



Long Term, Low Carbon Options for the UK

Peter G Taylor
ETSAP Workshop, Torino, October 2002



Background

- Report on climate change by Royal Commission on Environmental Pollution
- Energy Review by the Performance & Innovation Unit of the Cabinet Office
- Government White Paper on Energy Policy (forthcoming)





MARKAL study

- Commissioned by UK Department of Trade and industry
- Objectives:
 - Develop bottom-up baseline carbon dioxide emissions projections to 2050
 - Identify potential technical options for carbon dioxide abatement
 - Investigate the cost of reducing carbon emissions



Initial work programme (6 months)

- Build new UK MARKAL model (50 year time horizon, specifically aimed at analysing substantial CO₂ reductions)
 - Develop scenarios
 - Collect and input technology data
 - Test & calibrate model
- Undertake model runs
- Analyse results



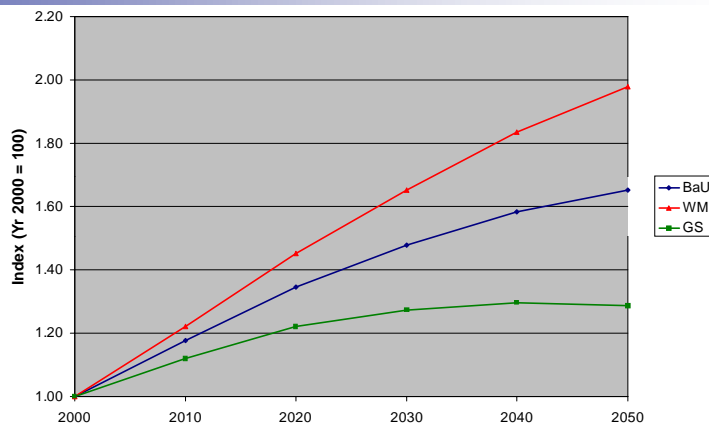
Scenarios

- Business as Usual (GDP 2.25 % p.a.)
- World Markets (GDP 3 % p.a.)
- Global Sustainability (2.25 % p.a.)

Exploring a range of possible futures covering both economic and social change



Example of scenario for UED - Transport



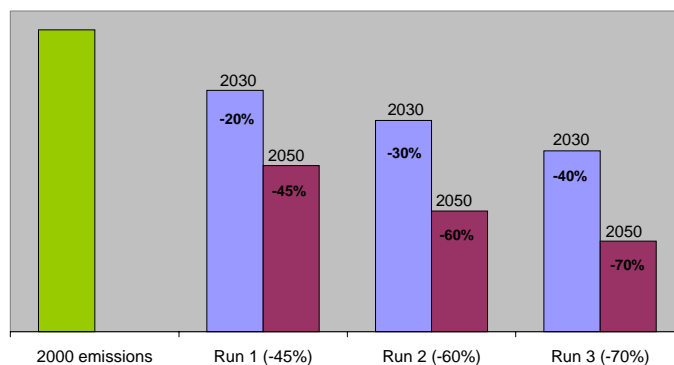
Scenario Energy Prices

	2000	2010	2020	2030	2040	2050
Oil (\$ per barrel)						
<i>BaU</i>	28	20	20	25	25	25
<i>World Markets</i>	28	24	28	35	35	35
<i>Global Sustainability</i>	28	15	15	15	15	15
Gas (\$/toe)						
<i>BaU</i>	120	120	135	160	180	180
<i>World Markets</i>	120	145	170	210	210	210
<i>Global Sustainability</i>	120	130	150	180	190	200
Coal (\$/tonne)						
<i>All scenarios</i>	36	36	36	36	36	36



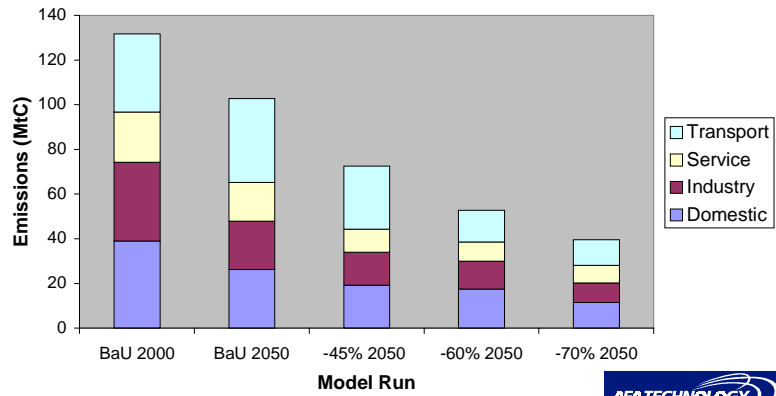
CO₂ reductions examined

CO₂ emissions



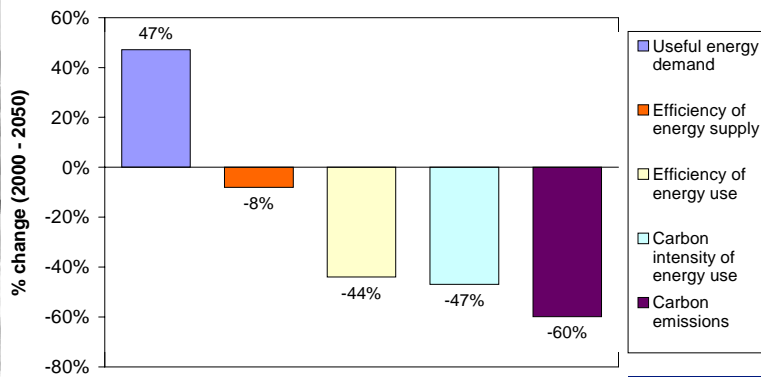
Results (1)

BaU Scenario - Carbon Emissions by Sector



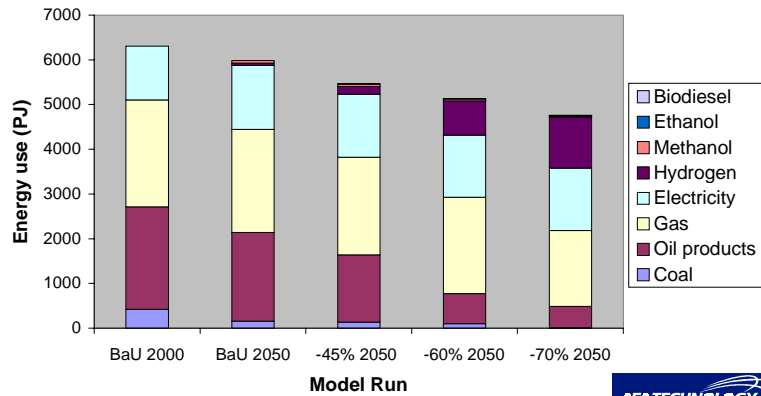
Results (2)

Contributions to overall CO₂ emission reductions



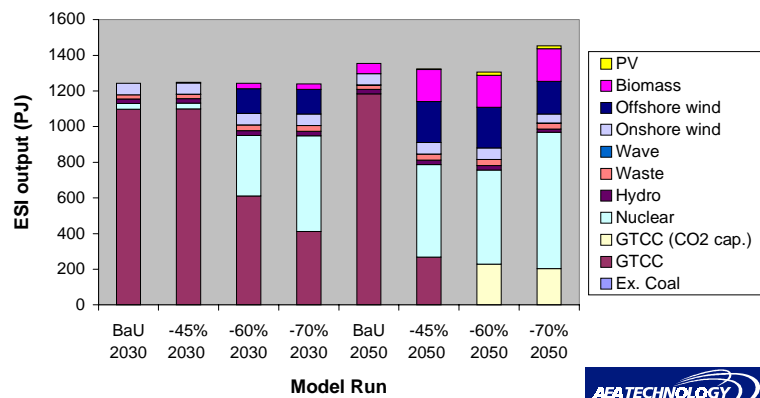
Results (3)

BaU Scenario - Final Energy Use by Fuel



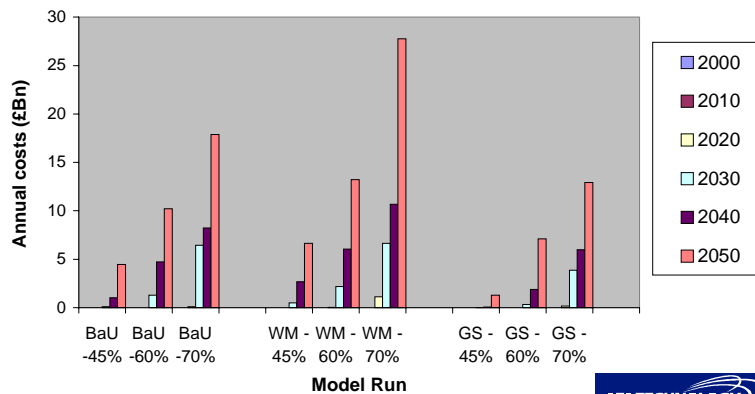
Results (4)

BaU Scenario - Electricity Generation by Fuel



Cost of CO₂ Abatement

Costs of Reducing CO₂ Emissions



Main conclusions of first study

- Diversity of technology options
- Importance of energy efficiency
- Attractiveness of natural gas
- Costs tolerable?
- Innovation is key



Further analysis (ongoing)

- Reduced energy efficiency
- Limits on natural gas
- Reduced innovation
- Cost of renewables targets
- Fuel price assumptions
- Technology costs & exclusion
- Abatement trajectories
- Infrastructure
- Sector impacts

