



Institute for
Fiscal Studies

Environmental Taxes

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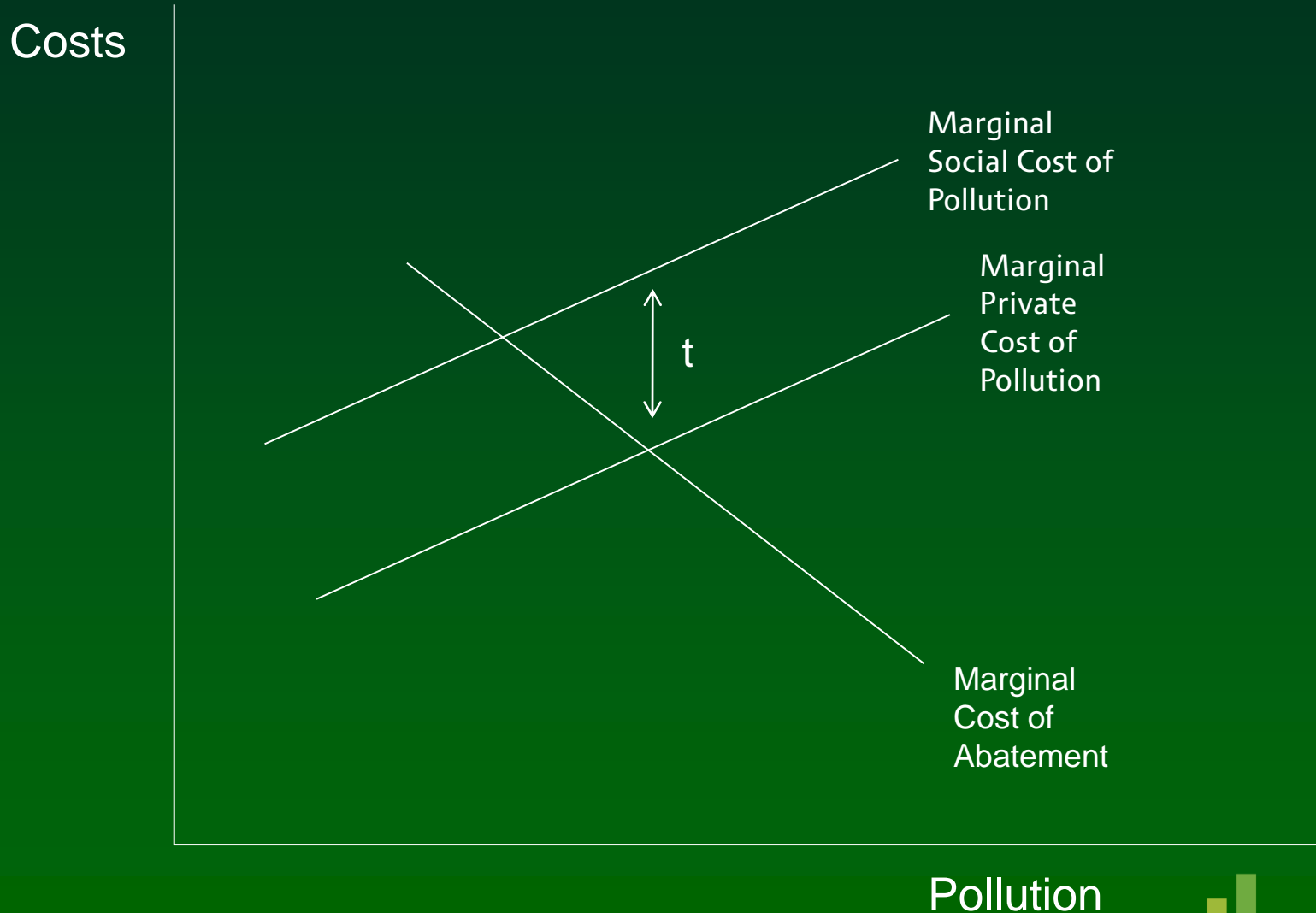
Outline

- Environmental Economics: Externalities.
- Application: Economics of Climate Change.
- What makes a good environmental tax?
- Some policy examples:
 - Current environmental taxes.
 - Implicit (e.g. Renewables Obligation) and explicit (e.g. Fuel Duty).
- Possible future reforms.
- References and further reading.

Correcting Externalities (1)

- Externalities
 - Costs or benefits from an activity borne by third parties which are not reflected in prices.
- Pricing pollution internalises these costs and can lead to a welfare gain.
- Different ways to do this:
 - Taxes.
 - Regulation.
 - Subsidising alternatives.

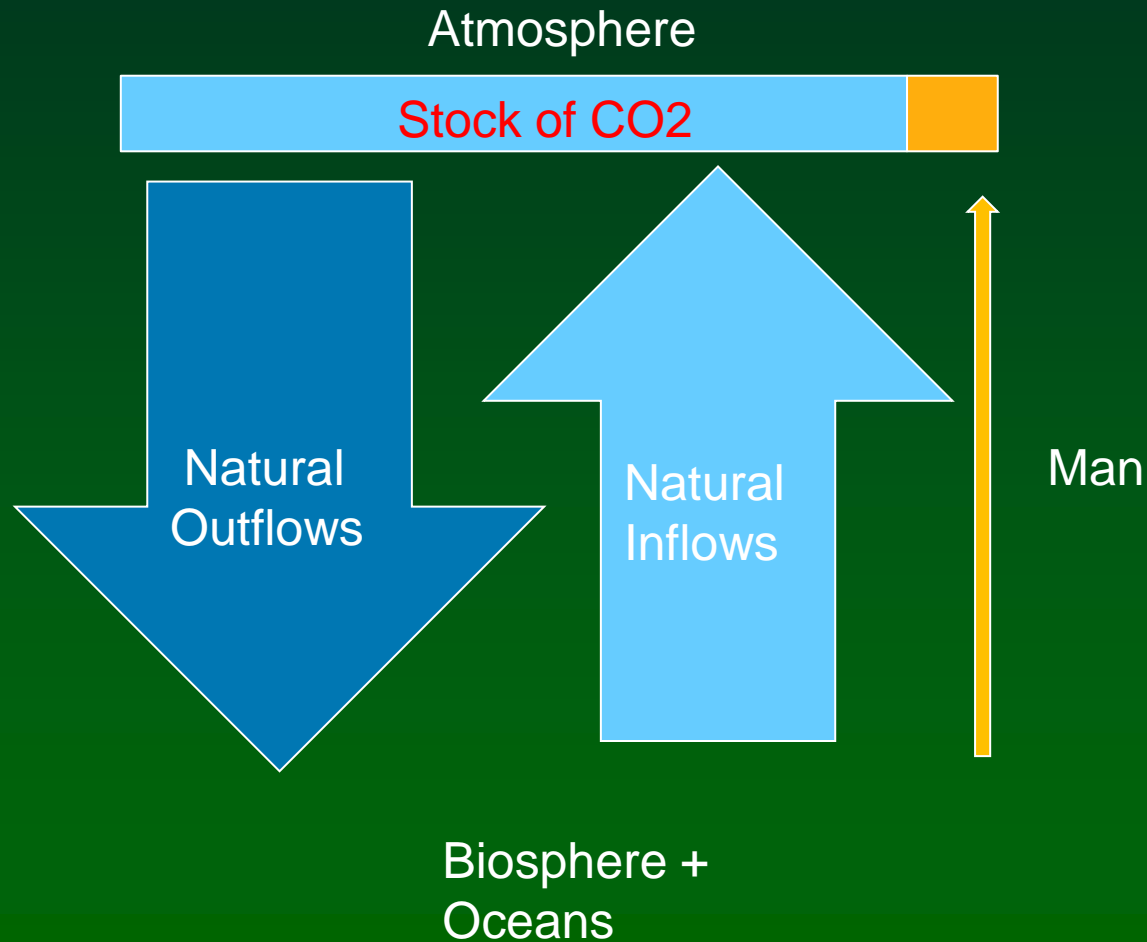
Correcting Externalities (2)



Science of Climate Change (1)

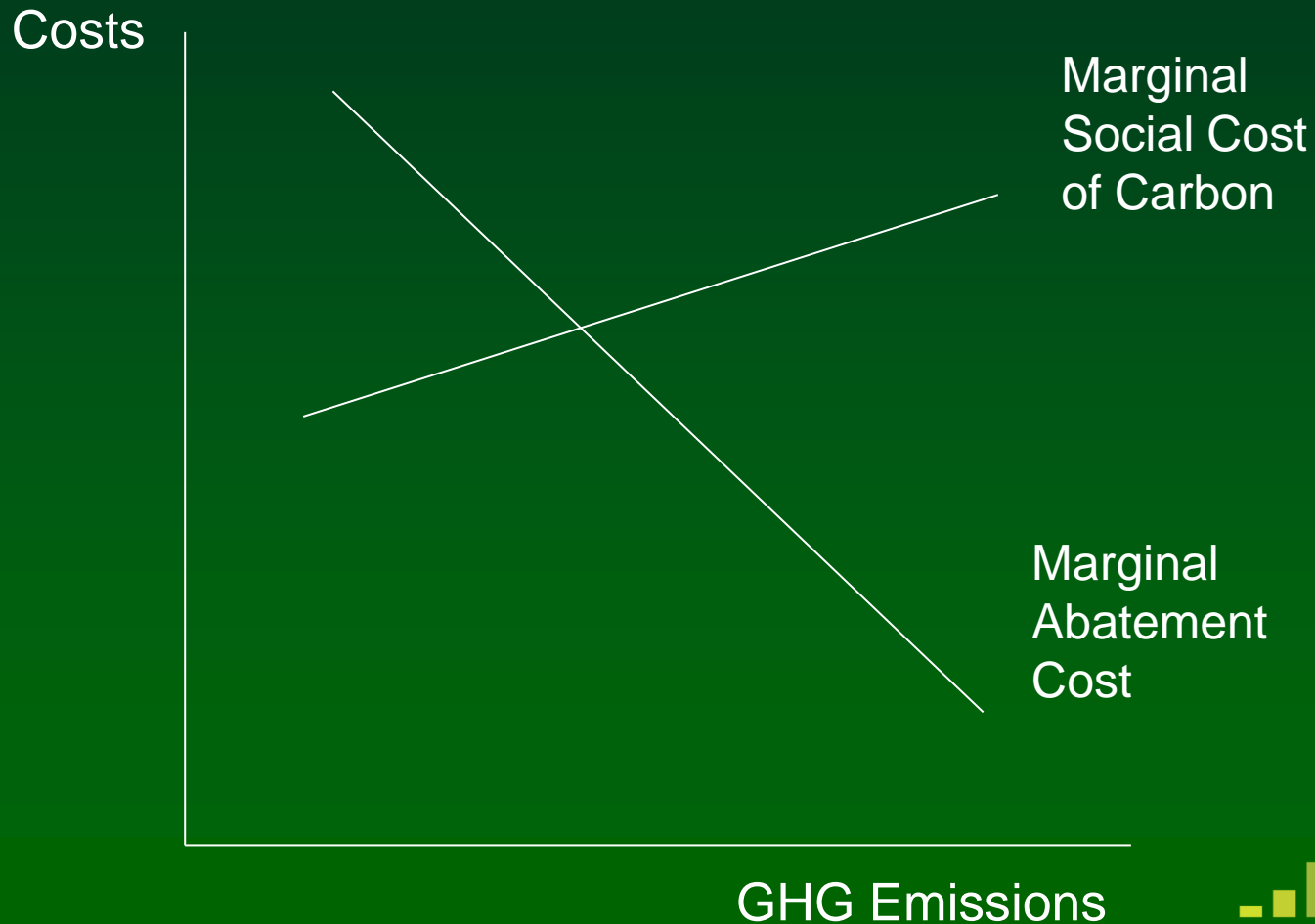
- Green house gases are associated with external costs:
 - Warming.
 - Ocean Acidification.
- It is the stock of CO₂ in the atmosphere that causes the damage not the flow.
- The marginal damage of GHGs depends on the stock of current emissions.
- Stocks and flows often confuse people...let's look at the system.

Science of Climate Change (2)



Economics of Climate Change (1)

- Appears similar to textbook treatment:



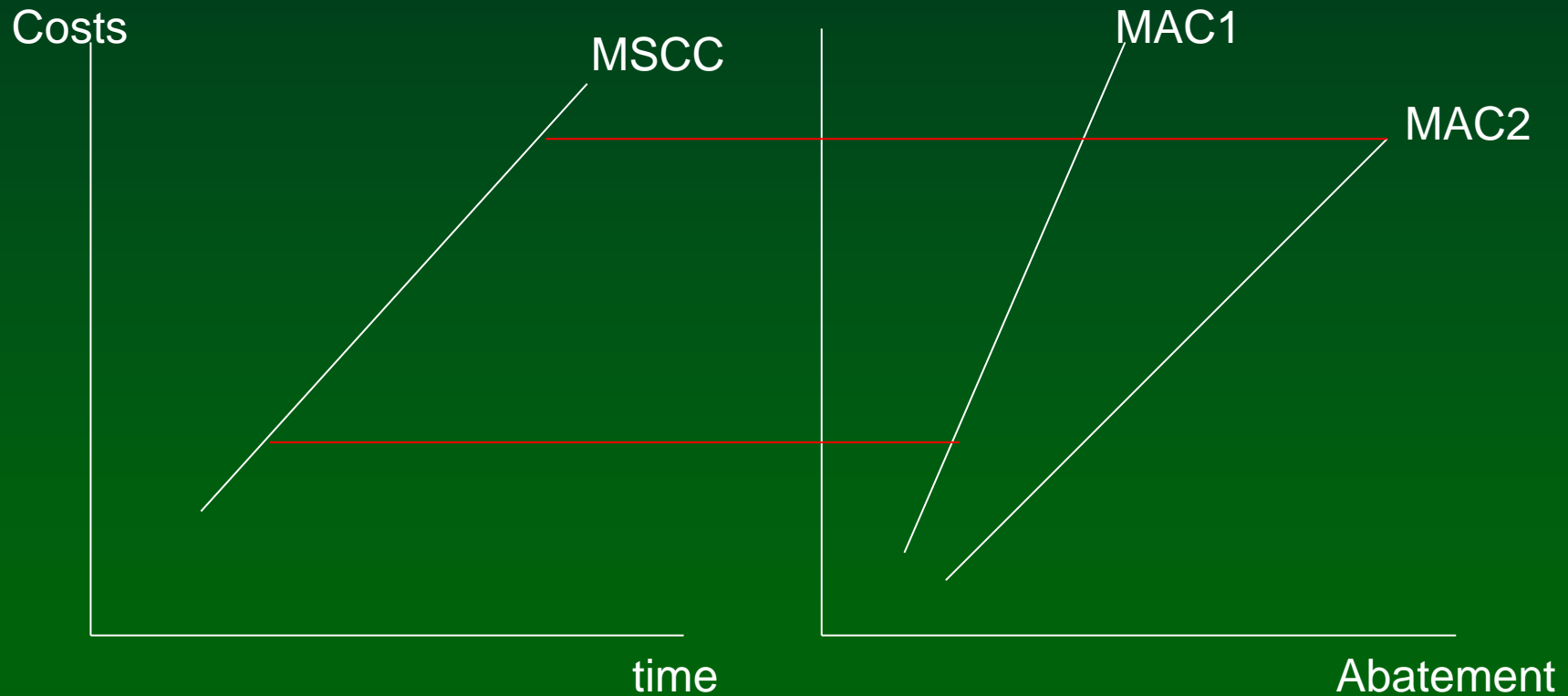
Economics of Climate Change (2)

- Cost curves 'shift' between periods.
 - MSCC curve shifts as stock of emissions changes.
 - MAC curve shifts as technology changes.
- When making decisions in period t , should take account of expected future path of emissions and expected future changes in technology.
- Naive response is to solve 'within period problem' only.
- Sophisticated response is to solve all future period problems simultaneously.

Economics of Climate Change (3)

- Considering the dynamic aspect of the problem has implications
 - Other things equal, earlier action is better.
 - Uncertainty over future cost curves is important for decision making.
 - Need to think carefully about future reductions when considering current ones.
 - “Time inconsistency”.
- Should consider expected future paths of emissions when drawing the diagram.
- If we solve optimally, the marginal abatement cost should be rising over time, even though technology is improving.

Economics of Climate Change (3)



How best to control pollution? (1)

- Regulation?
- Economic instruments
 - Taxes?
 - Subsidies for alternative activities?
 - Trading schemes?

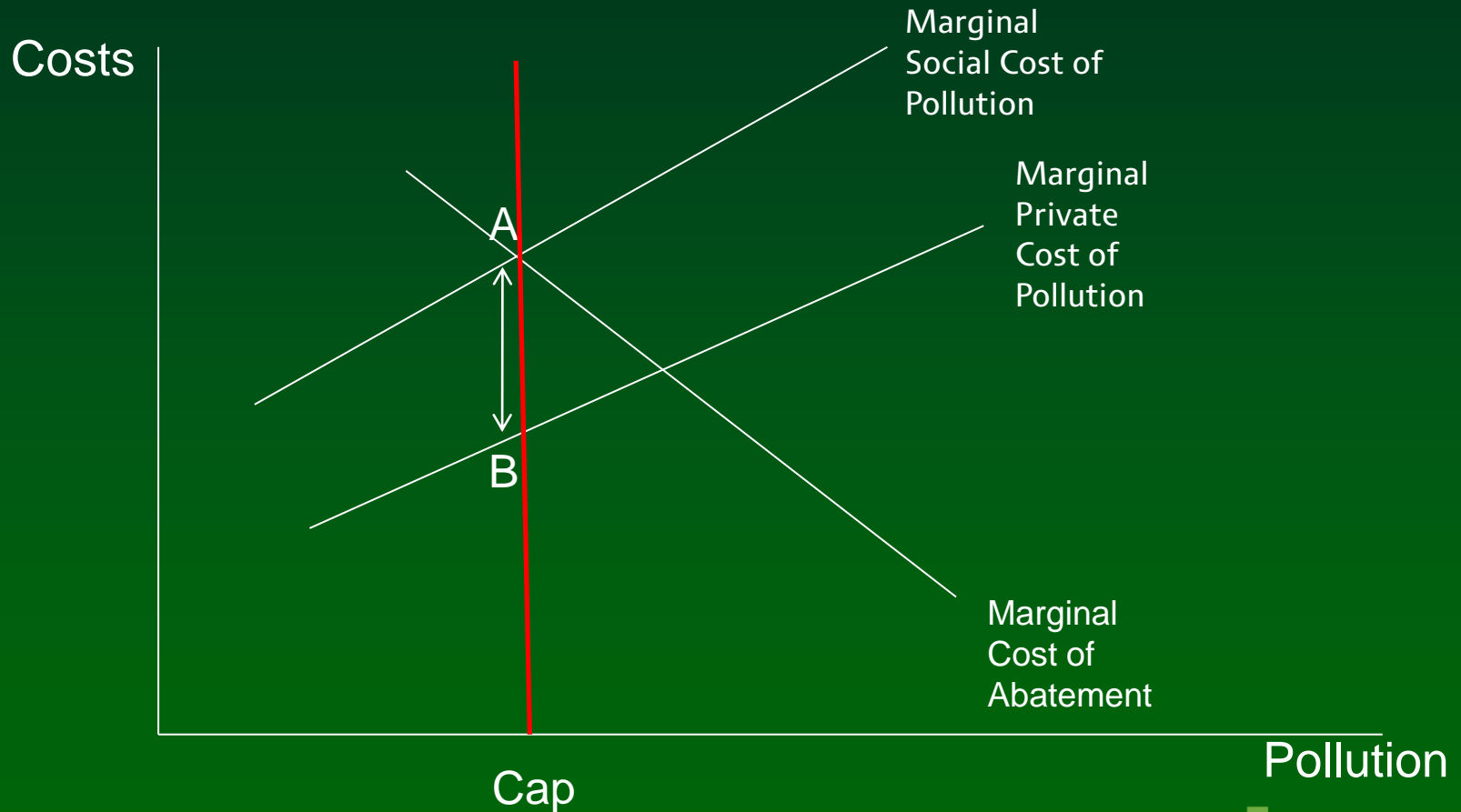
How best to control pollution? (2)

- Regulation vs Taxes
 - Firms' decision making structures.
 - Lower enforcement costs.
 - Taxes might be seen as legitimising pollution?
 - Taxes regressive?
- Taxes vs Regulation
 - But, regulators may not have information about the least costly way to reduce emissions.
 - Regulators might be prone to lobbying.
 - Dynamic innovation incentives.
 - Raise revenue. Taxes may be associated with a “double dividend”.

How best to control pollution? (3)

- Taxes vs Subsidies
 - Weaker incentives to innovate.
 - Other distortionary taxes must be increased to finance the subsidy.
 - Opposite of the “double dividend”.
- Taxes vs Trading Schemes
 - Equivalence under certainty.

How best to control pollution? (4)



How best to control pollution? (3)

- Taxes vs Trading schemes
 - Equivalent under certainty.
- Many governments prefer trading schemes. Why?
 - With uncertainty over MAC, equivalence breaks down.
 - Choice depends on steepness of MSC curve.
 - If curve steep more important to hit targets and so cap is to be preferred.
 - Permits may allow governments to “buy” consent.
 - Difference between extensive and intensive margins.

How best to control pollution? (4): Conclusions

- In general economic instruments to be preferred over regulation.
- Don't subsidise alternatives.
- Auction permits, don't redistribute taxes lump sum.
- Marginal cost of abatement should be equal for everyone.
- Target externality directly.

- Let's use these principles to discuss actual policy....

Policy (1)

- Government uses a variety of economic instruments at the moment:
 - Climate Change Levy
 - Aggregates Levy
 - Landfill Tax
 - Air Passenger Duty
 - Fuel Duty
 - Renewables Obligation
 - Carbon Reduction Commitment
 - European Emissions Trading Scheme.

Policy (2)

- Climate Change Levy
 - Tax on non-renewable energy used by businesses.
 - Does not depend on carbon content of fuels.
 - Business only.
- Air Passenger Duty
 - Not a carbon tax.
 - Levied per passenger.
 - Varies according to distance within four broadly defined bands.
 - Doesn't vary by aircraft type.
 - Fuel taxes not permitted under Chicago Convention.

Policy (3)

- Renewables Obligation
 - Firms must source a particular proportion of energy from renewable sources.
 - Implicit carbon tax.
 - Increase in marginal costs capped – firms may purchase ‘buyouts’ if not able to supply enough certificates at the end of the year.
 - Buyout fund redistributed to firms in proportion to ROCs supplied.
 - Banded ROCs, more ROCs for energy generated from certain sources.
- European Emissions Trading Scheme
 - Covers certain sectors only.
 - Not sufficient to meet 20:20:20 target on its own.
 - UK currently auctions 7% of permits.
 - Maximum 10% of permits may be auctioned.

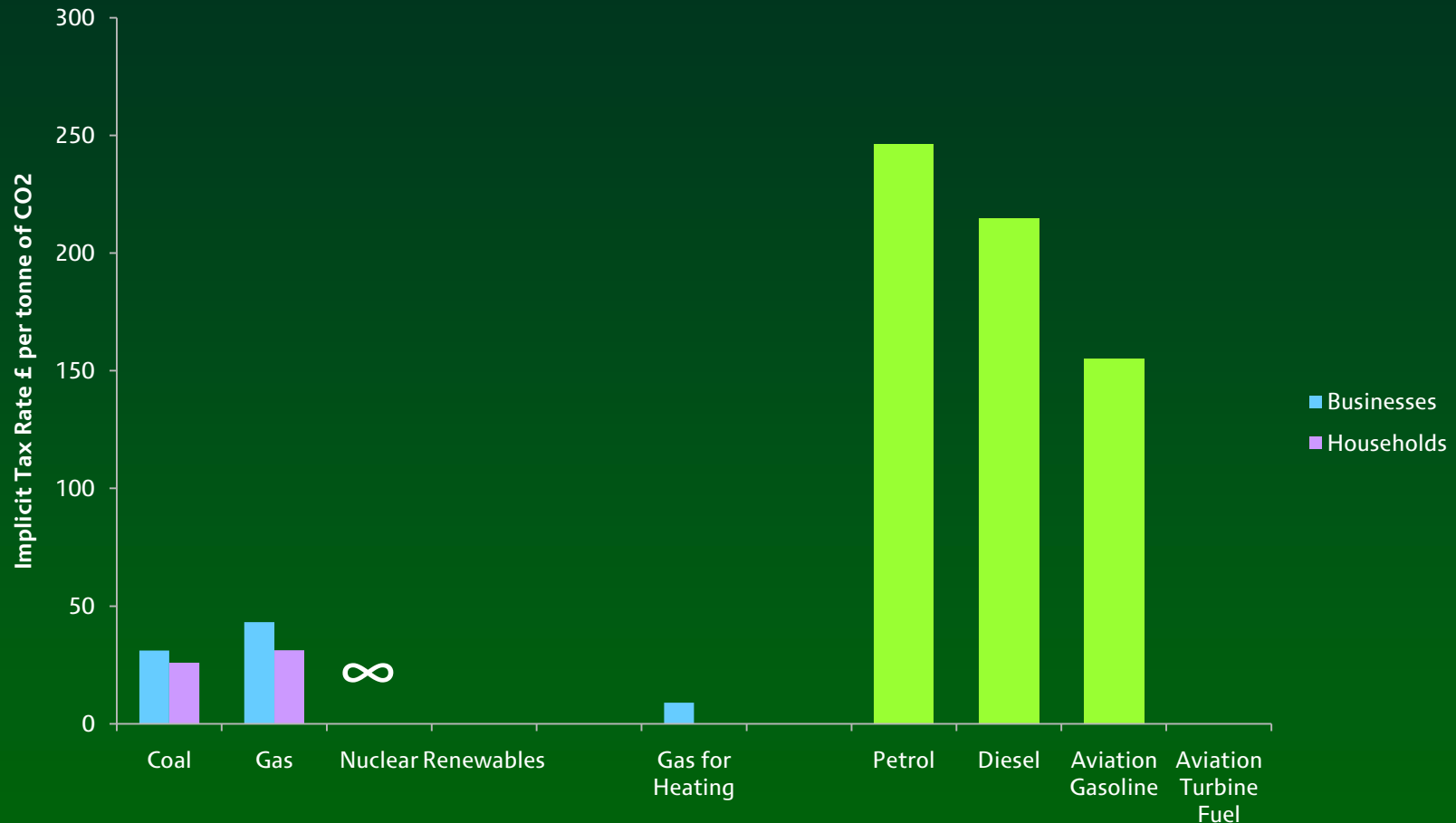
Policy (4)

- Carbon Reduction Commitment
 - First sale of allowances starting in April 2012.
 - Overlap with ETS.
 - Spending review announced proceeds to be kept by Treasury.
 - May affect incentives.
 - But more efficient than other tax rises?

Policy (5)

- Summary
 - A lot of lump sum redistributions.
 - Taxes don't always target externalities directly.
 - Variation in taxes for different economic agents.

Policy (6): Implicit Carbon Taxes



Source: Johnson, Leicester and Levell (2010)

Policy (7)

- Differences between households and firms
 - Equity efficiency trade-off.
 - Households helped with energy efficiency through Carbon Emissions Reduction Target and Community Energy Savings Programme.
- Transport fuel taxes not only aimed at reducing carbon emissions
 - Congestion, accidents etc.
 - Tax inelastic goods more.

Future Reforms

- Per Plane Duty?
- Reforms to CCL proposed by conservatives
 - CCL to be levied “upstream” on generators according to carbon content of fuels.
 - Able to subtract cost of ETS permits from tax liability (tax liability does not fall below 0)
 - Floor on emissions price.

Further Reading

- Stern, N., (2006), *The Economics of Climate Change: The Stern Review*, Chapter 2
http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/d/Chapter_2_Economics_Ethics_and_Climate_Change.pdf
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