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Designing effective and efficient environmental markets for the energy sector

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Energy and climate policy

- *Energy* market failures and incompleteness:
  - Monopolies, public goods, incomplete markets, information failures…
  - **Externalities**
    - Energy security, social impacts, local/regional environmental impacts (air, land, water)
    - **Climate change**
- Require a public policy response:
  - Pattern of government decisions and actions to solve public problems (Laws & Meyer,1999)
- Where Governments act to change societal decision making:
  - Taxation
  - Spending
  - **Regulation:** least understood but potentially most far-reaching and powerful option. *(NB. Taxation also via regulation)*

Climate policy options – a role for env. markets

- Taxation:
  - eg. Load-Based Licensing of pollutants, Tax Credits, Carbon Tax…
- Government spending:
  - eg. information, encouragement, financial assistance, public R&D…
- Regulation:
  - Direct 'command + control' mechanisms
    - eg. technical performance standards
  - **Designer environmental markets:**
    - Set a societal environmental objective + create market that achieves this by 'environmental' price influencing participant decision making
    - Eg. MRET, EU ETS, NSW GGAS, Qld 13% Gas Scheme
  - *Potential advantages over conventional policy approaches*
    - leaving decision making to those best placed to make them
    - competitive pressures to drive innovation + reduce costs of compliance
  - *A promising but still flawed policy tool:*
    - New challenges for policy makers + other stakeholders
    - **Proving harder than many had hoped**

Designing environmental markets

- Criteria:
  - Environmental performance – *objective achieved?*
  - Economic efficiency – *at least cost?*
    - **Productive**: participants act to reduce own environmental impacts
    - **Allocative**: participants with lower env. impacts advantaged
    - **Dynamic**: participants driven to innovate + transform themselves – *The most important efficiency when substantial change needed*
  - Equity – *while being fair + supporting other societal objectives?*
- Key issues:
  - **Design**: the rules
  - **Settings**: targets
  - **Structure**: who are the participants
  - **Context**: the wider policy framework; governance + institutions
- *The key challenge - establishing a robust design process:*
  - That contains self-interested distortions to the scheme
  - That delivers the design objectives in an efficient & equitable manner

The design process

- Stakeholder participation in the design process:
  - Incumbents have substantial influence:
    - Important knowledge & expertise but also information asymmetry
    - Equity - individual participants will be advantaged/disadvantaged
  - Ensure other stakeholders have a voice:-new entrants, public interest
- Transparency:
  - How and by whom were decisions made?
- Accountability:
  - Who takes responsibility for particular decisions?
- Robustness:
  - With respect to political, institutional and industry influence
- Ongoing scheme review + improvement:
  - Separate responsibility for each of design, administration & review

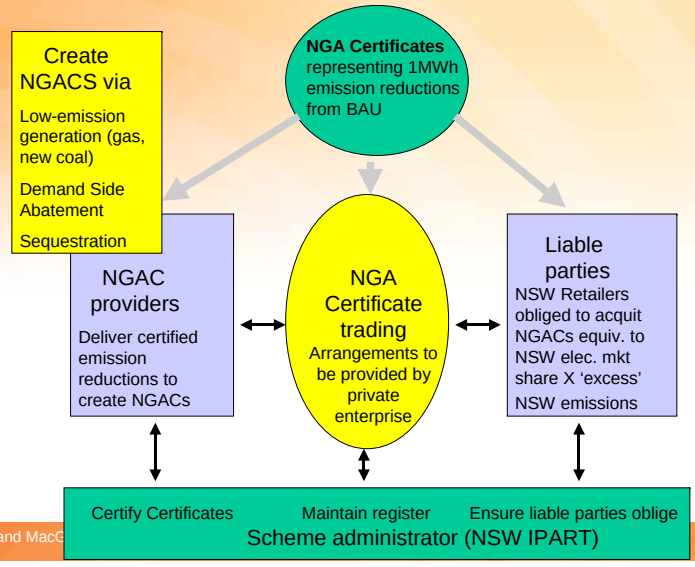
Example: the MRET design process

- Renewables Target Working Group final report
  - Unable to form consensus on baselines for 'old hydro'; instead offered 3 options:
    1. Do not include any renewable energy projects in commercial operation prior to 1997 – *favored by Fed. Govt + WA*
    2. Provide regulator with discretion to decide proportion of existing renewable generator output eligible to earn RECs – *favored by QLD*
    3. Make existing generators eligible for RECS for generation above baseline to be determined through political process – *favored by TAS.*
- Final scheme baseline design was **option 3:**
  - 'old-hydro' projected to supply near 30% of total REC demand:
    - *Inefficient windfall profits & reduced opportunities for new renewables*
- Tambling Review:
  - Unwilling or unable to address this issue before 2020
  - Proposed 15 year sunset clause for generators starting 2005.

Market design

- Environmental markets are designer markets:
  - Governments create + can change rules with few restrictions:
  - Creates both opportunities & risks for scheme design
- Fundamentals: any effective market will require:
  - A tradeable commodity
  - Willing buyers and sellers
  - Adequate competition between traders
  - Governance & institutions that support market operation over long-term
- Key 'allocation' issues:
  - **Scheme cash flow:** determines scheme efficiency & outcomes
  - **Risk:** Inevitable uncertainties in targets; participant behaviour; industry structure; wider policy context. Many uncertainties can't be eliminated & must be assigned:
    - *eg. Investor certainty vs policy effectiveness*

Example: NSW GAS as a 'designer' market



Design – establishing a fungible commodity

- Choice between permission to do something (**Permits**), or **Credits** for doing something
- *Measurable + relevant to scheme objectives*

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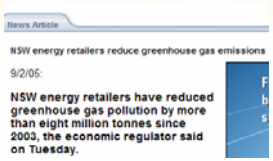


Physical, measurable emissions from fossil-fuel consumption

Estimated net CO2 fluxes from select ecosystems

Hypothetical estimates of emission reductions from counter-factual BAU baselines

Measurability: GHG emissions uncertainties

(Australian 4th Communication to UNFCCC, 2006)

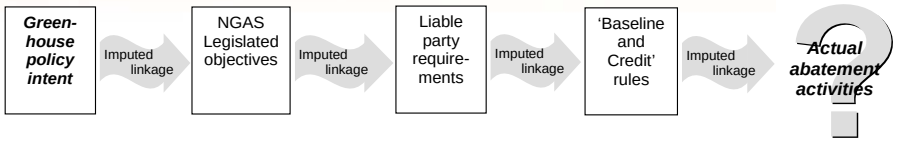
Uncertainty in the emissions estimates for each sector or subsector can be summarised as follows:

- Stationary Energy and Transport—less than 10% for estimates of CO_2 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%.

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

Relevance to scheme objectives

- eg. MRET 'new' renewable generation with RECs generated by old-hydro
- eg. GGAS per-capita GHG emission targets met by abstract imputed 'emissions abatement' wrt made-up baselines(NGACs)



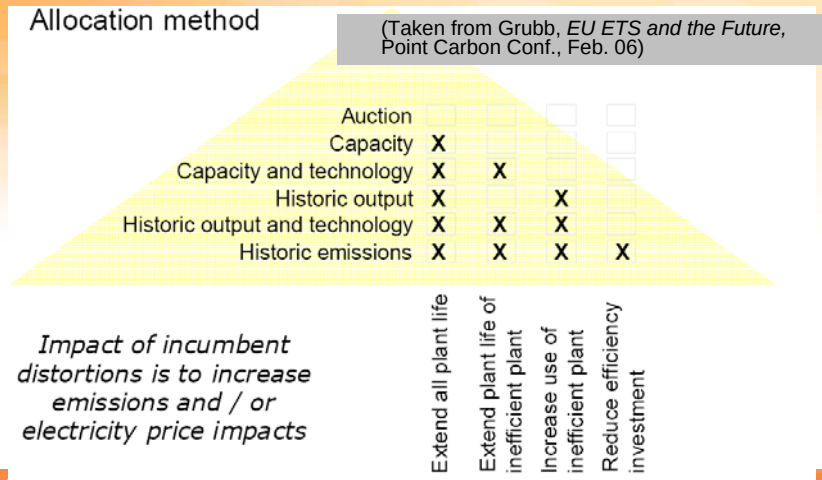
Design – willing buyers + sellers

- Buyers:
  - Generally, mandatory requirement placed on chosen participants
  - Motivation depends on target allocation: grandfathering vs auctioning
  - *Responsible for environmental impacts? polluter pays or paid?*
  - *Able to act to reduce these impacts? or only pay others to do so*
  - *Able to pass on costs? A private liability or easily socialised?*
- Sellers
  - Generally voluntary: given permits/credits or allowed to create them
  - Motivation also depends on target allocation
  - *Opportunities for reducing environmental impacts?*
  - *Additional effort or only BAU?*
  - *Generally a privatised benefit*

Eg. Poor allocation damages efficiency:

dynamic: extending inefficient plant life, reducing investment in efficient plant
productive + allocative: increased use of inefficient plant

(Taken from Grubb, *EU ETS and the Future,* Point Carbon Conf., Feb. 06)



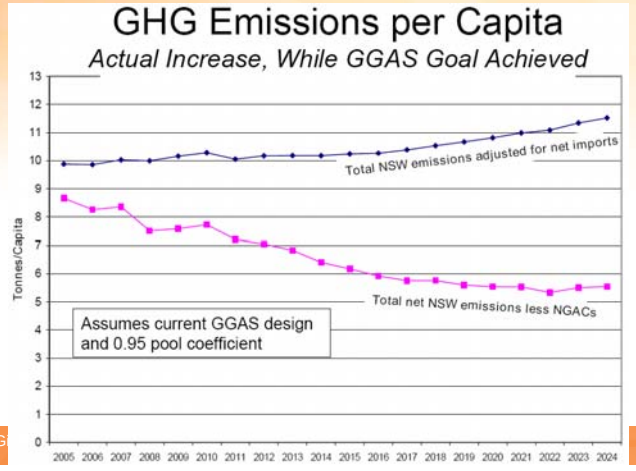
Impact of incumbent distortions is to increase emissions and / or electricity price impacts

Setting targets: eg. UK climate policy

- "They are real relative savings. They are measured against the baseline that was projected… they are genuine reductions on what would otherwise have happened had these policies not been put in place" (DEFRA official questioned by House of Lords Science & Technology Committee, 2005)
- "If savings are real, they cannot be relative – it is meaningless to talk of savings against what might have happened had certain policies not been in place… We recommend that the Government ground its targets more firmly in reality" (Committee response, Energy Efficiency Rpt, 2005)

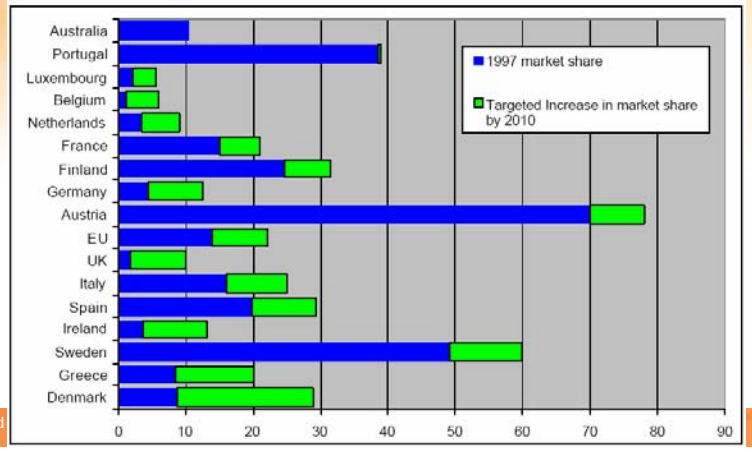
Setting targets: 'keeping it real'

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



Setting targets: meaningful wrt objectives

- Example: MRET has GHG reduction + renewable industry development objectives, drove considerable early investment, however target clearly inadequate (BCSE, 2004)



Market structure

- Are buyers also sellers?
  - eg. Integral Energy currently largest NGAC creator as well as major buyer in NSW GGAS
- Market concentration:
  - eg. 6 large UK suppliers (retailers) have 90% of UK Renewable Obligation liability; suppliers also directly control ~ 40% of ROC supply
    - Suppliers have incentive for RO target not to be achieved (penalties recycled to suppliers) + extract most of 'profit' in currently high ROC prices
      (Oxera, Renewable generation: is there a future for independent producers?, June 2005.
  - eg. Ergon and Energex dominant GEC buyers in Qld 13% Scheme
- Are buyers able to operate as societal 'tax collectors':
  - eg. Regulated franchise tariff pass-throughs for retailers wrt MRET, NSW GGAS, Qld 13% Gas Scheme….

Policy context for env. markets

- Likely to work best as part of broader policy mix including direct regulation, taxation, support mechanisms:
  - eg. MEPS, Minimum Building Performance Ratings to set minimum acceptable performance; wind planning support policies to facilitate effective response to MRET
- Well suited to such policy frameworks:
  - **Can set minimum environmental outcomes**
  - price of traded instrument can change in response to other policies
- **However**:
  - Interactions can be complex and surprising
    - *eg. Solar Hot Water driven by new State Building Standards (BASIX) impacting the REC market*

  ⇒ Can adversely impact market certainty *…but formal forward markets help*
  - Inefficient markets can blunt price responses and society may end up paying for env. improvements twice
  - *Interactions between different climate policy measures and mechanisms need to be carefully considered in ETS design*.

Eg: policy framework with poor env. certainty

(Australian 4th Comm. to UNFCCC, 2006)

These scenarios give a range of 522 to 605 Mt CO_2-e in 2010, or 102 to 118% of 1990 levels using UNFCCC accounting provisions. Under the Kyoto accounting framework, the scenarios give an uncertainty range of 100 to 115%, which is 8% around the central estimate of the Kyoto projection. These ranges are based on the following scenarios:

- The low scenario combines all of the sectoral low estimates, and the best estimate for Land Use, Land Use Change and Forestry.
- The high scenario combines all of the sectoral high estimates, and the best estimate for Land Use, Land Use Change and Forestry.

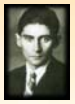
These scenarios will likely understate total uncertainty as they do not include contributing uncertainty from the Land Use, Land Use Change and Forestry estimates.

Institutional context for env. Markets

(Grubb, *EU ETS and the Future*, Point Carbon Conf., Feb. 06)

- **"** The pursuit of long-term objectives using instruments that have to adapt to shorter term cycles requires institutional independence"
- Current policy design processes are political (hence short-term) with multiple, partly conflicting, objectives
- *A possible approach:*
  - Follow example of monetary policy where independent Central banks have one objective: control inflation
  - *eg. for next phase of EU ETS "… establish institutional mechanisms analogous to national and European Central Banks, charged with prime goal of designing allocation to deliver emission goals with minimal distortion whilst compensating existing installations for distributional impacts"*

In conclusion.. 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 
- ***Focus on***
  - ***Objectives:*** *real env. outcomes + high dynamic efficiency in presence of considerable uncertainty + risk*
  - ***Design process:*** *transparent disciplined process, institutions + governance to deliver these over the long term*

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