

Climate Change: Is the UK Government Doing Enough?

**A presentation to the Climate Change
Conference**

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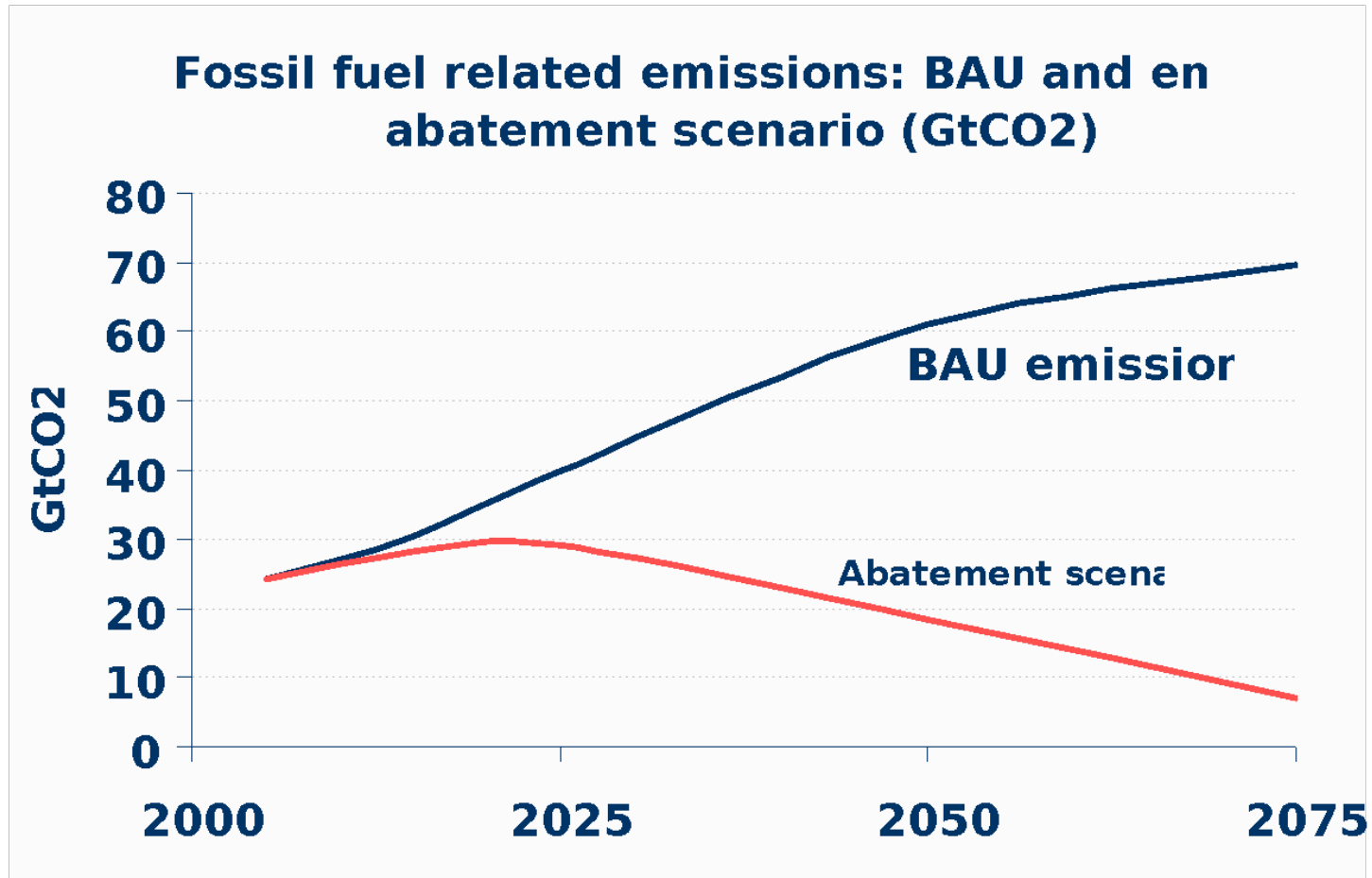
Royal Institute of British Architects

May 10th 2012

Structure of presentation

- What must the UK Government do?
- What is it doing?
- Is this enough?
- Could it do more?

EMISSIONS SCENARIO TO LIMIT TEMPERATURE CHANGE



The framework of climate policy

- UN Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, annual COP/MOP meetings, post-Durban process
- G20 processes and discussions
- The EU 20/20/20 by 2020 Programme and associated policies
- National policies and programmes
- State (US)-level policies and programmes
- Regional/city/local roll-out ambitions/ obligations

The international state of play post-Durban in summary

- Curbing global warming requires international cooperation and agreement to reduce emissions of greenhouse gases
 - All countries are now committed to the prospect of legally binding emissions reduction (agreed 2015, in force 2020)
 - This could provide a major impetus for the development and adoption of low-carbon technologies
- BUT**
 - Developing countries will not accept emission control if they think it will impede their development
- SO**
 - Committed industrial countries (like the UK, Korea) will need to show that deep emissions control is compatible with continued economic growth and development
 - Best hope for emission control is the emergence of a 'green race' for low-carbon technologies: 'green economy'
 - 'Green growth' is now the strategic economic imperative

The EU 20/20/20 by 2020 Programme

- 20% cuts in carbon emissions (30% with international cooperation)
- 20% of renewable energy in final energy demand
- 20% reduction in energy use (below what it would otherwise be)
- EU Emissions Trading System (EU ETS)
- Targets rolled out to Member States
 - e.g. UK 15% final energy demand from renewables by 2020 - approx. 30% electricity, 12% heat; 10% transport; 16% cuts in GHG emissions from 2005 level from non-traded sector
- How is the UK responding to these targets?

Climate Change Act 2008 created an ambitious legal framework to tackle UK emissions contributing to climate change

Ambitious targets to reduce emissions

- Requiring us to cut emissions by at least 80% by 2050 relative to 1990 levels, and by 34% by 2020

Binding carbon budgets

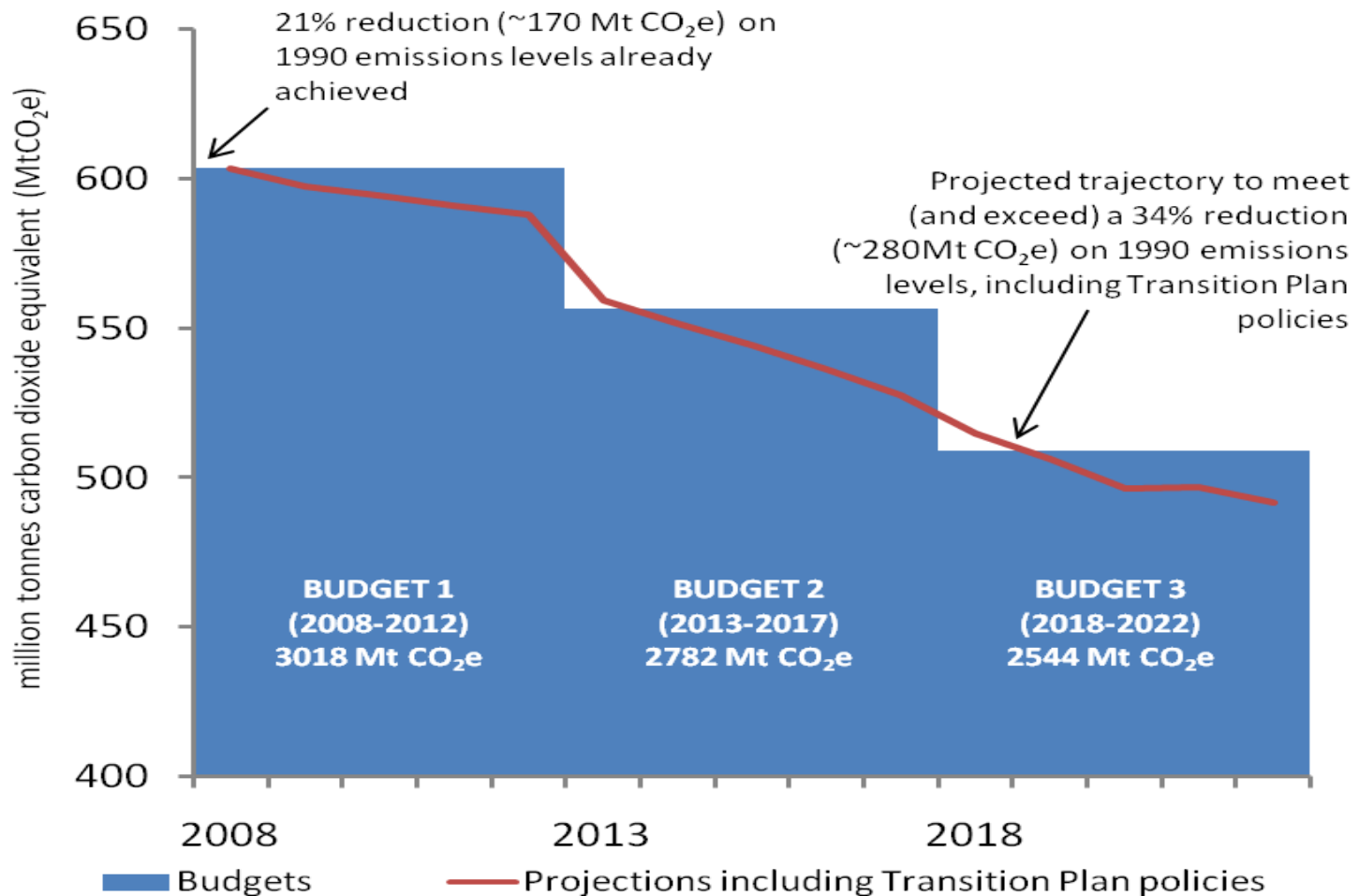
- Five-year carbon budgets; first three budgets cover the period 2008-2022
- Set the trajectory towards the 2020 and 2050 targets, and ensure that cumulative emissions are limited.

A clear accountability framework

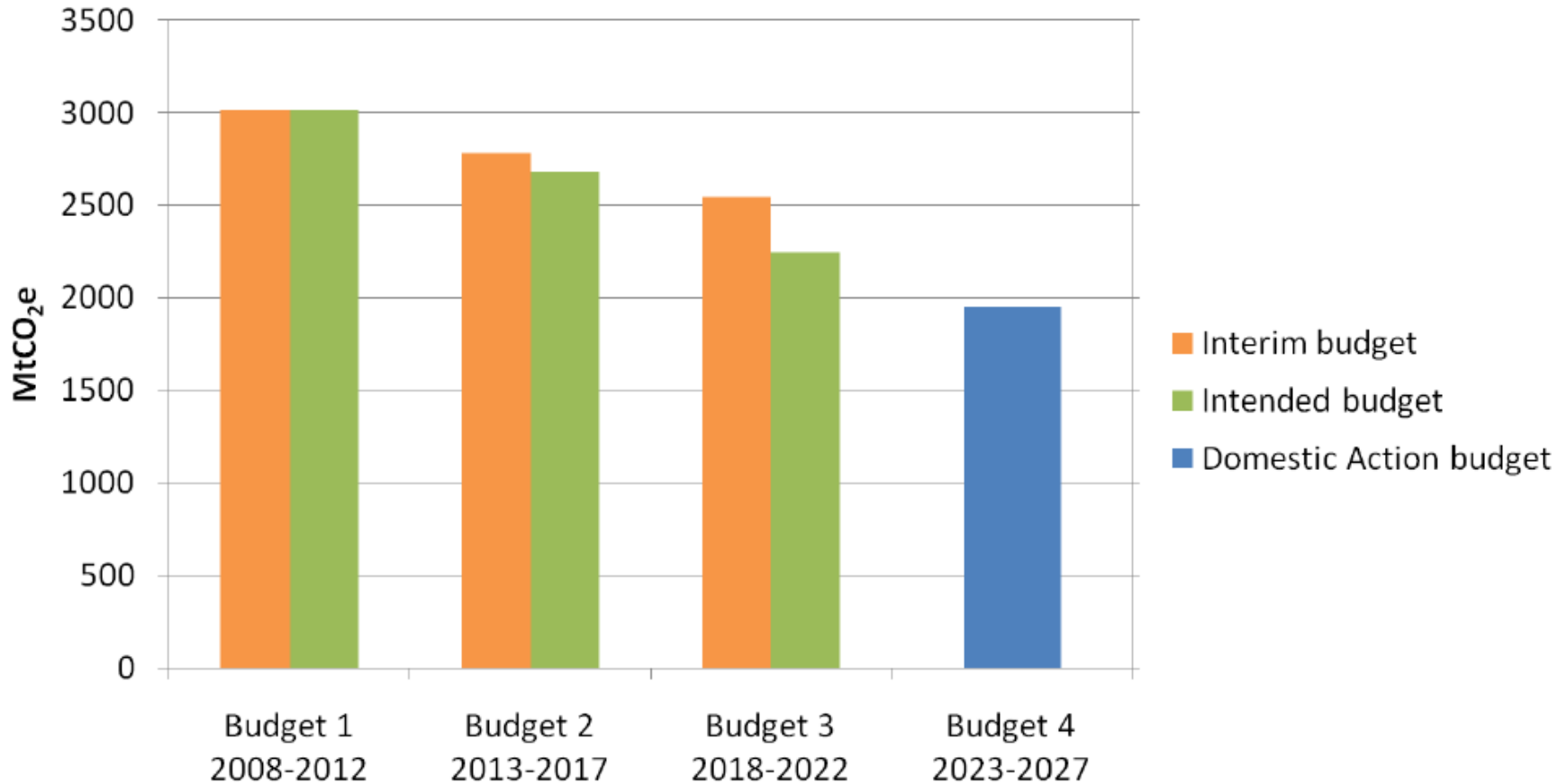
- A requirement to introduce policies to meet the carbon budgets
- Established the Committee on Climate Change to advise Government on its budgets and how to meet them, and scrutinise delivery through annual progress reports.

First three carbon budgets

Source: Department of Energy and Climate Change



Fourth carbon budget



ENERGY POLICY OBJECTIVES (LOW CARBON +)

The objectives of energy policy for European and many other countries are basically three:

- Transition to a low-carbon energy system (involving cuts of at least 80% in greenhouse gas (GHG) emissions by 2050, which will require the almost complete decarbonisation of the electricity system), and a wider 'green economy'
- Increased security and resilience of the energy system (involving reduced dependence on imported fossil fuels and system robustness against a range of possible economic, social and geo-political shocks)
- Competitiveness (some sectors will decline as others grow – allow time for the transition) and cost efficiency (ensuring that investments, which will be large, are timely and appropriate and, above all, are not stranded by unforeseen developments) and affordability for vulnerable households (special arrangements if prices continue to rise)

An unprecedented policy challenge

The Stern Review Policy Prescription

- Carbon pricing: carbon taxes; emission trading**
- Technology policy: low-carbon energy sources; high-efficiency end-use appliances/buildings; incentivisation of a HUGE investment programme**
- Remove other barriers and promote behaviour change: take-up of new technologies and high-efficiency end-use options; low-energy (carbon) behaviours (i.e. Less driving/flying/meat-eating/lower building temperatures in winter, higher in summer)**

UK POLICIES FOR CARBON DECOUPLING

(1)

- Huge policy innovation over the last ten years; we know what to do
- Limited results from these policies; we don't apply the policies hard enough
 - Many policies need local implementation/enforcement
- Economic instruments: importance of resource and emission prices, driver of efficient use, emission and waste reduction
 - Energy taxes: climate change levy (carbon reduced by 3.5 mtc by 2010), fuel taxes (EU emissions half what they would have been at US prices)
 - Emissions trading: EU ETS; CRC (Carbon Reduction Commitment)
- Energy Efficiency Scheme
 - Feed-in-Tariffs for small-scale renewable electricity generation (review)
 - Renewable Heat Incentive (response to consultation)
 - Green Deal
 - Green Investment Bank
 - Capital grants, demonstration projects

UK Policies for carbon decoupling (2)

•Regulation

- Renewables Obligation; Renewable Transport Fuel Obligation
- Carbon Emissions Reduction Target , Energy Company Obligation
- Integrated Pollution Prevention and Control (control of non-carbon emissions may *increase* carbon emissions)
- Building Regulations (zero-carbon buildings)

•Voluntary agreements

- Climate change agreements
- EU fuel efficiency agreements (targets not met); targets now mandatory (i.e. Regulation)

•Information/education

- Energy efficiency labels for appliances and vehicles (e.g. A-rated fridge freezers 0-80% market share in 6 years)
- Smart meters and energy billing
- Act on CO2

UK POLICIES FOR CARBON DECOUPLING

- **(3) Energy market reforms**
 - Post-war: nationalisation (high R&D; low efficiency; nuclear)
 - 1980s: privatisation (low R&D; low prices; sweating assets – little investment; change from central dispatch to Pool to NETA/BETTA)
 - Market not fit to response to challenges of decarbonisation and energy security
- **Energy/electricity Market Reform**
 - Carbon support price (extension of CCL to fossil fuel inputs into electricity production)
 - Feed-in Tariffs (fixed, premium, contract-for-difference; implications for Renewables Obligation)
 - Capacity payments (per MW of reserve)
 - Emissions Performance Standard
- **Charging for Transmission/Distribution**
 - Ofgem Project TransmiT

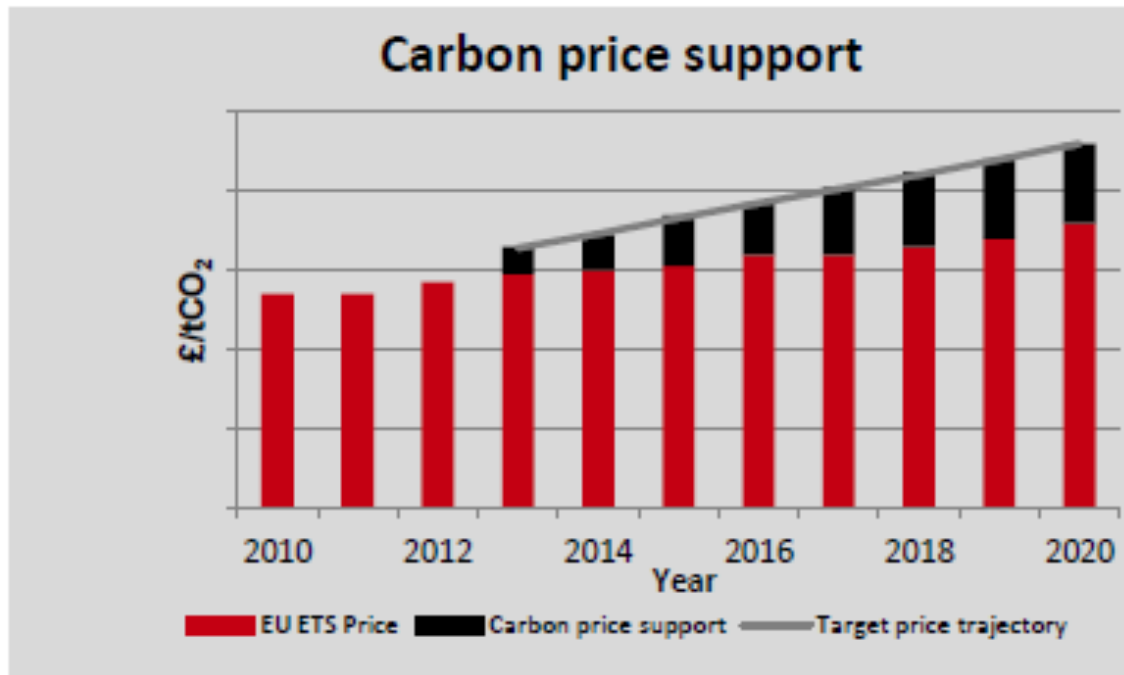
DEVELOPMENT OF THE CARBON PRICE: PHASE II EU ETS ALLOWANCE PRICES

€/tCO₂



CARBON PRICE POLICY

- Commitment to increase proportion of tax revenue from environmental taxes (little progress so far)
- Carbon price support (£13/tCO₂ in 2013, £30/tCO₂ in 2020)
- Why not at EU level? Energy Tax Directive

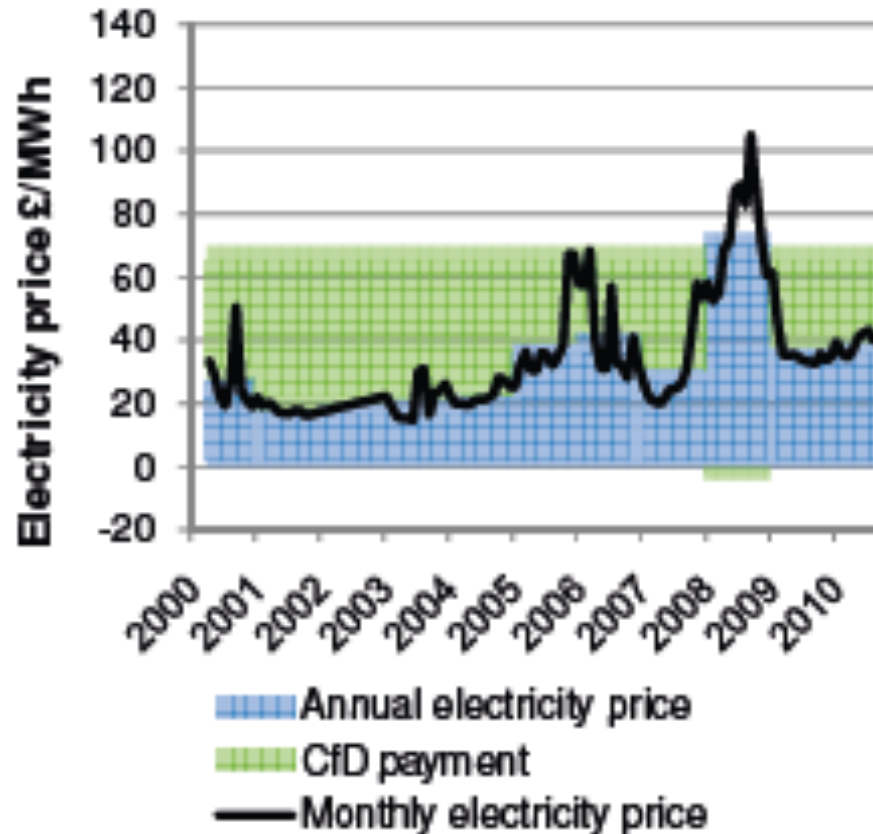


MODELS OF FEED-IN TARIFF (3)

FIT with CfD

Generators sell their electricity into the market, then receive a top-up payment (or, as the 2008 CfD payment year illustrates, may repay revenues).

The top-up payment or repayment is calculated as the difference between the average market wholesale price and the agreed tariff level.



POLICY EFFECTIVENESS

- Relative, but not absolute, carbon decoupling (carbon emissions rose in UK from 1997-2007, despite Climate Change Programme policies)
 - (Much) More stringent application of policy instruments (especially price-based to avoid rebound effects) seems to be required
 - Implications for economic growth: what would stringent policy cost?
 - Political feasibility: could the UK Government do more?

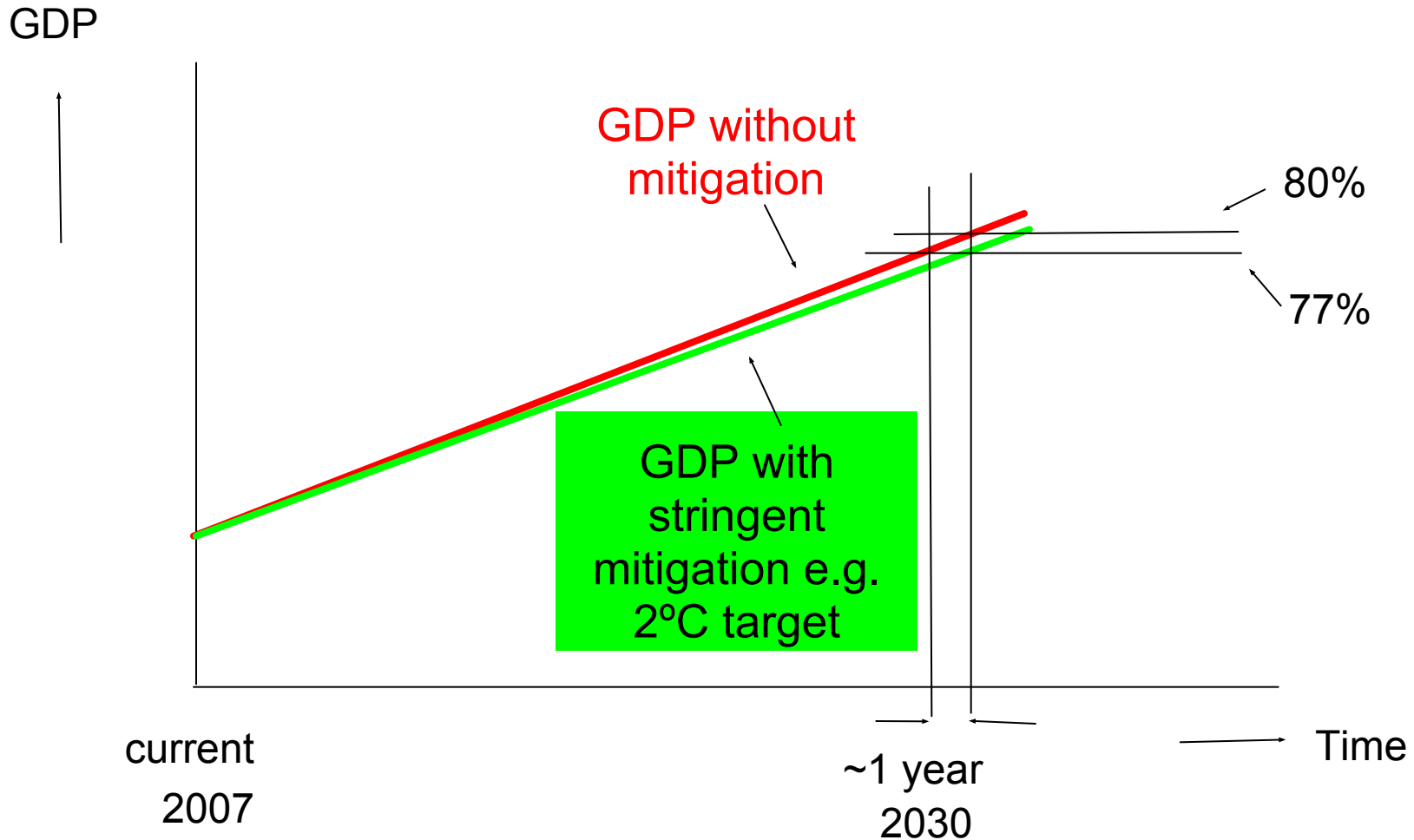
THE (MACRO-ECONOMIC) COSTS OF CLIMATE CHANGE MITIGATION

- Pessimists:
 - Alternative energy sources are more expensive, are bound to constrain growth
 - Cheap, concentrated energy sources are fundamental to industrial development
- Optimists (broadly the Stern Review arguments, no time for evidence):
 - ‘Costs’ are really investments, can contribute to GDP growth
 - Considerable opportunity for zero-cost mitigation
 - A number of low-carbon technologies are (nearly) available at low incremental cost over the huge investments in the energy system that need to be made anyway
 - ‘Learning curve’ experience suggests that the costs of new technologies will fall dramatically
 - Climate change policies can spur innovation, new industries, exports and growth

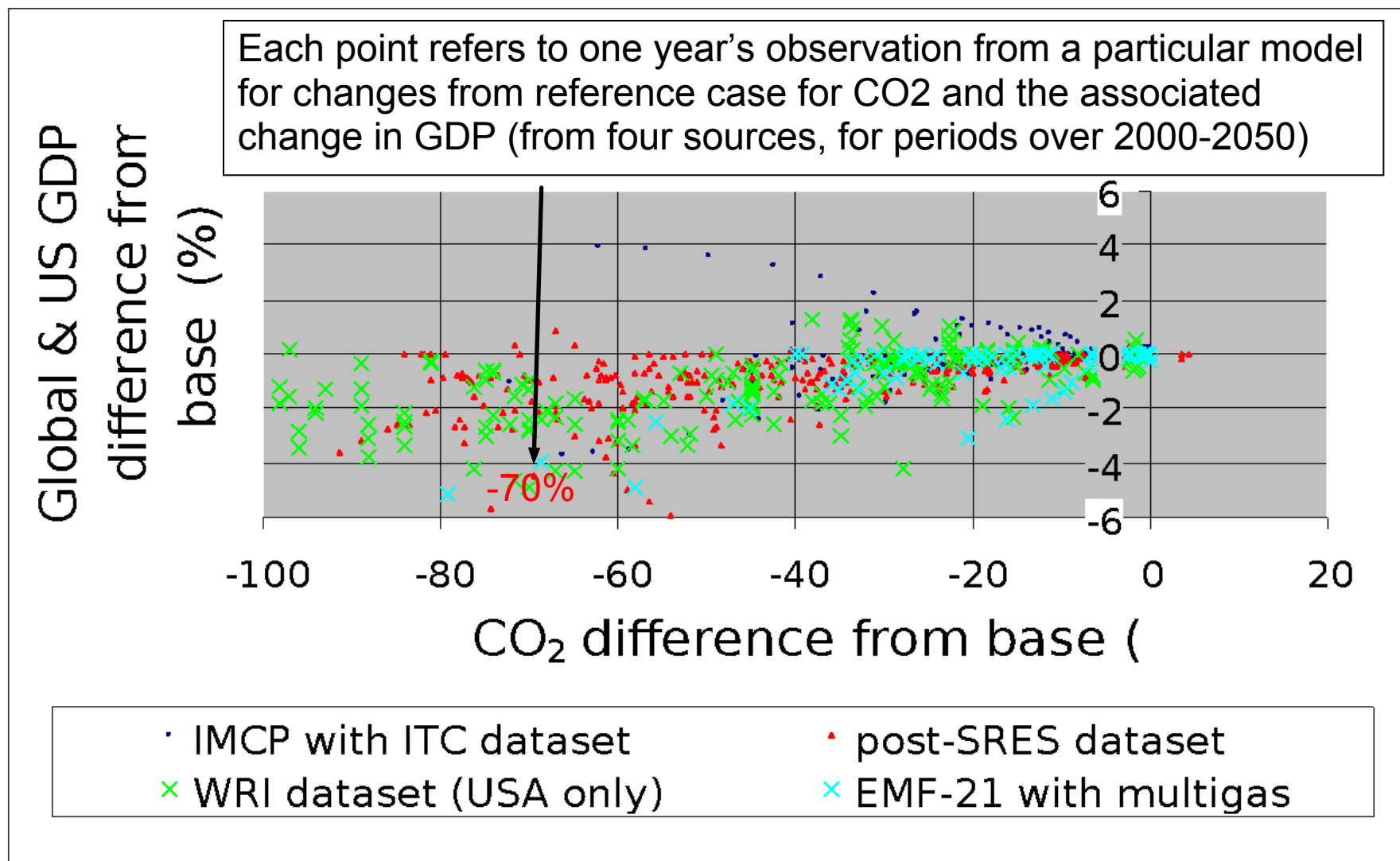
Estimating the macro-economic cost of carbon reduction

- **Models are essential to integrate cost data in a representation of**
 - **The energy system (MARKAL): energy system cost, welfare cost, GDP cost**
 - **The economy : macro-econometric/general equilibrium models**
 - **Good models are ‘garbage in – garbage out’; getting the inputs right**
- **Stern’s conclusion (p.267)**
 - **“Overall, the expected annual cost of achieving emissions reductions, consistent with an emissions trajectory leading to stabilisation at around 500-550 ppm CO₂e, is likely to be around 1% GDP by 2050, with a range of +/-3%, reflecting uncertainties over the scale of mitigation required, the pace of technological innovation and the degree of policy flexibility.”**

Illustration of a 3% GDP cost number with 3% GDP growth per annum

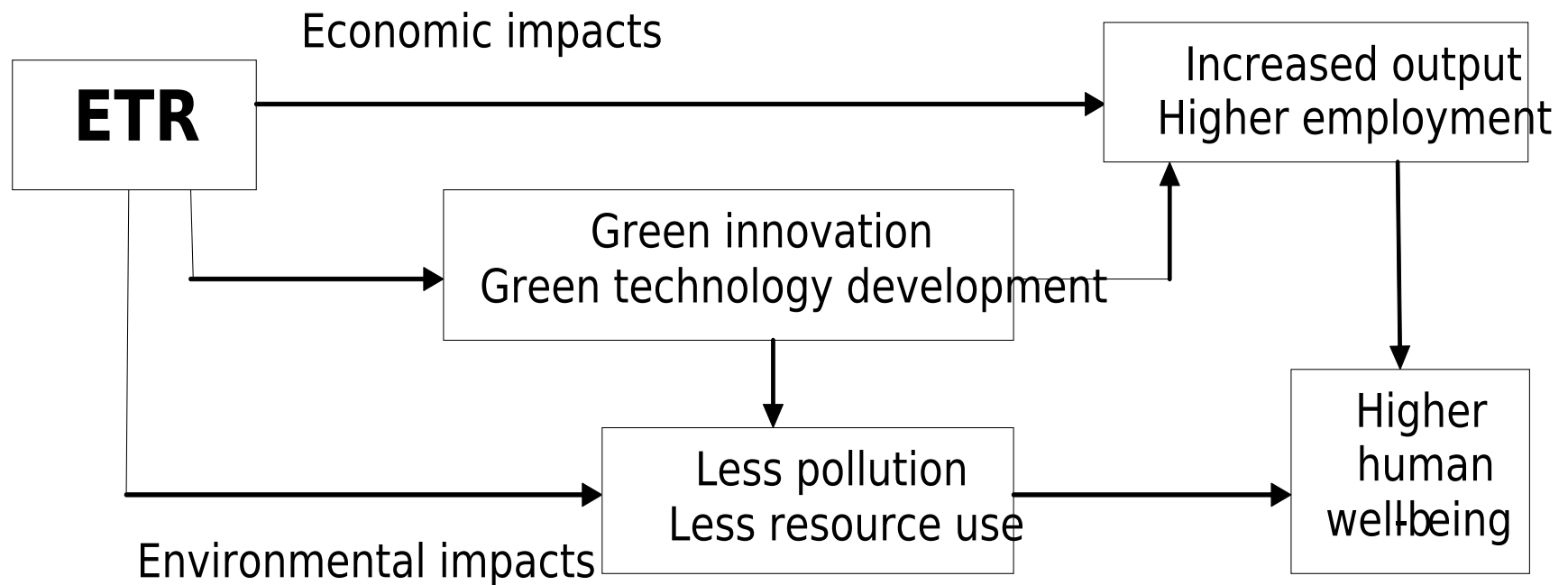


Scatter plot of model cost projections, 2000-2050



THE ADDITIONAL PROMISE OF ENVIRONMENTAL TAX REFORM (ETR)/GREEN FISCAL REFORM (GFR)

ETR/GFR IS THE SHIFTING OF TAXATION FROM 'GOODS' (LIKE INCOME, PROFITS) TO 'BADs' (LIKE RESOURCE USE AND POLLUTION)



RELEVANT PROJECTS ON ENVIRONMENTAL TAX REFORM (ETR) OR GREEN FISCAL REFORM (GFR)

Definition: ETR is the shifting of taxation from ‘goods’ (like income, profits) to ‘bads’ (like resource use and pollution)

- COMETR: Competitiveness effects of environmental tax reforms, 2007. <http://www2.dmu.dk/cometr/>
See Andersen, M.S. & Ekins, P. (Eds.) 2009 *Carbon Taxation: Lessons from Europe*, Oxford University Press, Oxford/New York
- petrE: ‘Resource productivity, environmental tax reform (ETR) and sustainable growth in Europe’. One of four final projects of the Anglo-German Foundation under the collective title ‘Creating Sustainable Growth in Europe’. Final report published October 29, Berlin, November 25, London. www.petre.org.uk
See Ekins, P. & Speck S. Eds. 2011 *Environmental Tax Reform: A Policy for Green Growth*, Oxford University Press, Oxford
- UK Green Fiscal Commission. Final report published October 26, London. www.greenfiscalcommission.org.uk

WHAT IS THE EXPERIENCE TO DATE OF ETR IN EUROPE?

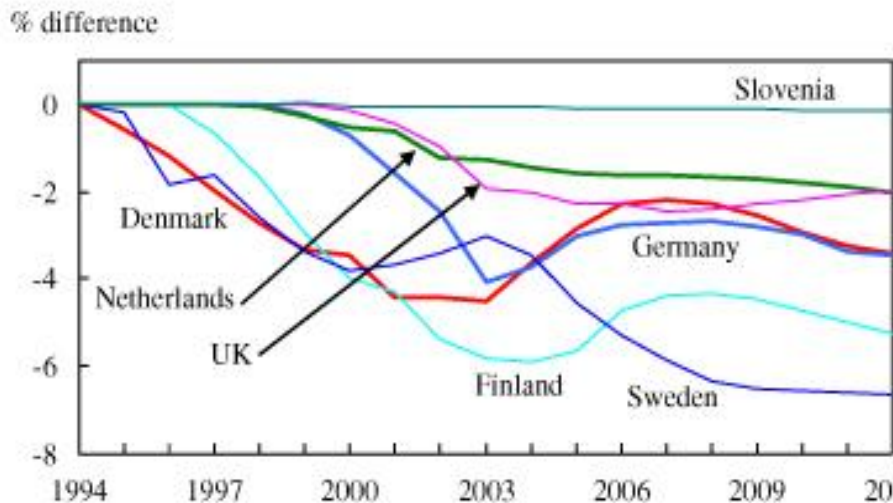
- Six EU countries have implemented ETRs: Denmark, Finland, Germany, Netherlands, Sweden, UK
- The outcomes – environmental and economic – have been broadly positive: energy demand and emissions are reduced; employment is increased; effects on GDP are very small
- Effects on industrial competitiveness have been minimal

- See Andersen, M.S. & Ekins, P. (Eds.) *Carbon Taxation: Lessons from Europe*, Oxford University Press, Oxford/New York, 2009

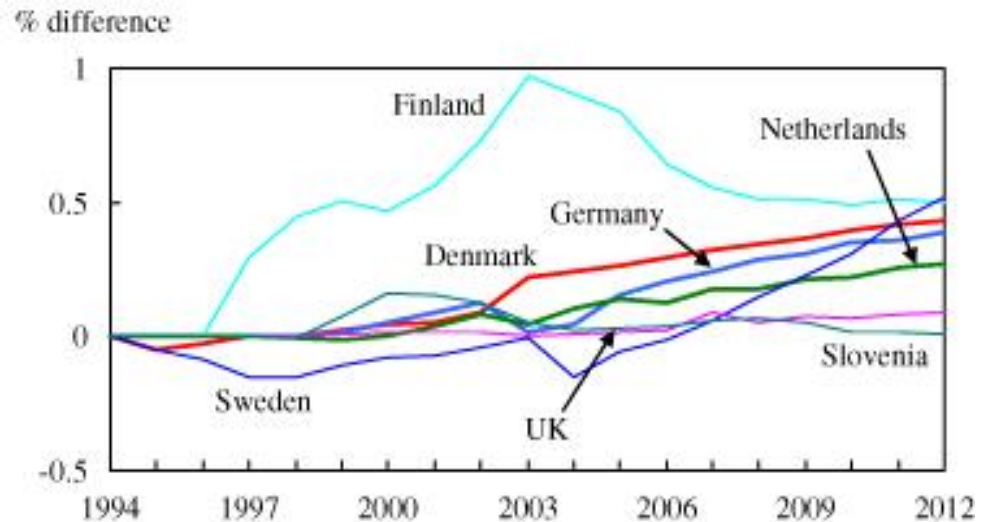
ENVIRONMENTAL AND ECONOMIC IMPACTS OF ETR, FROM COMETR STUDY, 2007

CHART 2: THE EFFECT OF ETR ON GHG EMISSIONS

CHART 3: THE EFFECT OF ETR ON GDP



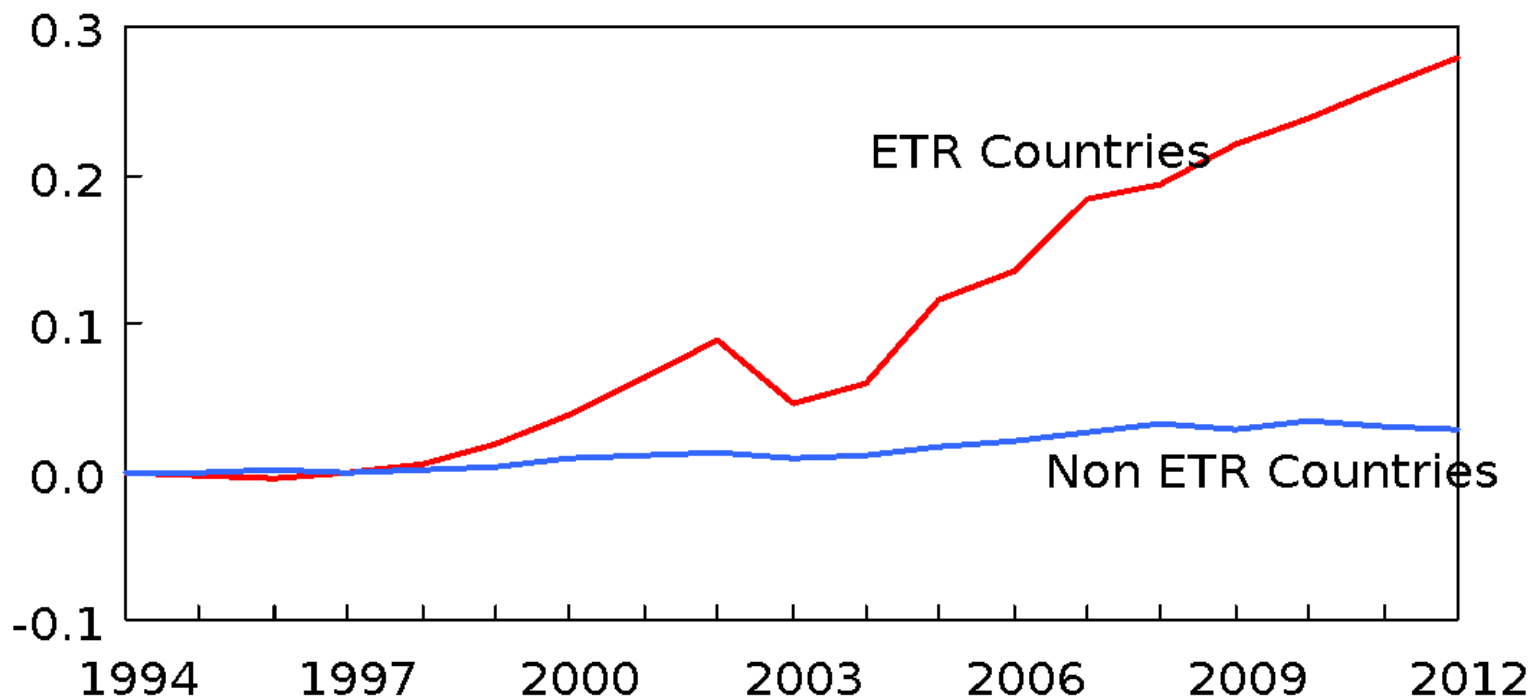
Note(s) : % difference is the difference between the base case and the counterfactual reference case.
Source(s) : CE.



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Source(s) : CE.

CHART 7.28: THE EFFECTS OF ETR: GDP IN ETR AND NON COUNTRIES

% difference



Note(s) : % difference is the difference between the base case and the actual reference case.

Source(s) : CE.

CONCLUSIONS ON COSTS AND GROWTH

- The Stern Review central estimate (1% GDP) was on the low side, but its upper range (1-4% GDP) is certainly consistent with the evidence
 - There is no evidence that strong action to mitigate climate change will have much higher costs or halt economic growth completely
 - Environmental tax reform (ETR) is a crucial policy approach for cost-effective carbon reduction and low-carbon structural change
 - If the economic costs are low, why is carbon reduction so difficult?

REASONS FOR THE COST/POLITICAL FEASIBILITY PARADOX (1)

- The consumption-to-investment shift
 - The technologies for large-scale climate change mitigation are, or soon will be, available at affordable cost.
 - Government funding of R,D&D will need to increase dramatically, but deployment and diffusion can only be driven at scale by markets.
 - Developing and deploying the technologies will require huge investments in low-carbon technologies right along the innovation chain (research, development, demonstration, diffusion).
 - Financing this investment will require a substantial shift from the consumption-oriented economy of today to an investment economy that builds up low-carbon infrastructure and industries.
 - This shift need not have a major negative impact on GDP (incomes) and employment but will require higher savings and lower consumption rates. This may not be politically popular in a consumer society (UK savings rates fell below zero in early 2008).

REASONS FOR THE COST/POLITICAL FEASIBILITY PARADOX (2):

- The required lifestyle change
 - Stimulating the required investment will require high (now) and rising carbon prices over the next half century, to choke off investment in high-carbon technologies and incentivise low-carbon investments.
 - These high carbon prices will also greatly change lifestyles and consumption patterns. This too is not proving politically popular.

CONCLUSION

- The adequate mitigation of climate change will require a fundamental shift in the direction of innovation, brought about by changes in relative prices through ETR.
- This innovation will generate ‘green growth’ which in the medium term will exceed rates of brown growth.
- It is not technology or cost, that are the main constraining factors to policies for ‘green growth’, but politics – people’s attachment to consumption rather than savings/investment, and to high-carbon lifestyles.
- Changing this political reality is the necessary condition for the adequate mitigation of climate change, which will alone avoid the potentially enormous, but still very uncertain, costs of adapting to climate events and conditions outside all known human experience.
- It is also the necessary condition for ‘green growth’ to become a reality.
- Conversely, it is only the possibility of and prospects for ‘green growth’ that will persuade policy makers and the public to go for environmental sustainability at all
- For further reading: Ekins, P. *Economic Growth and Environmental Sustainability: the Prospects for Green Growth* (Routledge 2000)

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Thank You

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