



UNSW SCHOOL OF ELECTRICAL ENGINEERING + TELECOMMUNICATIONS
ELECTRICITY RESTRUCTURING GROUP

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Market Based Environmental Regulation in the Restructured Australian Electricity Industry

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Presentation outline

- The role of env. regulation in the electricity industry
- Key Australian market-based regulatory measures for climate change
 - Electricity industry ‘reform’
 - Mandatory Renewable Energy Target (MRET)
 - NSW Greenhouse Benchmarks Scheme
- Key lessons from experience to date
- Where next?



Why have government?

- A possible economist's (and Australian NCP) perspective
 - *For when the market does not provide efficient outcomes for society; ie. market failures*
 - Monopolies
 - Public Goods
 - Incomplete markets
 - Information failures
 - The 'Business Cycle'
 - ***Externalities – eg. climate change***
- Governments can act on these
 - *They tax, spend and **regulate***



Electricity markets and env. regulation

- Regulation to ensure imperfect market 'means' lead to desired environmental 'policy' ends
 - *Electricity* markets pose particular challenges
 - Shared nature of operation + hence decision making
 - *Externalities* pose particular challenges
 - Measurement, private cost – public benefit analysis
 - **Climate change** poses yet further challenges
 - Fundamental transformation that seems required (no easy 'fix')
- Regulatory approaches
 - Technical 'command and control'
 - **Financial**
 - pollution taxes
 - **markets in tradeable permits / credits**
- *Market-based EI => must be effective yet compatible*



The restructured Australian EI

- Restructuring underway for a decade + continues (eg. CoAG Energy Market Review)
- Centrepiece is a multi-region NEM
 - Wholesale spot market with 30 minute bidding, 5 nodes (modified transport model for Tx)
 - Active forward trading of financial instruments
 - Ancillary services markets for frequency control
 - Compulsory for all generators + dispatchable links > 30MW, Network Service Providers + retailers

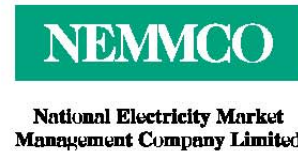
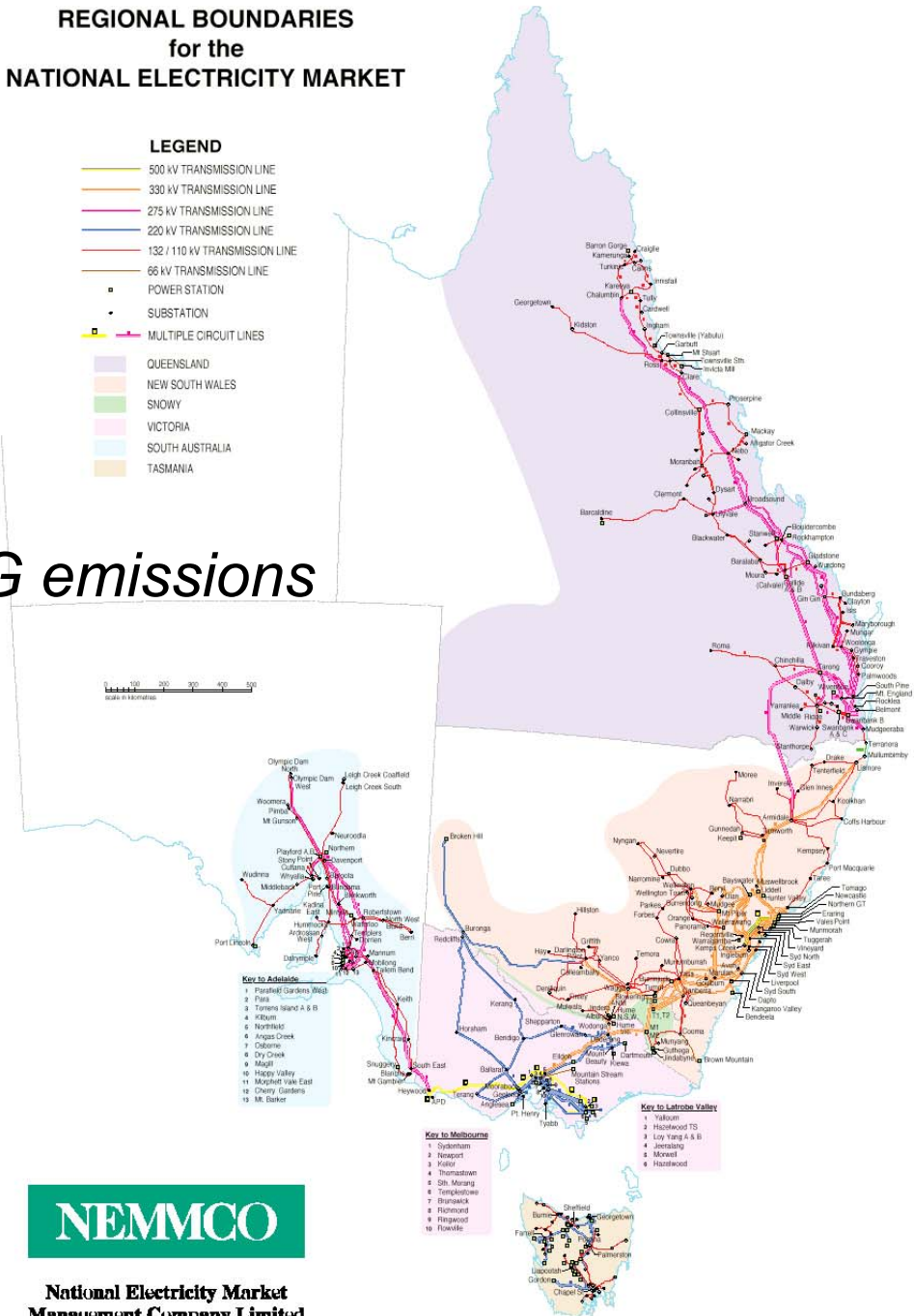


The NEM

- 5 States + territories
- covers ~90% of population
- *nearly 30% of national GHG emissions*

LEGEND

- 500 kV TRANSMISSION LINE
- 330 kV TRANSMISSION LINE
- 275 kV TRANSMISSION LINE
- 220 kV TRANSMISSION LINE
- 132 / 110 kV TRANSMISSION LINE
- 66 kV TRANSMISSION LINE
- POWER STATION
- SUBSTATION
- MULTIPLE CIRCUIT LINES
- QUEENSLAND
- NEW SOUTH WALES
- SNOWY
- VICTORIA
- SOUTH AUSTRALIA
- TASMANIA



Market based regulation of the



Greenhouse market-based regulation

- EI subject to a confusing mix of Federal and State govt. objectives + jurisdictions (+ ownership + ...)
- We will consider
 - **Electricity industry restructuring to date**
 - **Mandatory Renewable Energy Target (MRET)**
 - **NSW Greenhouse Benchmarks scheme**
 - Queensland 13% Gas scheme
 - Green power



Impact of Australian EI restructuring

- CoAG national energy policy objectives include the need for action on climate change
- National Electricity Code (NEC) doesn't include specific env. objectives
- However, expectation by some that would help “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



Outcomes of Australian EI restructuring

- Instead, now projected to increase 0.1MtCO₂ above BAU (CoAG, 2002)
 - Low cost of coal fired generation in Australia
 - Current failure to price greenhouse emissions
 - Excess electricity capacity depressing prices
 - Relatively immature and inflexible gas market
 - Reduced emphasis on EE from lower prices
 - Market design and regulation that favours incumbents (eg. for wind)
 - Supply-side orientation of reforms to date



Mandatory Renewable Energy Target



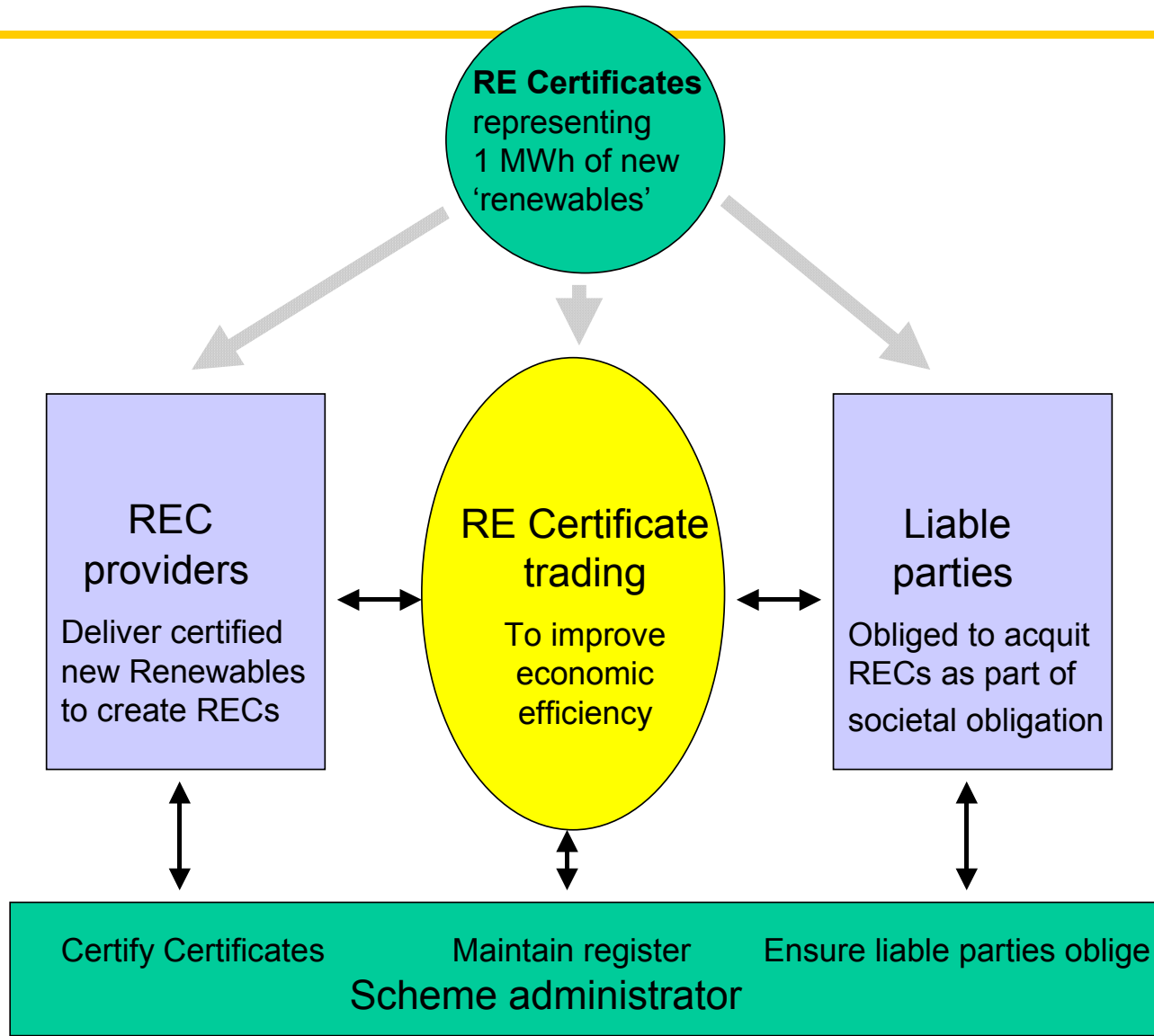
Renewable Energy (Electricity) Act 2000

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.

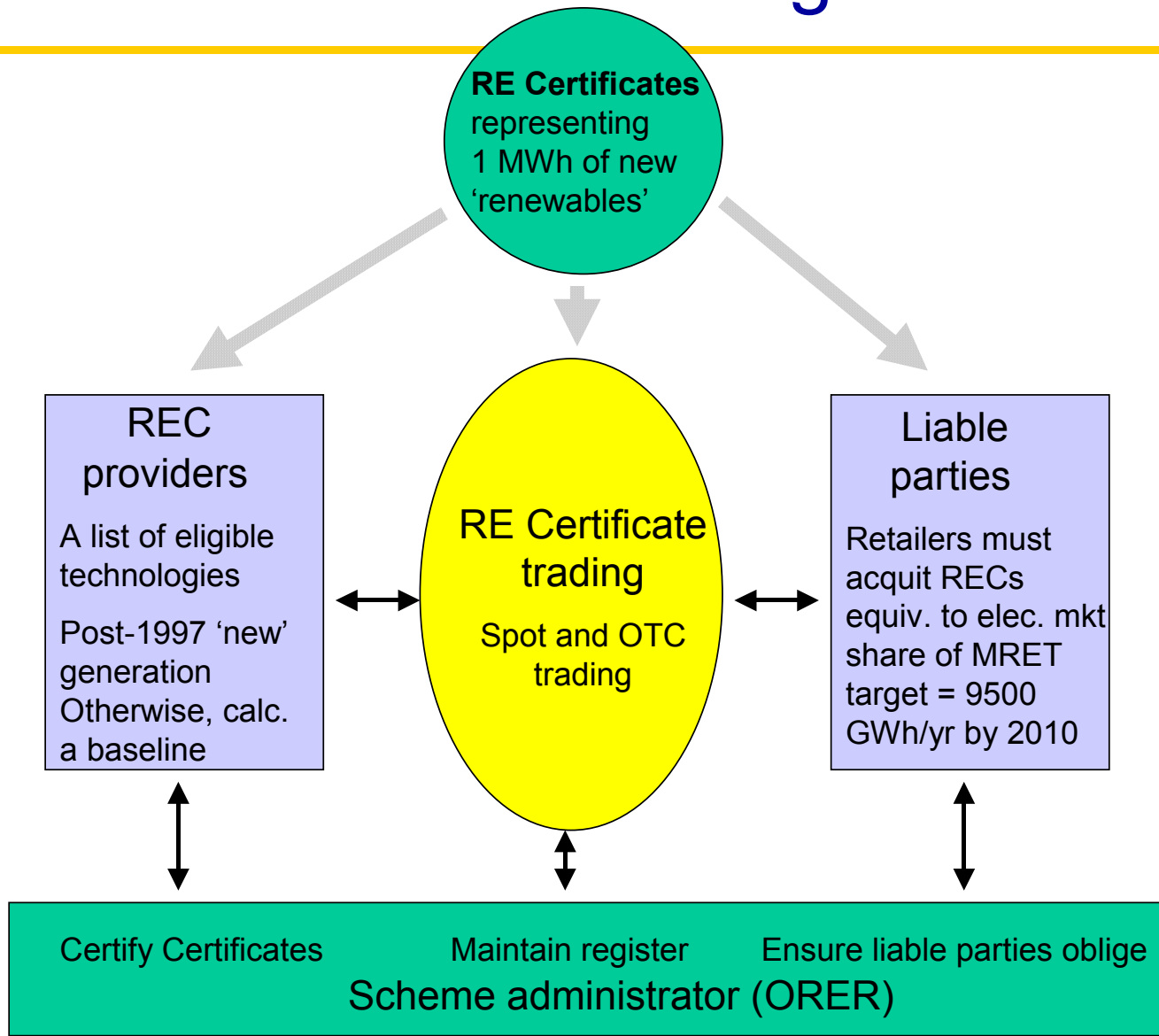


MRET – a ‘designer’ market





MRET 'settings'





MRET performance to date

- Now operating for two years
- Ramping target easily met
- Challenges
 - Public opposition to some ‘eligible’ renewables
 - Inadequate target, in terms of settings (+2%) and objectives for greenhouse + industry development
 - Market information failures
 - Can register RECs any time => information asymmetry
 - Only annual acquittal => poor price discovery
- **Baselines**
 - **All BAU baselines are ‘made up’**
 - **Large hydro particularly problematic**
 - Baseline for hydro scheme where output limited by demand
 - Variable renewable generation and ‘The ratchet’

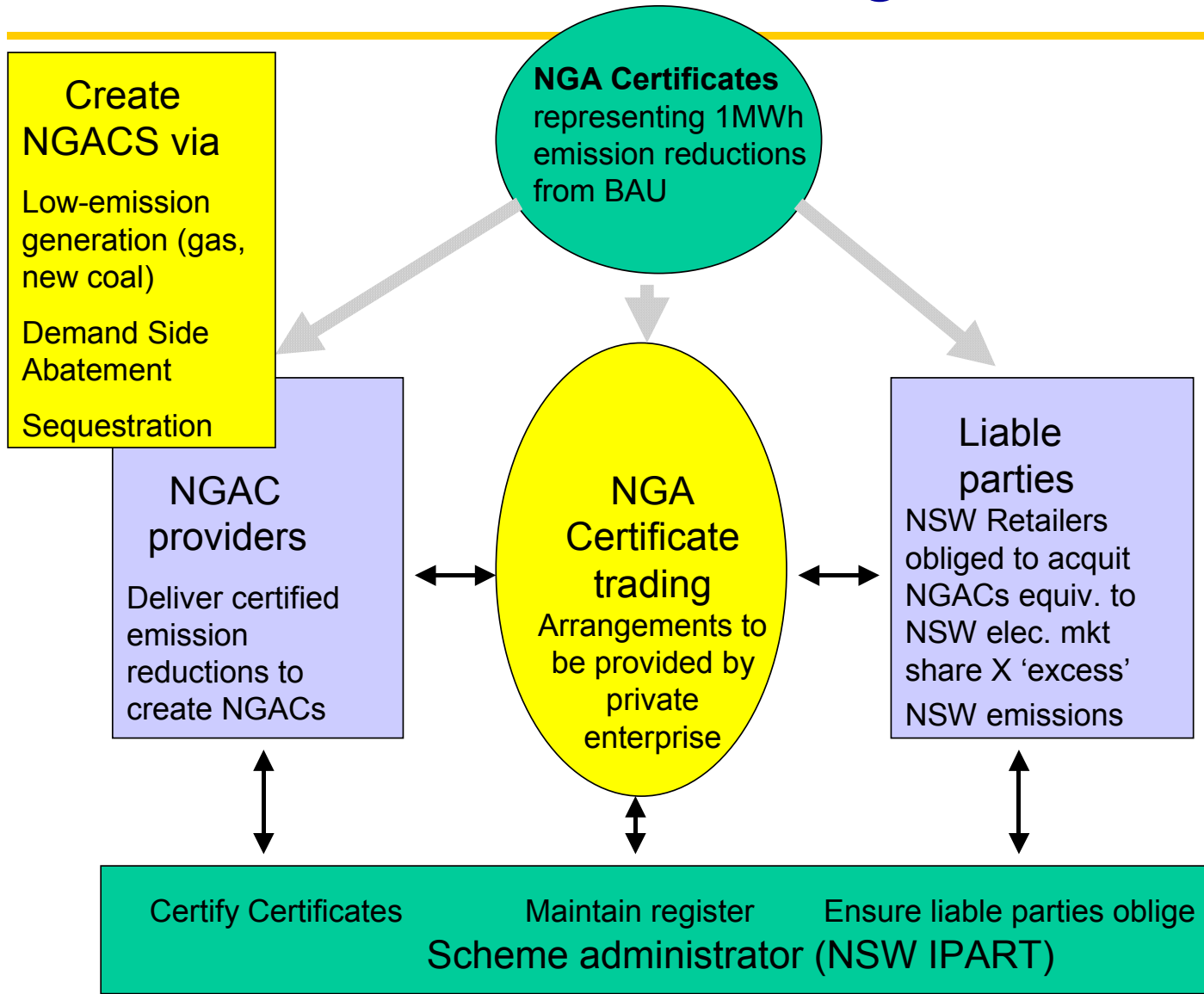


NSW Greenhouse Benchmarks Scheme

- 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





NSW Scheme - Challenges

- Jan 2003 start - still being finalised...

however

- Fungibility of different emissions reduction activities: is planting trees equivalent to building wind farms ...how do you measure planting trees in a 'credible' way
- 'Imputed' emissions rather than physical emissions
- Many baselines reqd, and for very different activities
- Double counting (free-riding) other policy measures
- Complexity
- Jurisdiction: eg. new gas-fired generation anywhere in NEM can create GHG reductions for NSW target



Key lessons

- Electricity Industry restructuring
 - *Will not 'necessarily' deliver improved environmental outcomes*
 - Requires pricing externalities, *yet more*
 - Motivation and ability for demand-side to participate
 - Design, regulatory and institutional choices should not favour centralised incumbents and supply-side players
 - Clear role for technical regulation – eg. demand-side MEPS
- Perils of abstraction
 - Complexities, moral hazards
 - Particular challenges for 'baseline and credit' schemes
- Possible policy interactions that reduce effectiveness
 - both unintended (complexity) and free-rider moral hazards
- Possible problems with trading schemes
 - 'Market for lemons' if tradeable commodity not credible



What's next?

- NEM – supply tightening, new CCGT.. but also new coal, and plans for more
- Projected that emissions with present 'climate change' measures will still rise markedly
- CoAG Energy Market Review recommends *National emissions trading to replace MRET, NSW Benchmarks, and Qld 13% Gas scheme*
- Market-based environmental regulation is proving harder than many had hoped....