ~$300/tCO2
  - US$100/t Coal => ~2.5tCO2 = ~$40/tCO2
  - US$5/GJ Gas => ~50kgCO2 = ~$100/tCO2
- Adding a greenhouse 'cost' on Carbon to reflect its env. costs changes prices
  - *Eg. US$50/tCO2 emitted => oil +15%, coal +125%, gas +50%*
  - *However, these prices are changing due to other factors as well*



(ABARE, 2007)

The emissions challenge: avoiding dangerous warming through stabilisation



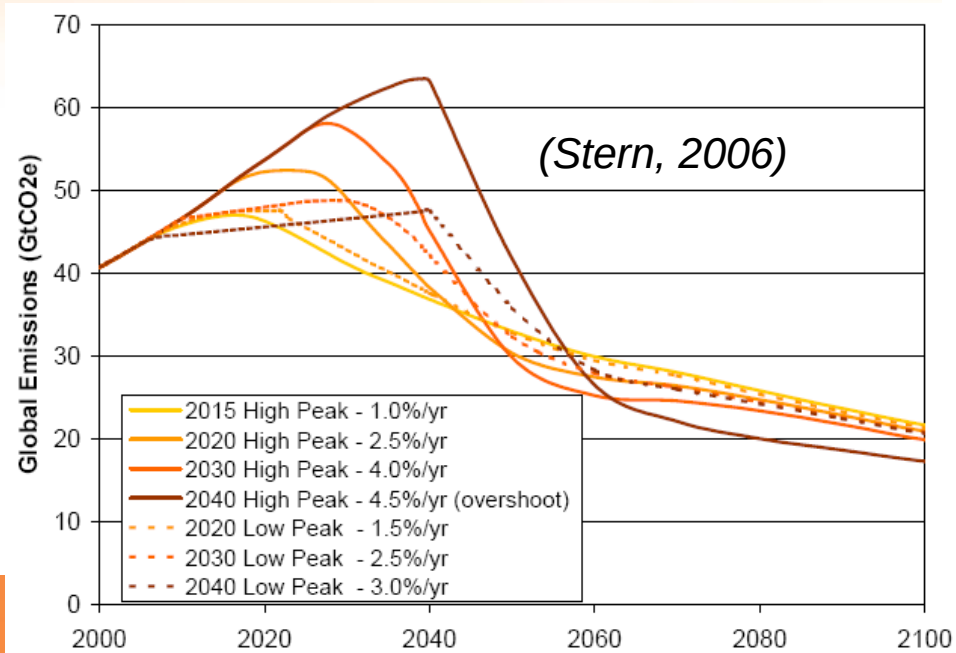
(FAR WGIII, 2007)

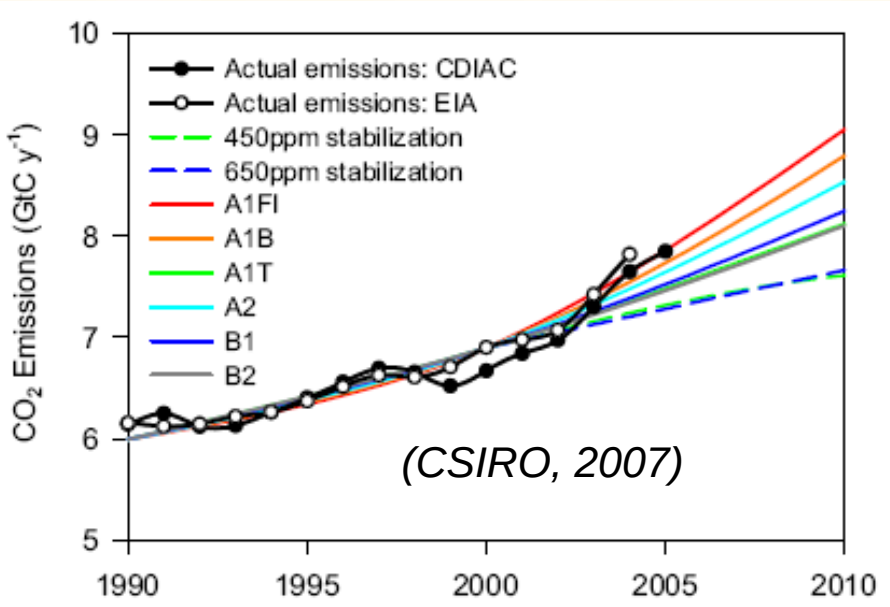
Table SPM.5: Characteristics of post-TAR stabilization scenarios [Table TS 2, 3.10][a)]

Category	Radiative Forcing (W/m^2)[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

…. and possible emission trajectories

- Note high 'price' of delay
  - Waiting 20 years to act requires emissions to fall 3-7 times faster to a lower level
- *… current trajectory exceeds the 'worst case' IPCC scenarios from TAR*

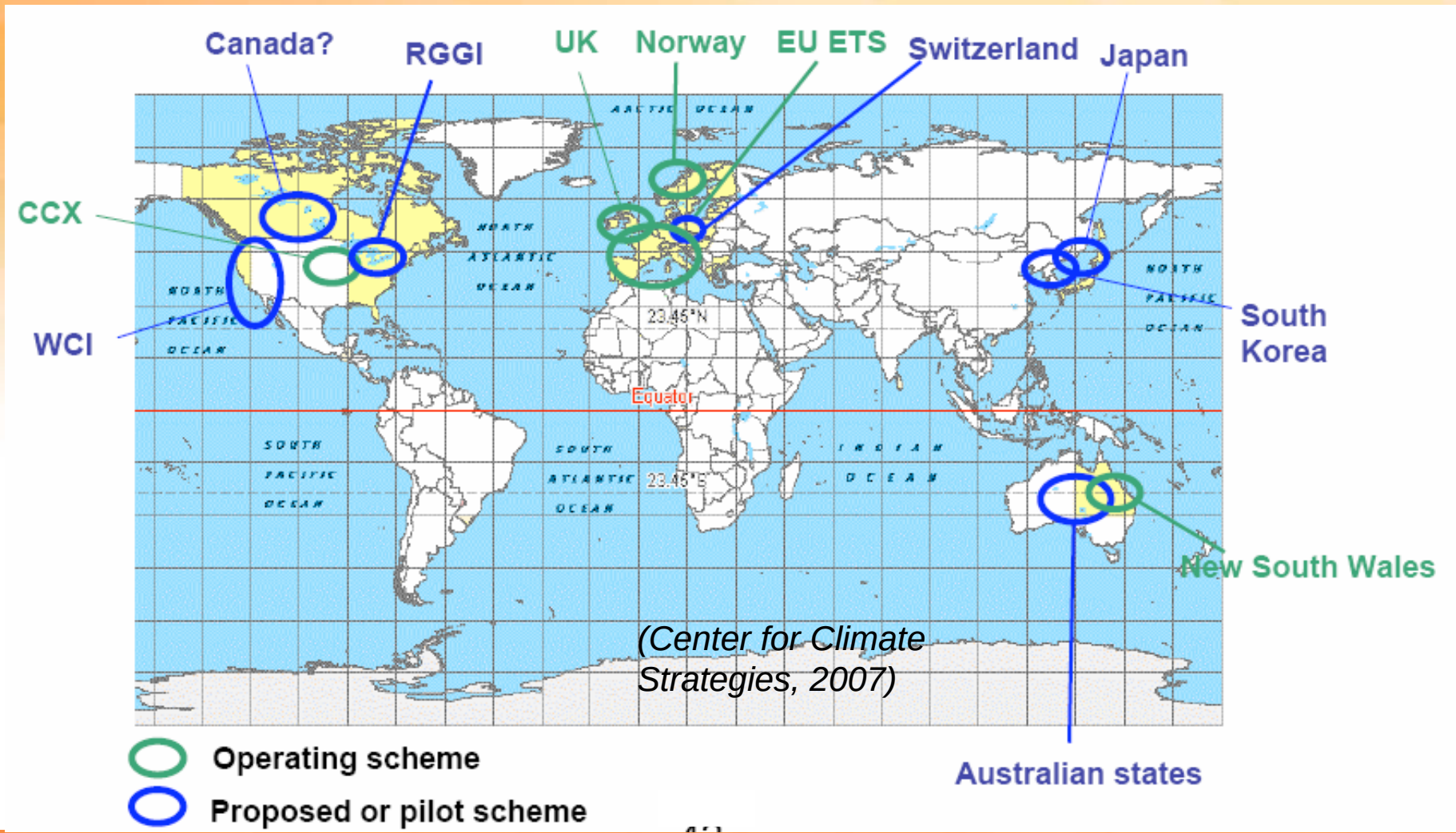




What policy role can ETS play?

- ETS only effective wrt its ability to drive changes, operational but especially investment, in markets that drive physical emissions – most importantly energy markets
- 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 + energy 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 compromises that reduce effectiveness
- 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

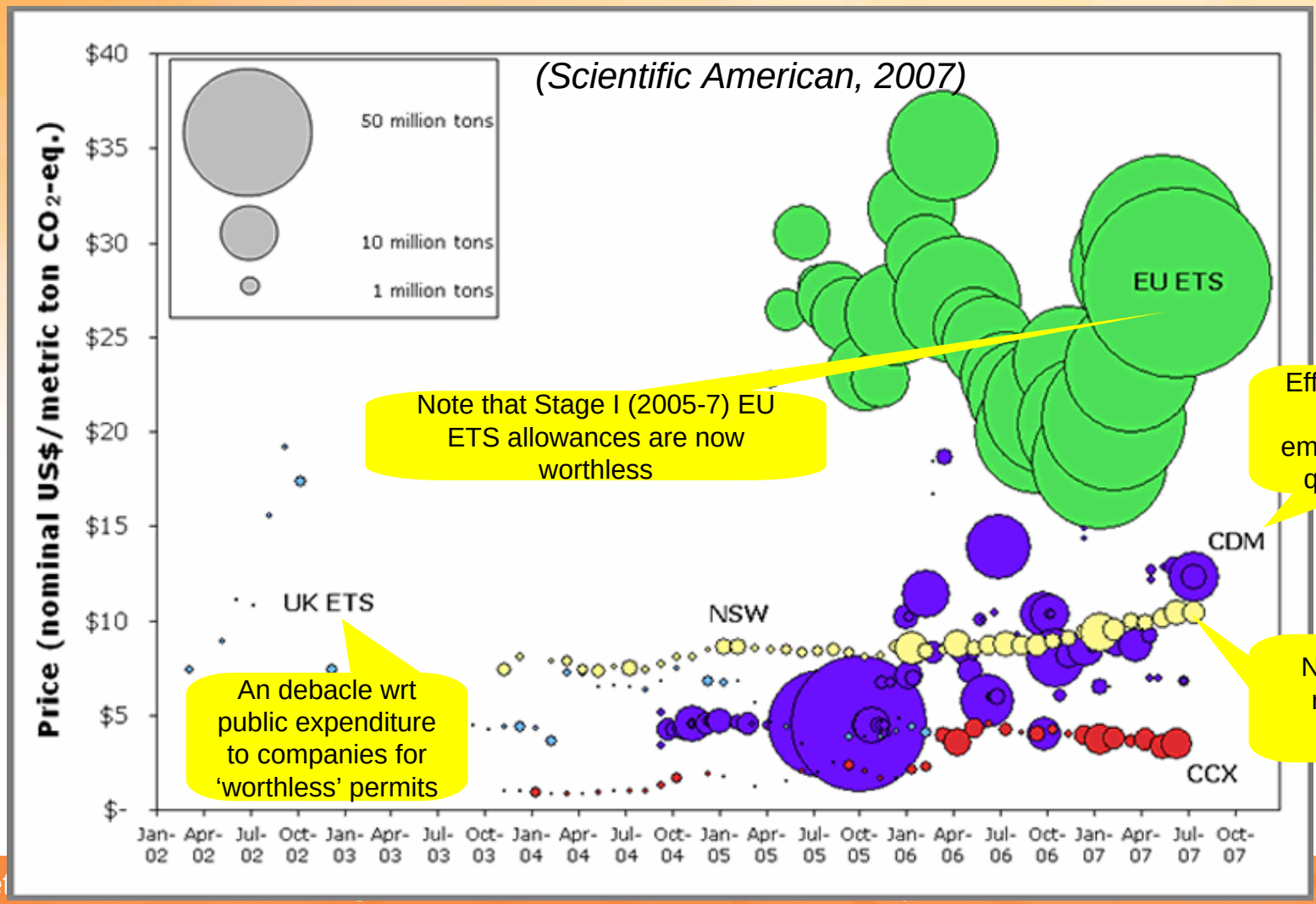
Existing and proposed ETS around world



Scheme	Emissions covered	Geographical reach	Emission sources targeted	Number of sources	Absolute or relative targets?	Start
EU ETS	CO_2	European Union	Large industrial and energy-intensive installations	~10,000 units	Absolute targets	2005
NSW GGAS	CO_2, CH_4, N_2O, PFCs, HFCs, SF_6	New South Wales (Australia)	Power generation, energy efficiency, industrial processes and carbon sequestration in forests	>160 projects so far and 32 benchmark participants	Relative targets	2003 (NSW) & 2005 (ACT)
JVETS	CO_2	Japan	Direct emissions from combustion of fuels and waste materials; direct emissions from processing chemicals and materials; and indirect emissions (e.g. use of grid-electricity)	90 entities	Absolute targets	2006/2007 (participant-dependent)
RGGI	CO_2	A group of Northeast and Mid-Atlantic US states	Electricity generating units that have a nameplate capacity equal to or larger than 25 MW and burn more than 50 per cent fossil fuels	Between a few and a few hundred units per state	Absolute targets	Compliance starts in 2009
CCX	CO_2, CH_4, N_2O, PFCs, HFCs, SF_6	US, Canada, Mexico, Brazil	Sources in the electric power sector and fossil fuel combustion and process emissions in the manufacturing sectors	43 entities ("Members")	Absolute targets	2003
CDM & JI	CO_2, CH_4, N_2O, PFCs, HFCs, SF_6	Global involvement	A wide range of activities	467 registered CDM projects, >100 JI projects in the pipeline	No targets	2005 (CDM) & 2008 (JI)

(PWC/IETA, 2007)

Performance to date has been mixed



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)

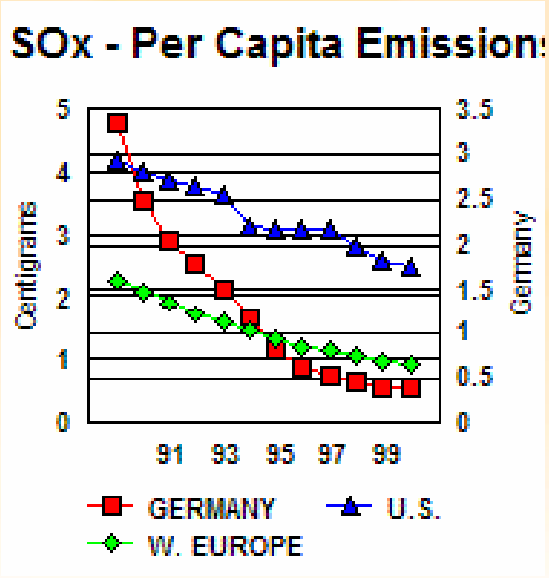
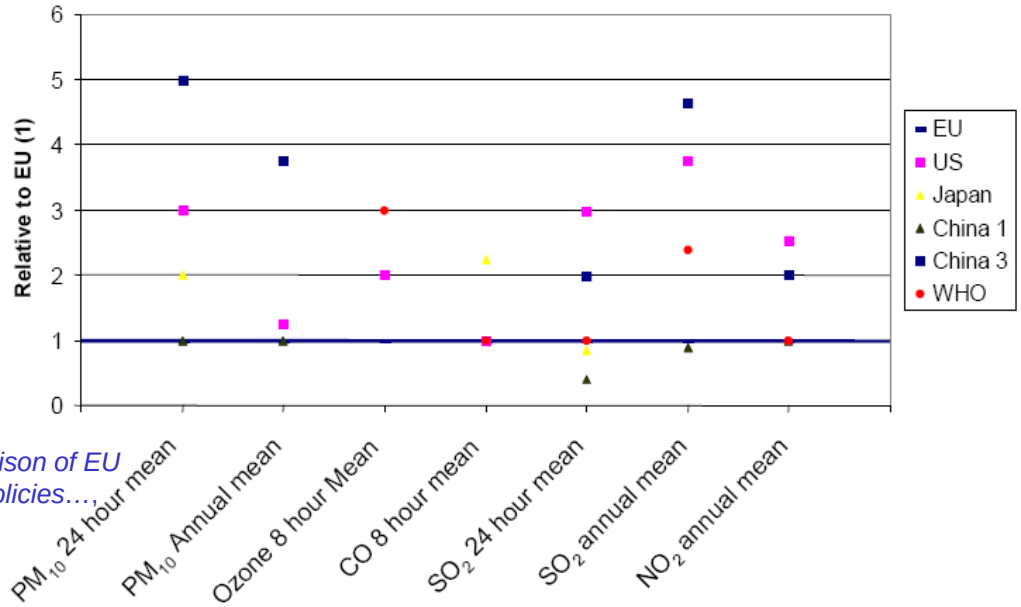


Table 6. Summary of Air Quality Expenditures by Region.

		€ 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)

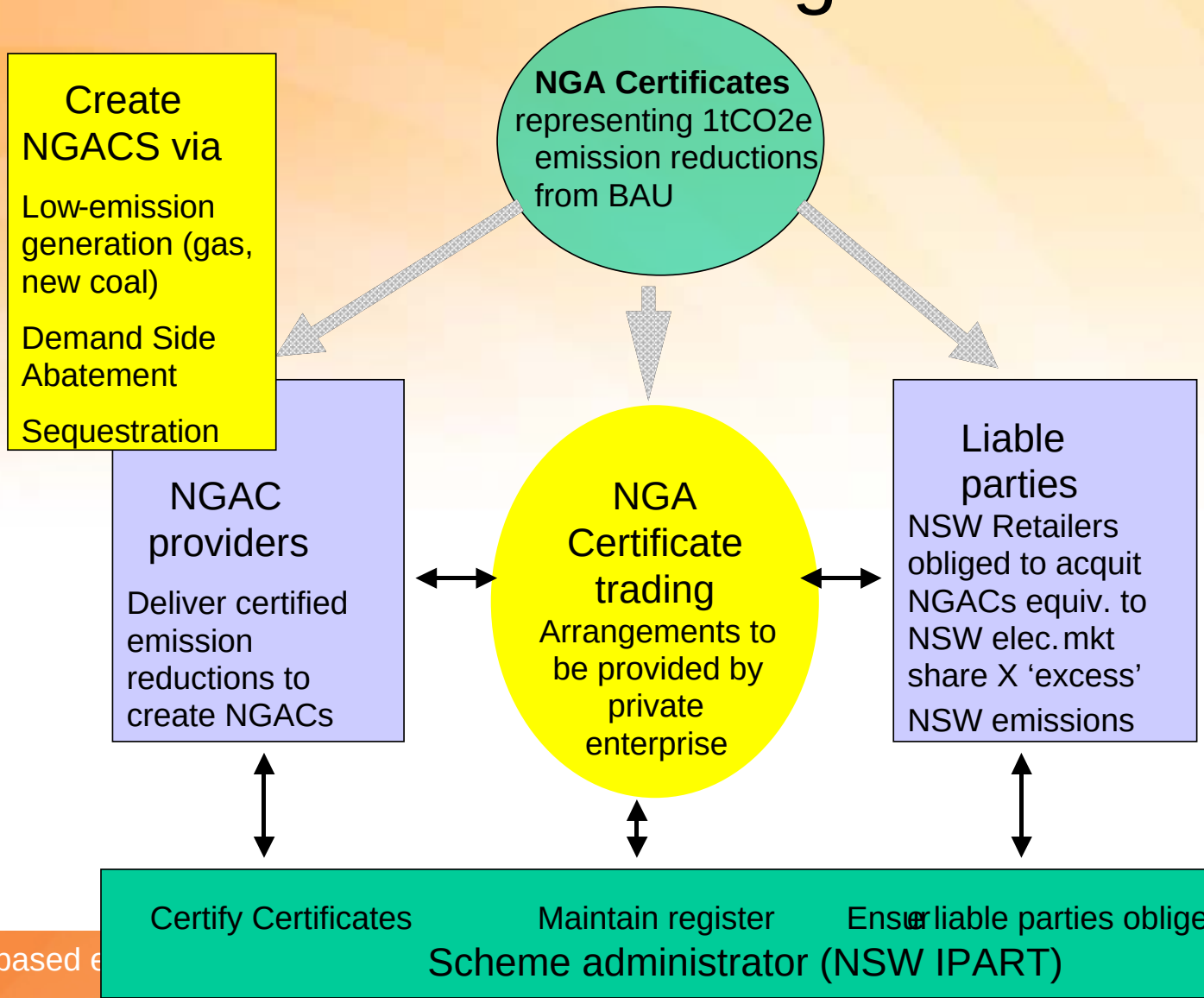
The EU ETS

- 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)

NSW Greenhouse Scheme

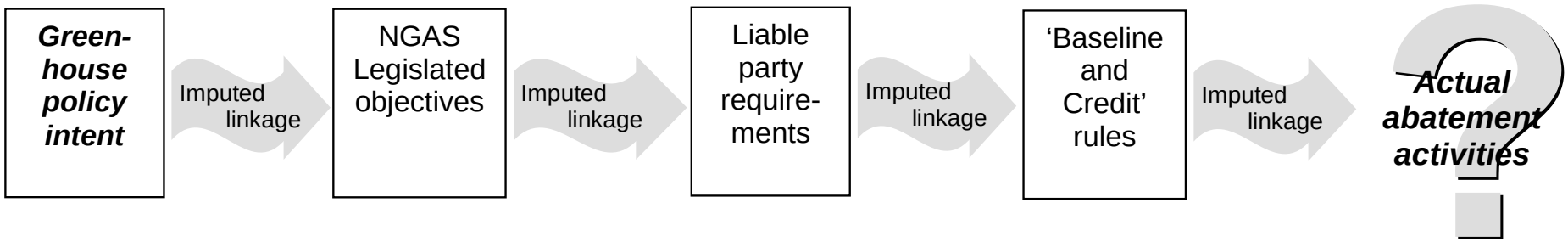
- Policy intent
  - "reduce greenhouse gas emissions associated with the production and use of electricity..."
    (Overview to the Electricity Supply Amendment Bill, 2002)
- Implementation
  - State per-capita greenhouse gas emissions targets for the NSW Electricity Industry via Retailer Licence Conditions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

NSW Scheme – a 'designer' market



Challenges of GGAS design

- Highly abstracted design
  - major separation b/n policy objectives + commercial arrangements + physical outcomes
- Very wide scope
  - Adds complexity, dilutes accountability
  - Risks creating a 'market for lemons'



Environmental performance – fungibility?

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

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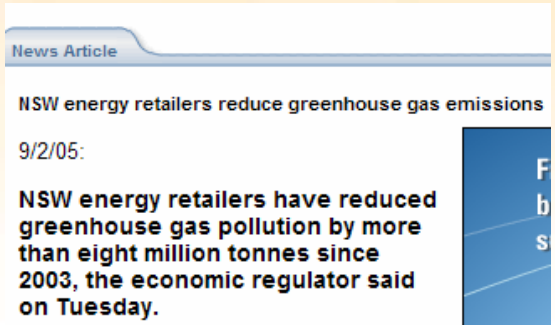


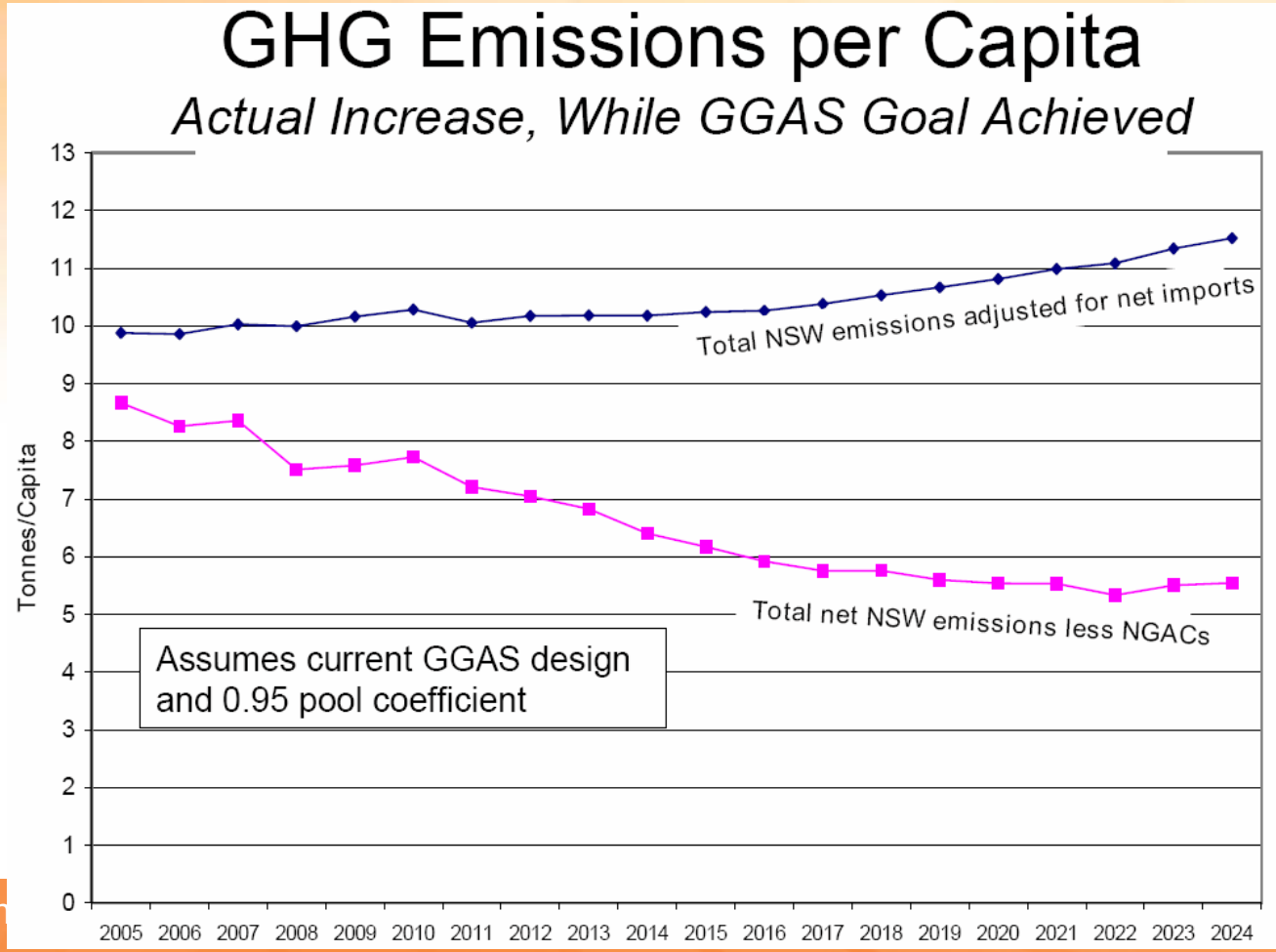
Physical, measurable emissions from fossil-fuel consumption

Estimated net CO2 fluxes from select ecosystems

Hypothetical estimates of emission reductions from counter-factual BAU baselines

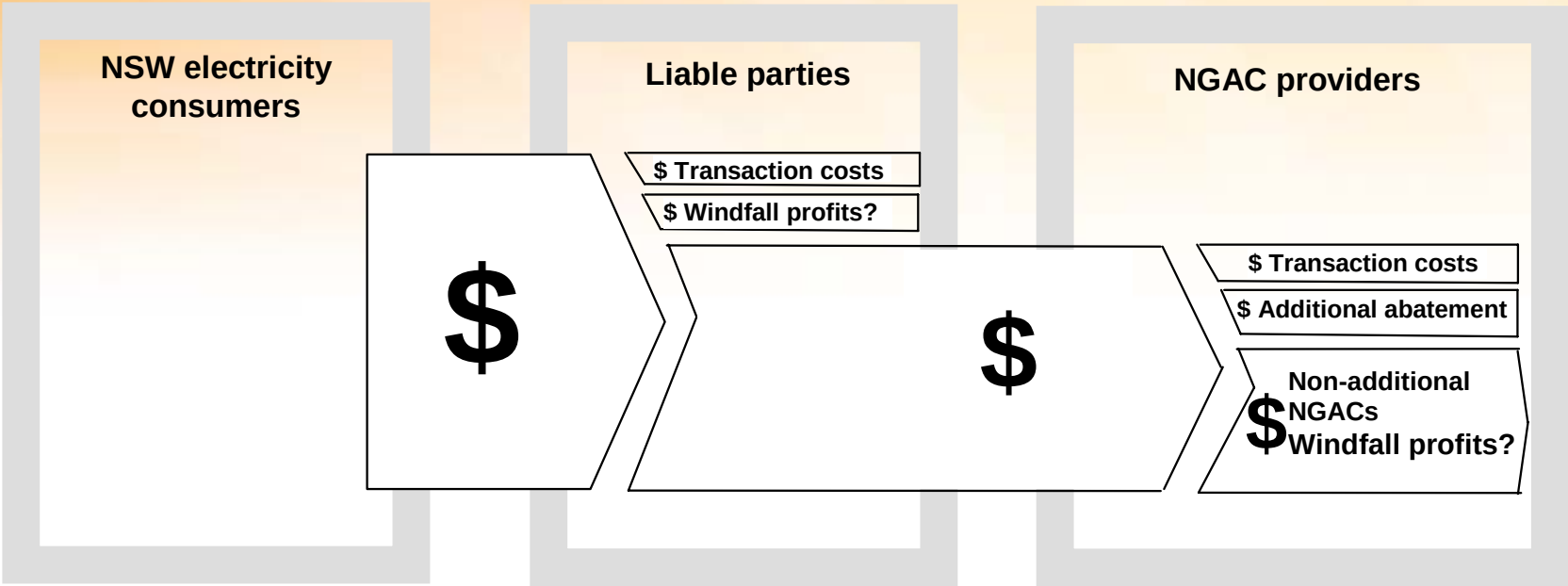
Low environmental effectiveness

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



Poor efficiency + equity outcomes

- Efficiency generally low when environmental effectiveness low
  - especially when high transaction costs + windfall profits
- Equity often threatened when environmental effectiveness low
  - Potential that some key stakeholders have captured the policy process



- **What next?** NSW Govt. has announced Scheme will end in 2010, transition arrangements being determined

Energy sector investment decision making

- 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, high political interest
- A wide range of risks; only some can be formally managed
- Key issue of **governance** risk
  - Governments proving inadequate to task of implementing ET schemes that support & protect low-emission investment
  - Therefore rational for sector participants to avoid making such investments foras long as possible to see if Govt will 'fold' to demands of large emitters for protection

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

CATEGORY	TYPES	EXAMPLES
ECONOMIC RISK	Market risk	• Inadequate price and/or demand to cover investment and production costs • Increase in input cost
	Construction risk	• Cost overruns • Project completion delays
	Operation risk	• Insufficient reserves • Unsatisfactory plant performance • Lack of capacity of operating entities • Cost of environmental degradation
	Macroeconomic risk	• Abrupt depreciation or appreciation of exchange rates • Changes in inflation and interest rates
POLITICAL RISK	Regulatory risk	• Changes in price controls and environmental obligations • Cumbersome administrative procedures
	Transfer-of-profit risk	• Foreign exchange convertibility • Restrictions on transferring funds
	Expropriation/ nationalisation risk	• Changing title of ownership of the assets
LEGAL RISK	Documentation / contract risk	• Terms and validity of contracts, such as purchase/supply, credit facilities, lending agreements and security/collateral agreements
	Jurisdictional risk	• Choice of jurisdiction • Enforcement risk • Lack of a dispute-settlement mechanism
FORCE MAJEURE RISK		• Natural disaster • Civil unrest • Strikes

Source: World Energy Investment Outlook (IEA 2003)

Australian ETS proposals to date

(State & former Fed. Governments (now new Garnaut Review)

- Cap and Trade scheme
  - *Comment: better termed hybrid given price caps (Garnaut: no price caps or floors)*
- 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. 4th 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 (Garnaut – multiple trajectories depending on international action)*
- 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 (Garnaut – no compensation for non-TEEI, possible ex-post cash compensation for TEEI)*

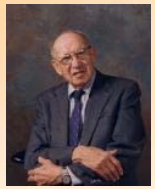
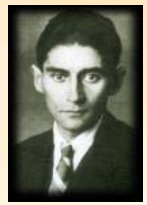
Possible policy conclusions wrt ETS

- 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*

Good governance in env. market design

- **Participation**
  - particularly those who will be paying (energy users) rather than just those who hope to get paid
- **Direction and strategic vision**
  - political commitment to effective schemes rather than window dressing
- **Performance**
  - Responsiveness: Institutions and processes try to serve all stakeholders
  - **Effectiveness and efficiency** – minimise abstraction + scope; commercial 'windfall' profits waste cashflow on parties not taking appropriate action
- **Accountability**
  - **Accountability** – Public justification for chosen rules + accountability wrt who made decisions
  - **Transparency** – Processes, institutions and information directly accessible with enough information to understand and monitor them
- **Fairness**
  - Equity: Ineffective schemes + windfall profits have adverse equity impacts
  - Rule of Law: minimise political 'discretion'

A challenging policy process

- Ideally
  - "Start with what is right rather than what is acceptable"
    - Peter F. Drucker  and/or Franz Kafka 
- In practice
  - "Politics is not the art of the possible. It consists in choosing between the disastrous and the unpalatable."
    - John Kenneth Galbraith 
- **The risks** – many moral hazards for ETS designers *(not just with 'baseline and credit' schemes)*
  - "The UK ETS seems to have suffered from a very common problem: policy-makers in an attempt to secure industry support and cooperation become far too reliant on industry guidance, subsequently leading to regulatory capture, and the extraction of concessions for industry cooperation." (Von Malmborg and Strachan, 2004)