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Putting a price on carbon

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CANA: Converting Concern into Action
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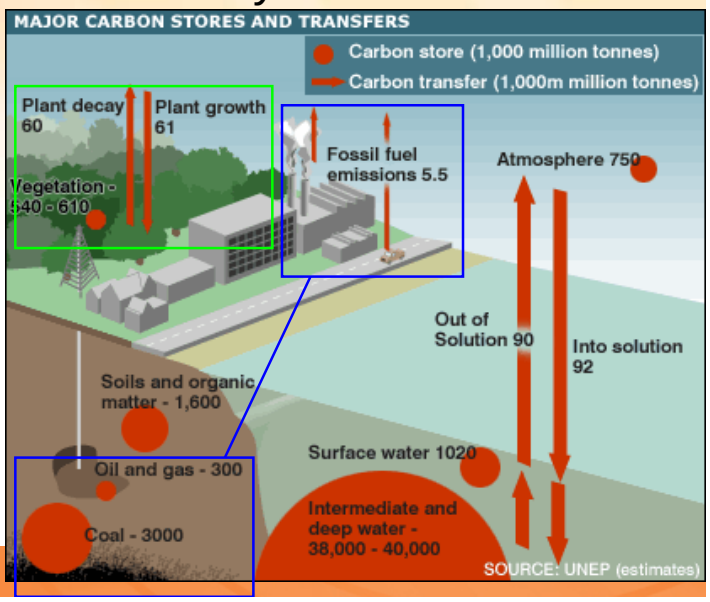
Carbon is

- Highly abundant in some forms
- The basis of all organic chemistry
  - C+O, C+H, C+H+O..

=> Has many values
  - ecosystems
  - fossil fuels

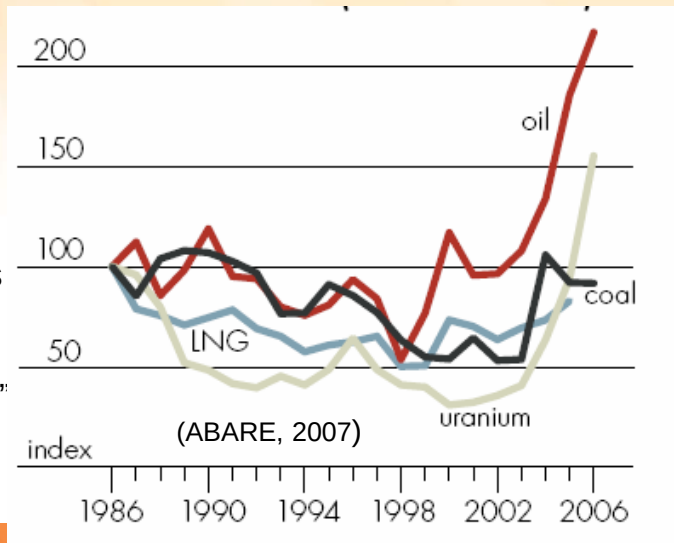


Price is..

- "quantity of payment or compensation for something"
- According to price theory
  - An approach for optimal resource allocation reflecting interaction between demand (marginal benefit) and supply (marginal cost).
  - Cost is value of money used up to acquire/produce something
    - Private/internal costs are those buyer of good or service pays seller
    - External/externality costs are those people other than buyer forced to pay – individual or society at large, *often not monetary*
- Key Government role in addressing externalities
  - both benefits + costs
- Government's act by regulating, taxing + spending
  - Define allowable behaviour, change private costs + benefits….

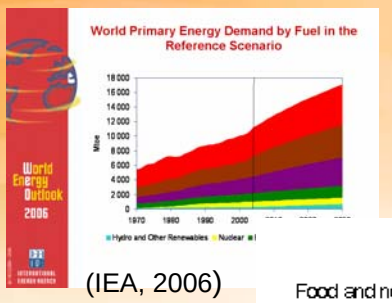
Valuing carbon in fossil fuels

- Energy highly valuable – vital roles, non-substitutable
- Many benefits+costs externalities unless addressed by govt
- Key externalities till now social welfare, natural resources, conventional pollutants
  - eg. "In Australia, mineral resources in the ground are owned by the community.
    The government, on behalf of the community, transfers exploration and production rights to the private sector in return for some payment"



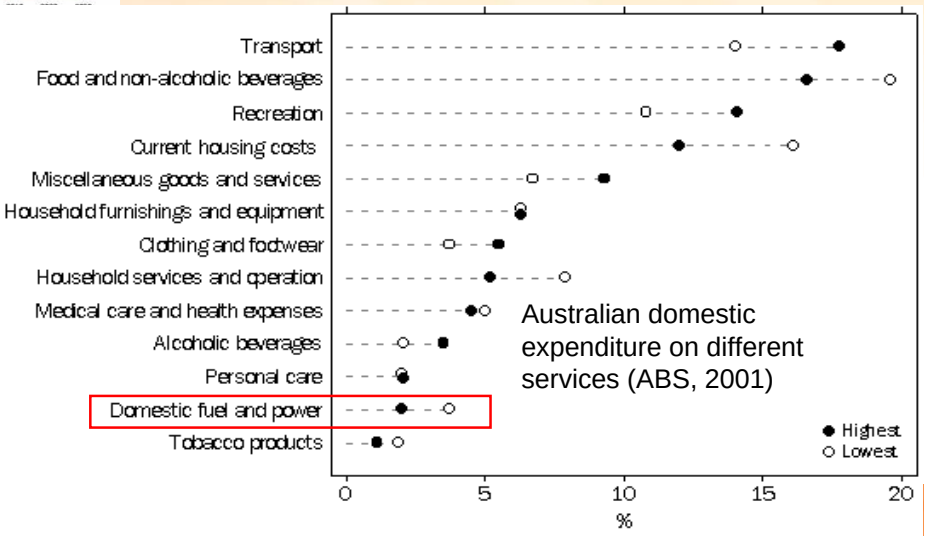
(ABARE, 2007)

Fossil fuels dominate for a reason…



(IEA, 2006)

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



Australian domestic expenditure on different services (ABS, 2001)

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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?

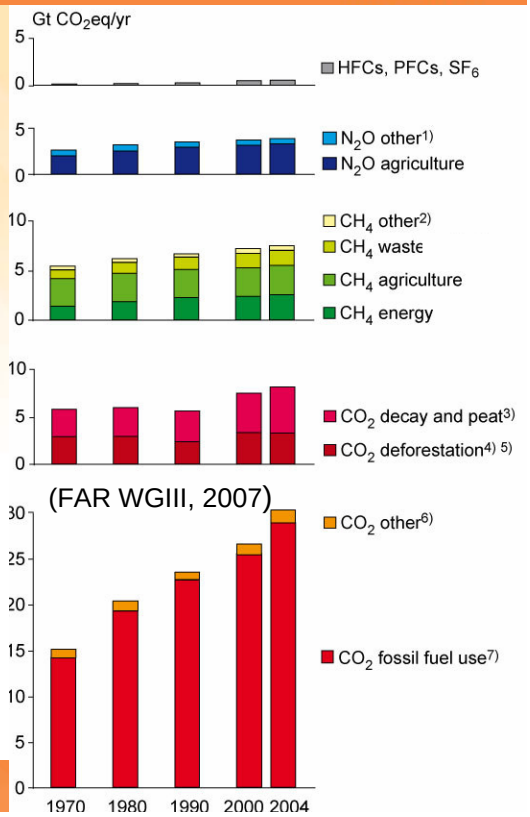
What to price?

- Range of greenhouse gases from range of activities
- Can only properly price what you can measure

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%. (Aust. Govt, 2005)

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



(FAR WGIII, 2007)

Should only trade fungible goods + services

"Greenhouse tonnes ain't greenhouse tonnes"

Some types of offset projects are questionable

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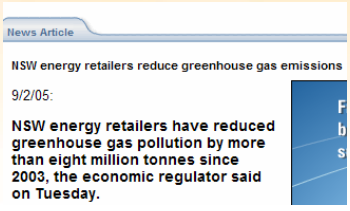


Physical, measurable emissions from fossil-fuel consumption

CO2 has been safely sequestered for millions of years

Estimated net CO2 fluxes from select ecosystems

CO2 is not safely sequestered from year to year

Hypothetical estimates of emission reductions from counter-factual BAU baselines

How to set the price?

- In theory
  - where additional mitigation = social cost of carbon
- However, in practice
  - Dynamics + uncertainties
- Instead
  - Decide on 'acceptable' warming risk
  - ⇒ Required GHG stabilisation
  - ⇒ **Necessary emmision trajectories**

Figure 2.1 The optimum degree of abatement in a given period

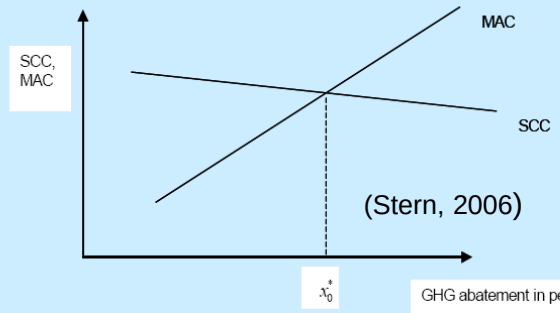


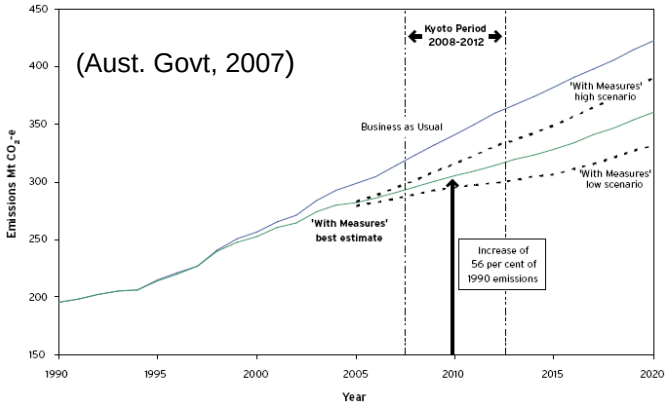
Table SPM.5: Characteristics of post-TAR stabilization scenarios [Table TS 2, 3.10][a)]

Category	Radiative Forcing (W/m²)[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

(FAR WGIII, 2007)

Key trajectory issues

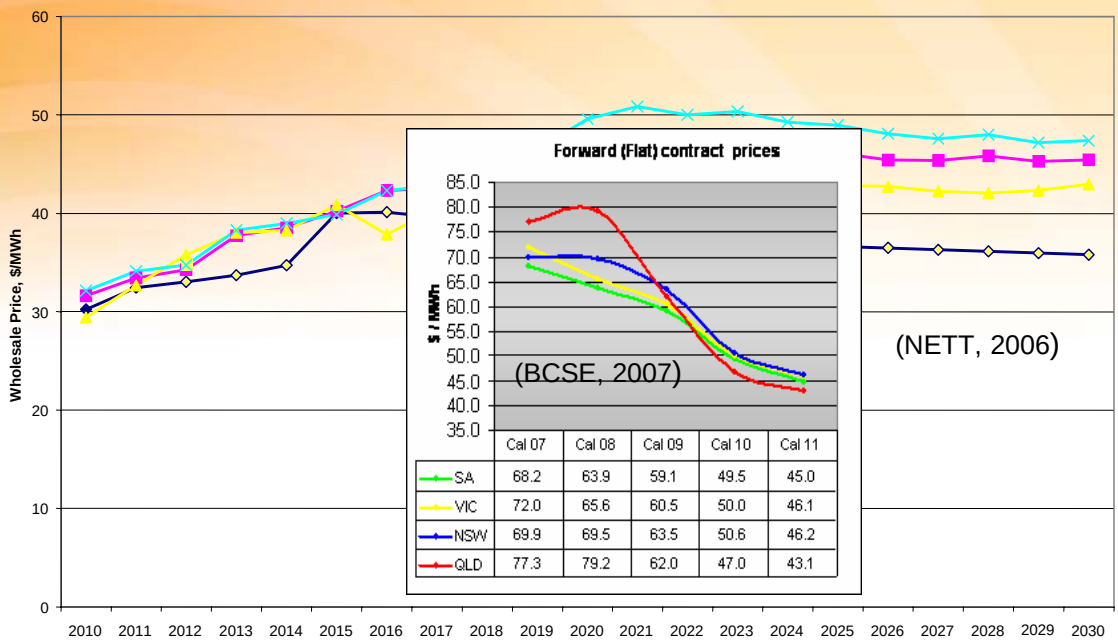
- Very high projection uncertainties
  - Australian inventory uncertainty currently +/-3%
  - "scenarios give an uncertainty range of 100-115% …likely understate total uncertainty as they do not include contributing uncertainty from the LULUCF estimates"
    - (Australian Govt. Fourth Communication to UNFCCC, 2005)
- Early emission reductions buy time, reduce risk
  - Important not to avoid structural change necessary for major emissions reductions through offsets / one-off activities



Key price issues

- Effective only wrt changes in decision making that reduce emissions – **investment** + operational
  - Investment largely driven by *expectation* of future prices
- Emissions reductions now more valuable than later
  - Buy time, let us better manage risk
  - Need an early 'price shock' rather than gradual implementation
- In theory
  - Emissions trading sets trajectory, market sets price (spot + future)
  - Carbon tax sets price (spot + future), market sets trajectory
- In practice
  - Choices to partition trajectory + price risk b/n society + decision makers
    - Investment certainty doesn't eliminate risk but transfers it to society
    - ETS with price cap protects investors from high prices but not low prices
      - *A very poor investment signal – safer not to act than to act*

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 carbon pricing efforts to date….
  - 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
    - *Focus on compensation for large polluters?*

Implications for carbon pricing

- Key question
  - What's worse wrt climate change than BAU?
  - *Possible Answer*: 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**
  - Need genuine policy making processes

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Thank you… and questions?

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