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# Solutions to Climate Change

Carbon trade, carbon tax, cap-and-share, tradable carbon quotas

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Content from David Suzuki, Michael Grubb – Carbon Trust, FEASTA, Lean Economy Connection

# Headlines from Stern

- Definition of the problem as „market failure“ and thus need to find „market“ solutions
- What we do now can have only a limited effect on the climate over the next 40 or 50 years; what we do in the next 10 or 20 years can have a profound effect on the climate in the second half of this century and in the next
- By investing 1% of GDP now (the next 10-20 years) we will avoid losing 20% of GDP later (40-50 years)
- Markets for low-carbon energy products are likely to be worth at least \$500bn per year by 2050, and perhaps much more

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# Why should economists tackle this problem?

- Because economists deal in prioritization of scarce resources
  - Broad and general expertise
  - Long, valuable experience
  - Technical understanding of measurement and projection
  - Expertise in dealing with uncertainty
  - Unaligned and impartial?
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# Upstream or Downstream?

- Upstream – with producers – is simpler, e.g. when the fossil fuel comes out of the ground
  - How can we be sure this will be passed on to consumers?
  - Downstream is complex and costly
  - But downstream – i.e. with consumers – does impose individuality responsibility
  - Downstream is also educational
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# Steps towards a solution

- Limit emissions
  - Decide who has the right to produce them
  - This will make the atmosphere a „scarce resource“, but should it be a „commons“?
  - If it is scarce it will have a price
  - If it is commons it will be universally valued?
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# Putting a price on carbon

- Applying a price to emissions of greenhouse gases (GHGs), not just carbon dioxide (CO<sub>2</sub> does make up 80% of GHGs)
- Both carbon tax and cap-and-trade system are examples of carbon pricing
- Polluter pays principle: stop treating the atmosphere as a free dumping ground
- Including this cost gives an incentive for polluters to invest in using less energy and using cleaner energy (EE and RE): especially strong for heavy industry

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# Nice and simple!

- Estimate the cost of specific impacts of / adaptation to climate change over time eg. on food prices, coastal defences, etc etc
  - Aggregate across the world (maybe with some kind of equity weighting)
  - Aggregate over the future (with some kind of discounting)
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# Carbon trading

- Tradable permits offer something of a hybrid between direct regulation and taxation
- Permissions, or permits, are defined in
- appropriate units (e.g. tonnes of carbon) per period of time (e.g., per year)
- Polluters must then have enough permissions for the amount of pollution they produce in a given period.
- A central planning authority handing out permissions thus places a cap on them

Create a product: 'the right to produce carbon dioxide'

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# Why is this efficient?

- The economic efficiency aspect arises from making the permissions tradable
  - This means rather than a polluter having no choice but to reduce pollution in line with their existing permissions they can alternatively seek to obtain more permissions on the open market
  - Polluters with high control costs buy permits from those with low costs this creates greater overall social welfare
  - Firms with difficult to control sources of pollution will buy permits to continue polluting, while easy to control sources reduce emissions and sell their unused permits for a profit.
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# Carbon trading: Spash critique

- „The divorce between the assumptions of economic theory and complex reality has been neglected.“
  - During the 1990s direct regulation and taxation were the favoured instruments to achieve GHG emissions targets, especially in Europe.
  - This was blocked in the Council of Ministers
  - Focus was on complexity of financial design and instruments, sidelining democratic debate
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# What is a carbon tax?

- For most sources of GHG emissions, it is applied as a fuel tax, based on amount of fuel sold e.g. gasoline:
- We know GHG emissions per litre of gasoline so convert the price per tonne into a price per litre (\$10/tonne CO<sub>2</sub> = 2.3 cents/litre of gas)
- Apply to fuel wholesalers
- Do this for tonnes of coal and cubic feet of nat. gas
- For process emissions, also applied as a tax but need estimate of GHG emissions

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# Advantages and disadvantages

## ■ Advantages

- Can be implemented quickly (BC: 4 months)
- Industry and other fuel users know exactly the costs they face now and in near future

## ■ • Disadvantages

- We are less sure of what emission reductions will result
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# EU Carbon Tax

- Taxation is amongst the most jealously guarded areas of national sovereignty
- Where carbon taxes have been implemented, even in relatively small homogenous regions such as carbon taxes introduced across Scandinavia from 1990-1992:
- 'The taxes differ considerably regarding rates, tax base and exemptions ....nominal rates are currently the highest for Danish Households. Sweden and Norway have the highest rates for industry, however, Norway applies the high rate to offshore oil and gas .. all four countries have [differing] special arrangements for energy-intensive companies'

- *Mikael SkouAnderson (2004), 'Vikings and Virtues: a decade of CO2 taxation', Climate Policy Vol.4(1):13-24*

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# Let's create our own ideal solution

- Needs to have political buy-in from a majority of nations
    - Nations controlling reserve currencies
    - Oil-exporting countries
    - Less developed countries
    - Countries presently dominating global production
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# What are the possibilities?

- Cap and share—deciding a realistic limit for global carbon and then dividing this between all the world's people
  - DTQs—imposing a cap and then giving each person their share of carbon directly, as an allowance
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# What Would an Effective Solution Include?

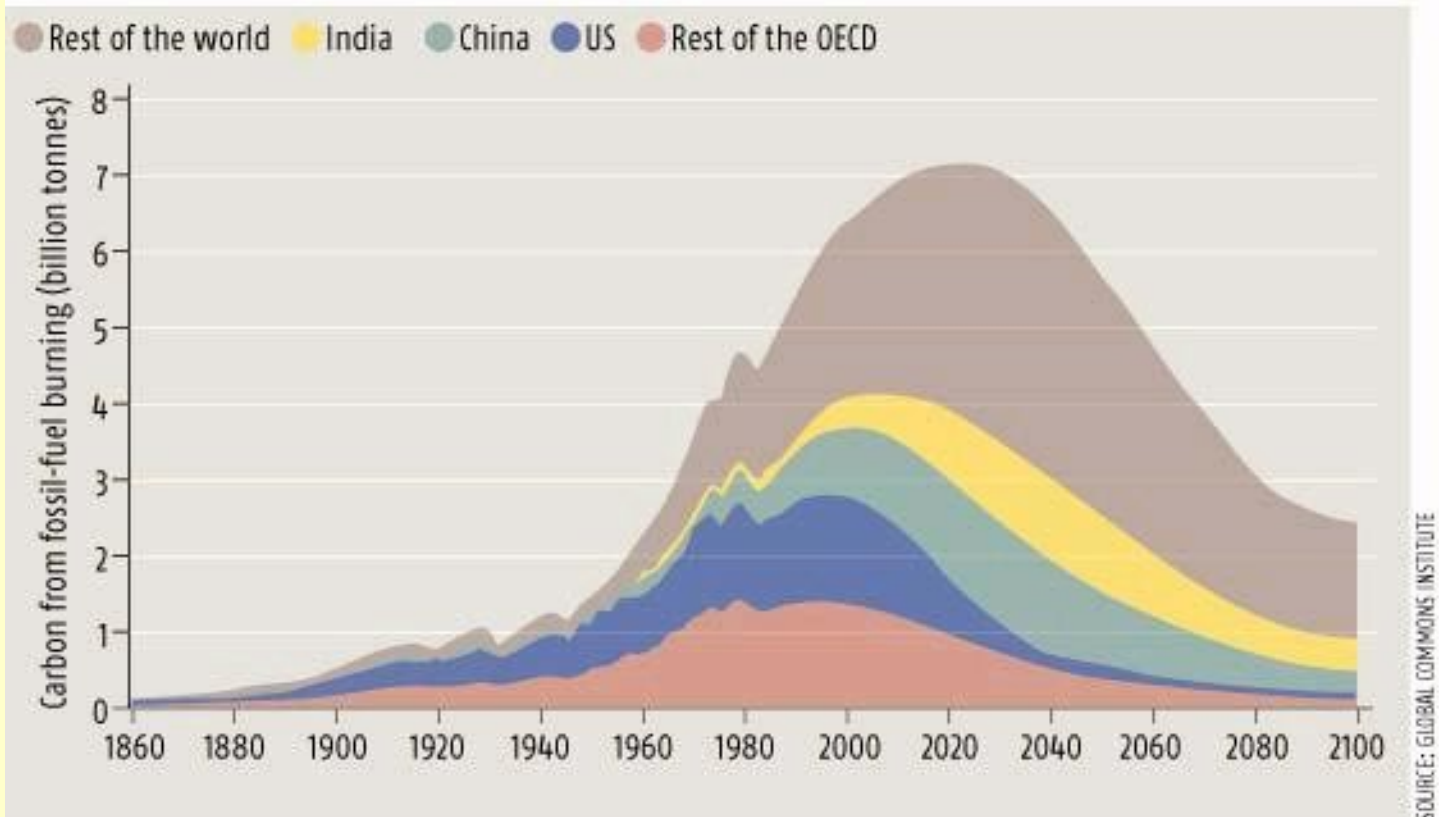
- A firm and 'scientifically based' cap on emissions
  - A fair method for sharing the emissions – equality between and within countries?
  - Prevention of financial leaks by countries controlling reserve currencies
  - A soft landing for the inevitable end of a growth-driven global economy
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# Contraction and Convergence

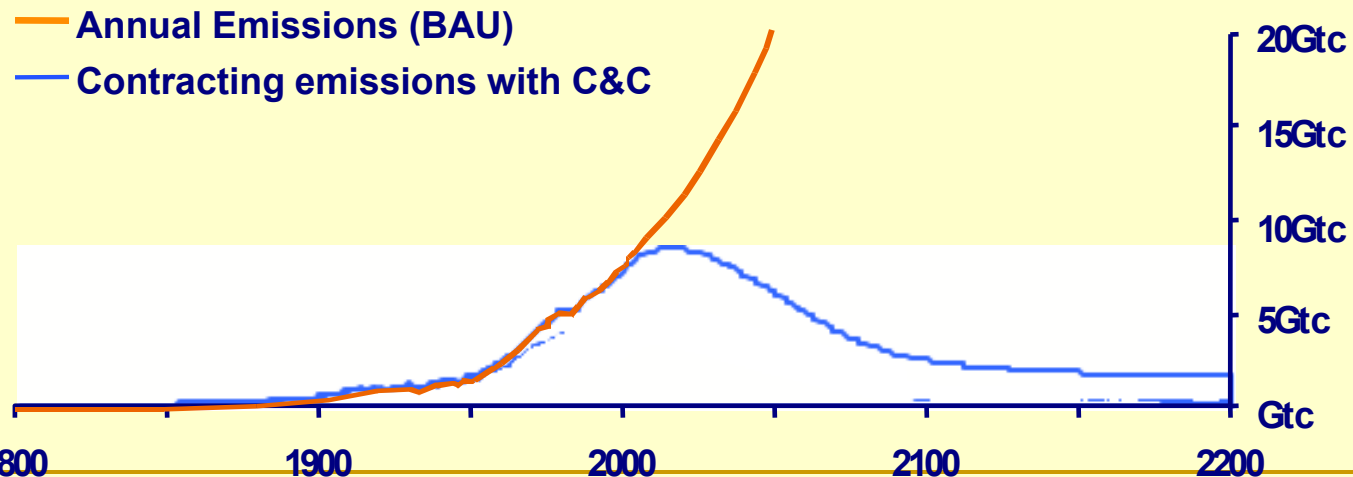
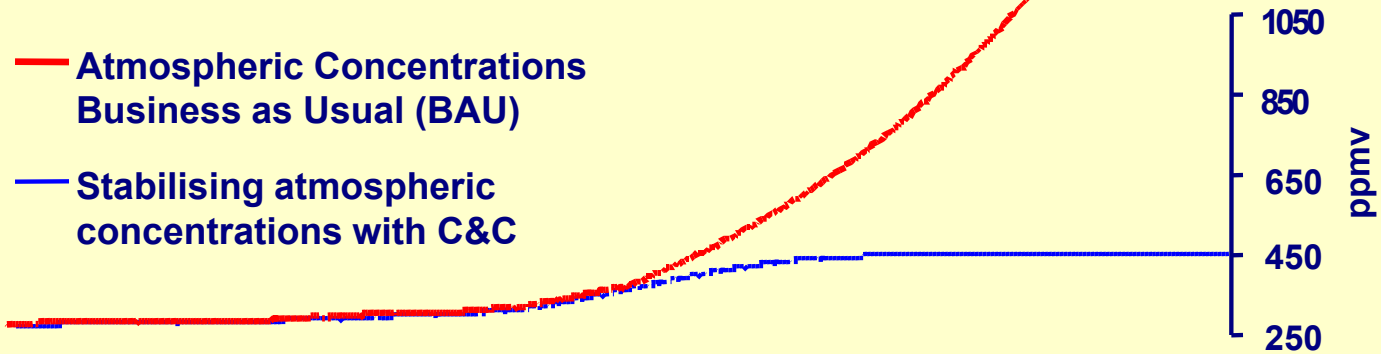
## CONTRACTION & CONVERGENCE MODEL

Convergence (universal emissions target per person) achieved by 2050.  
Contraction (falling global emissions) completed by 2100

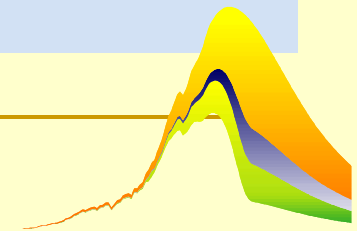
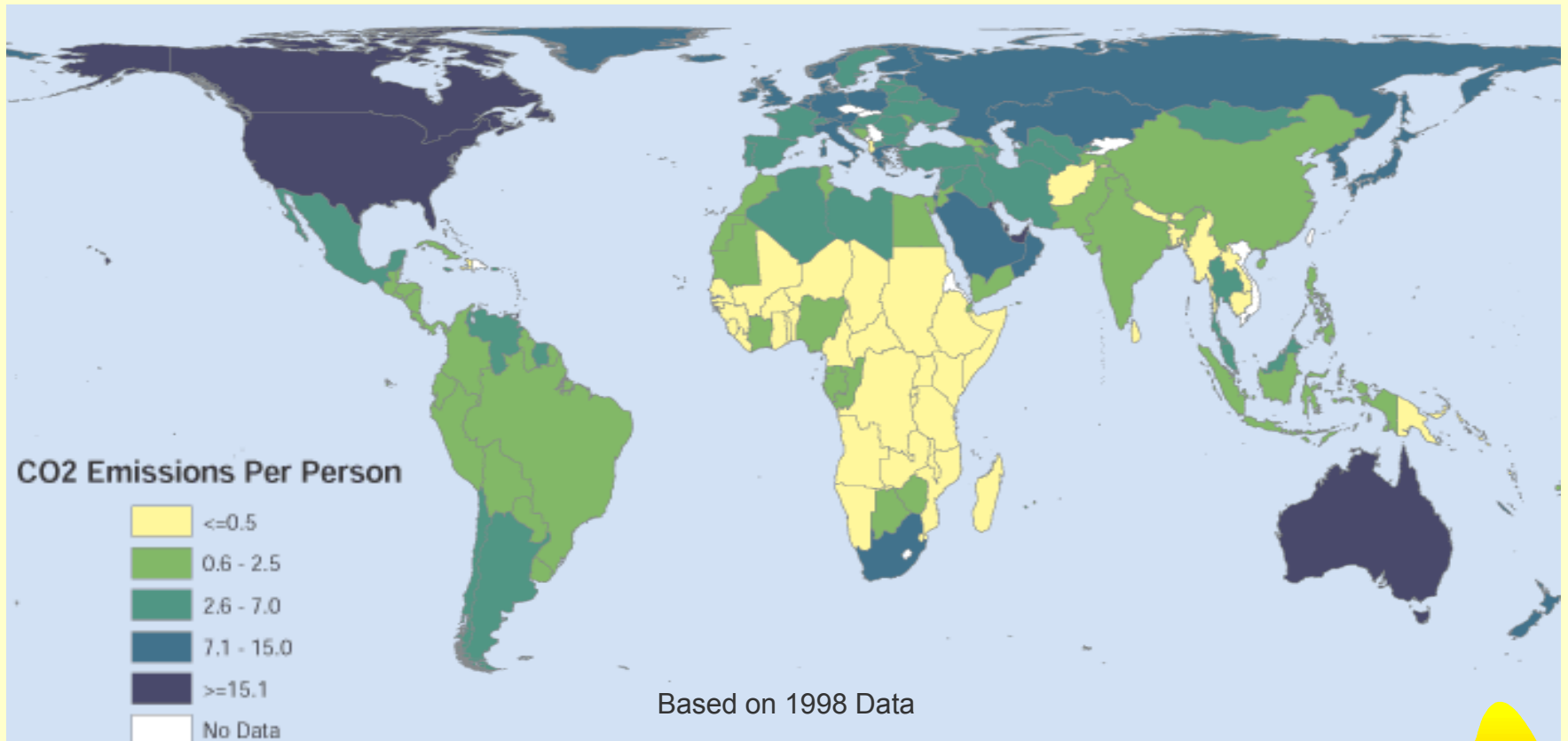


<http://www.gci.org.uk/contconv/cc.html>

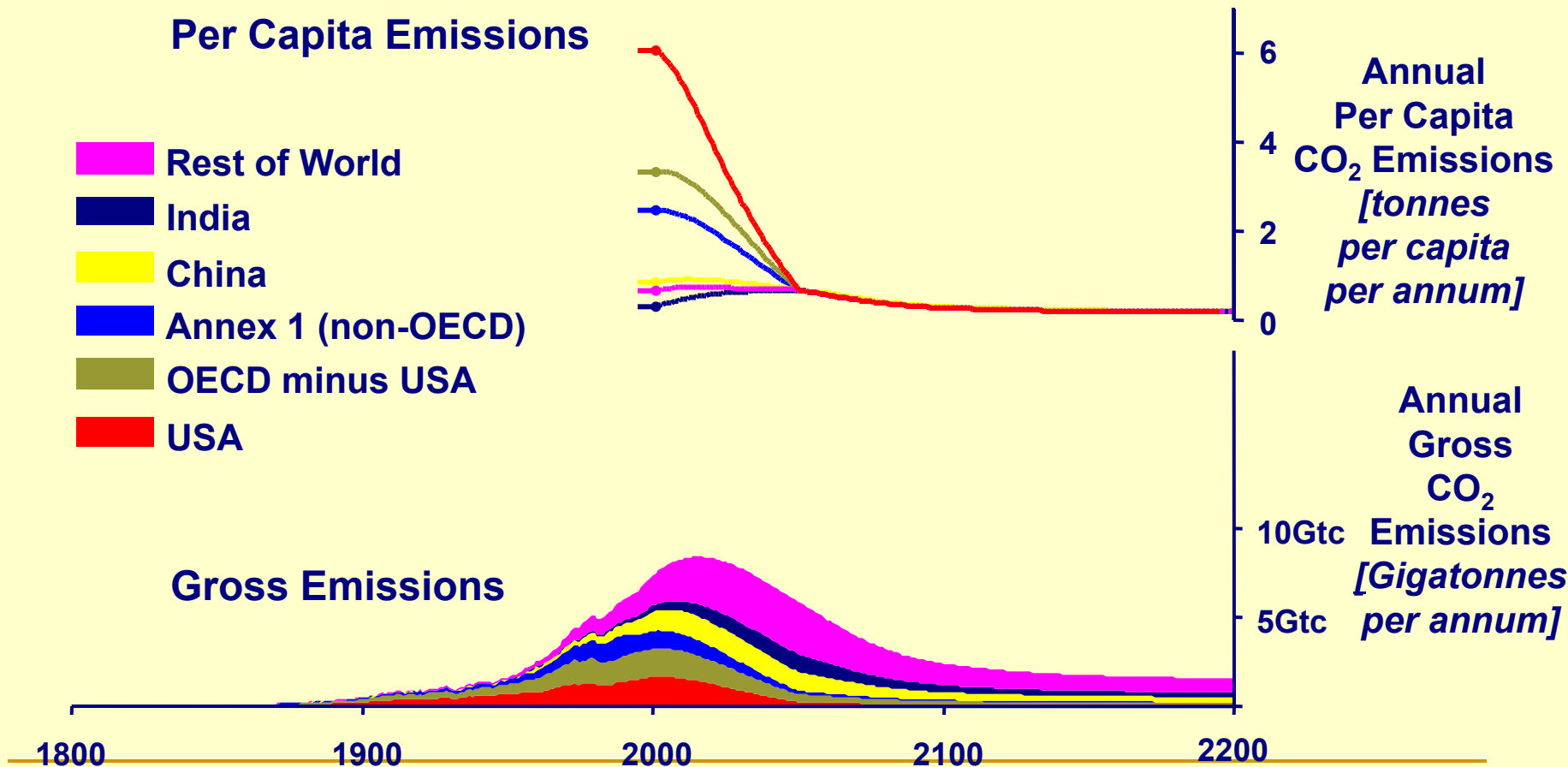
# Contraction and stabilisation at 450 ppmv



# CO<sub>2</sub> Emissions Per Capita



# Convergence by 2050



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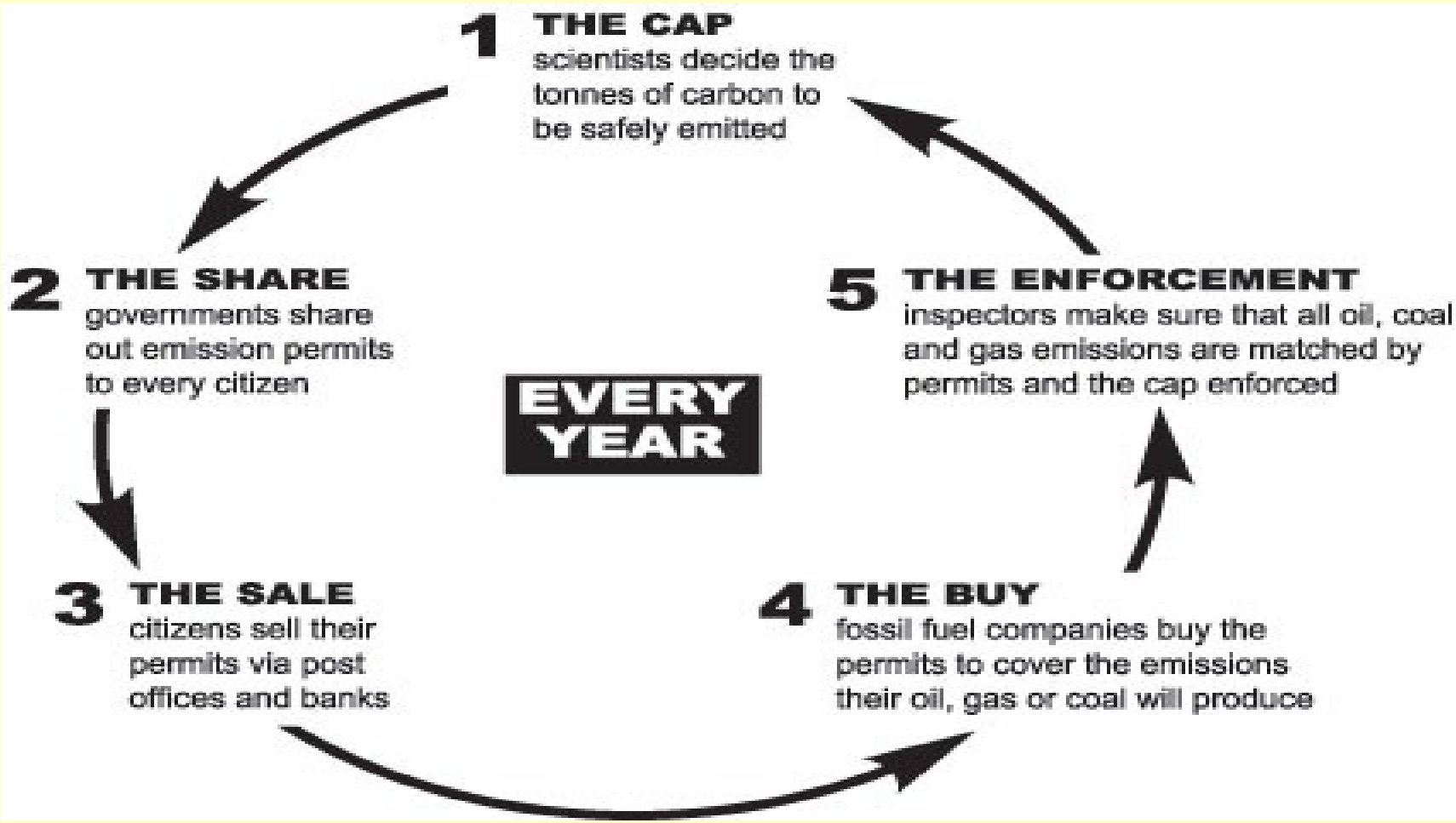
# Support for C&C

- Group of African Nations
  - India and China
  - 5 of 7 British political parties
  - Over half of the MPs in parliament
  - David Miliband, Minister for the environment
  - European Parliament
  - C&C meets every objection raised by the US to Kyoto
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# Cap & Share

- Issues entitlements for all the emissions allowed in a year under the EU's Kyoto target or that set by its successor.
- Gives equal entitlements to each EU resident
- Recipients then sell their entitlements at the current market rate, via banks or post-offices
- The entitlements are sold by the banks to companies producing or importing fossil fuels in the EU
- Each importer or producer needs to buy enough permits to cover the eventual emissions from the fuels they sell.





# Cap & Share

1234567890 EUROPEAN UNION EMISSIONS TRADING SCHEME

**10.5 tonnes CO<sup>2</sup>**

If this emissions entitlement certificate is presented at a bank or post office before the expiry date printed below, it can be exchanged for the buying price of the weight of emissions shown above on the day it is presented.

Please take a passport, driving license or some other form of photographic identification with you when you go to cash your entitlement.


**EXPIRY DATE: July 31st, 2009**

Any entitlement certificates not presented before their expiry date will reduce the EU's total emissions for the year.

**Mr. John Tyndall**

**Emissions Entitlement 2008**

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# Cap & Share

- C&S acknowledges the right to pollute the global commons is a human right and responsibility
- It compensates people via their emission entitlements for higher energy prices
- It emphasizes and promotes the idea the climate security is a societal issue, not merely a commercial or political one.
- All emissions, including transport and aviation can be included in C&S
- Perverse incentives removed
- It is far less prone to corruption
- It allows more efficient implementation and should provoke fewer national squabbles



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# Personal carbon trading

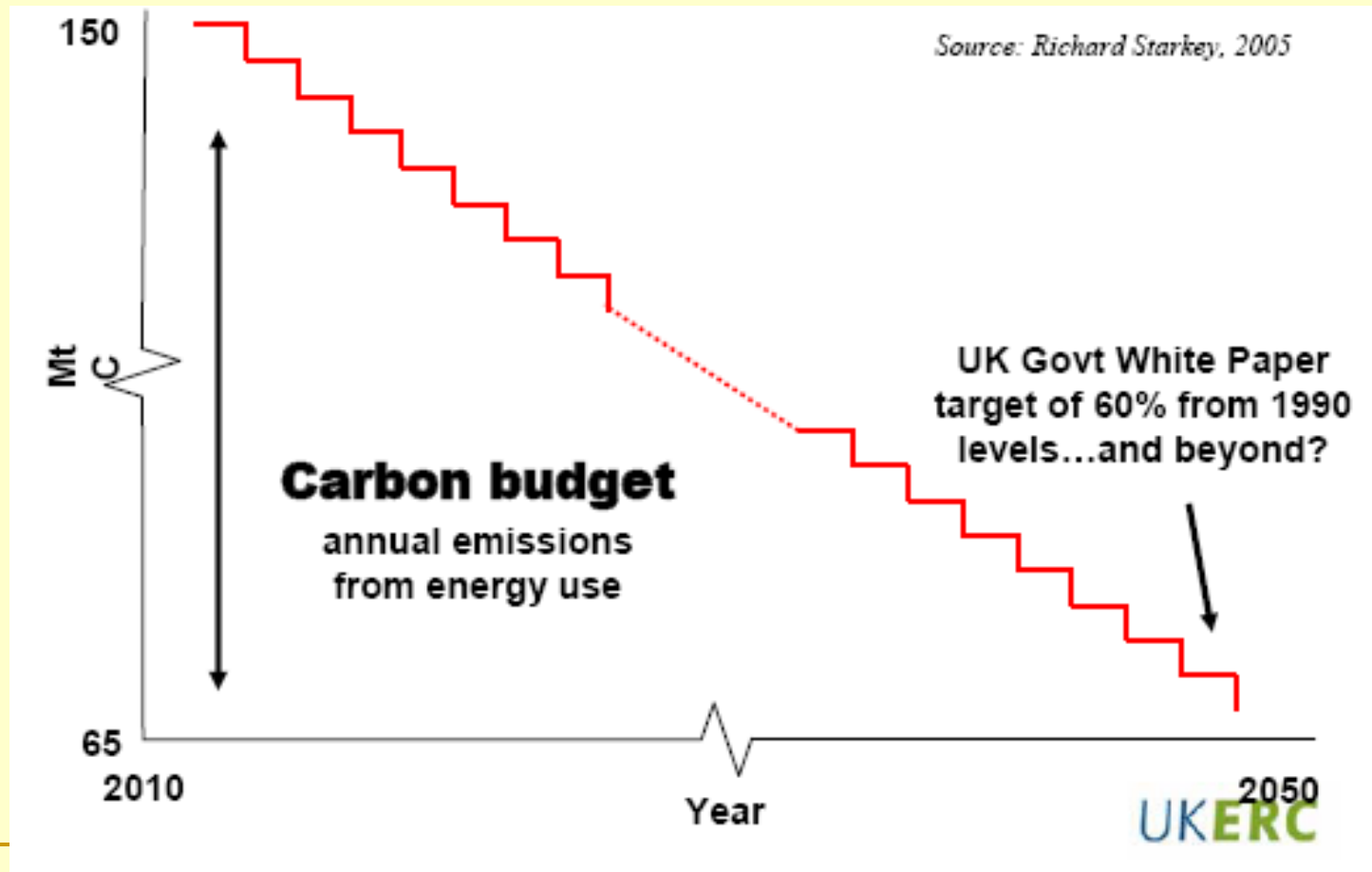
- Total emissions in the US: 20 t CO<sub>2</sub> per capita
  - Non-personal: services, goods and infrastructure--11 t CO<sub>2</sub> per capita
  - Personal: home energy and transport-- 9 t CO<sub>2</sub> per capita
  - An equitable share to stabilize at 450 ppm – Mayer Hillman ~1 t CO<sub>2</sub> per capita
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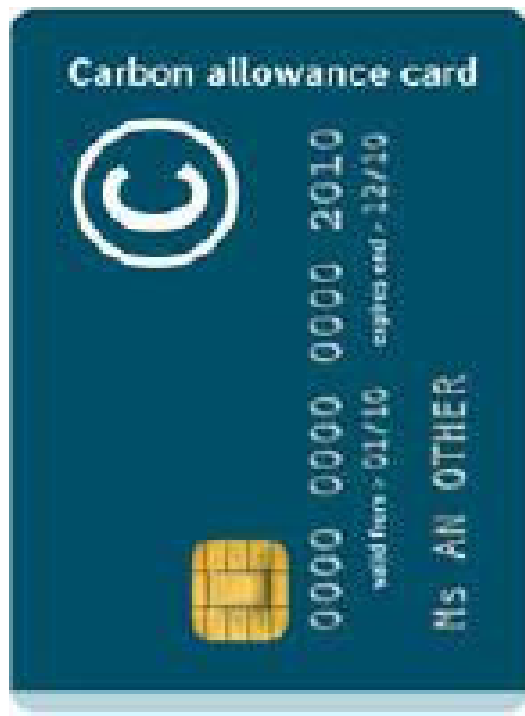
# Three key elements of personal carbon trading

- 1- Setting the carbon budget
  - 2- Surrendering carbon units
  - 3- Allocating carbon units
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# Setting a carbon budget



# Surrendering carbon units



- Fuels and electricity are assigned a carbon rating based on the quantity of ghg emissions emitted by the combustion
- Carbon units are surrendered at the point of energy purchase

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# Allocating or acquiring carbon units

- Individuals receive a free and equal per capita carbon allowance
  - Individuals exceeding their free allowance will have to buy additional carbon units from the market
  - Individuals having surplus carbon units will be able sell or save them
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# Why TEQs?

- Equity: Everyone given an equal carbon share
  - Effectiveness: Guarantees carbon emission cuts
  - Efficiency: Takes advantage of the market
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# Making carbon a part of everyday life

- Smart bills
  - Smart meters
  - Smart receipts
  - Enhanced petrol pumps
  - Carbon-ometers
  - Carbon responsibility in advertising
  - Carbon labels
  - Carbon promises
  - Carbon-rated homes
  - Carbon watchers
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