UK schemes for reducing carbon emissions from electricity and elsewhere

UK CARBON EMISSIONS POLICY OPTIONS AND EU POLICY CONFERENCE

London Business School

27 April 2004

John Bower
Overview

What the White Paper Said

Reality Dawns

An alternative 20:20 Vision
What the White Paper Said

UK schemes for reducing CO2 emissions

John Bower

UK Schemes for Reducing CO2 Emissions
What the White Paper Said

…. towards an EU driven multifaceted agenda

GOALS AND POLICIES

3. Promote competitive markets in UK and beyond – IMPLIES LOW PRICES
   - Raise rate of sustainable economic growth
   - Support business and competitiveness through reliable / affordable energy
   - Encourage firms to innovate, reduce cost, deliver better goods and services
   - Use market based instruments to deliver policy goals
   - Work with business to prepare them for the low carbon economy of the future

4. Ensure every home is adequately and affordably heated – IMPLIES LOW PRICES
   - Reduce poverty by lowering prices and raising social security payments
   - Improve quality of housing stock via insulation and energy efficiency grants
Reality Dawns

However political risk and planning uncertainty remain – TISC and Lords voicing concern

A SHIFT IN EMPHASIS OR A MAJOR RETHINK?

“Britain's future energy mix will be dominated by gas power generation with nuclear power likely to make a comeback and renewables only playing a limited part”

"I wouldn't put much money on there being much of a coal generation element by 2015."

"The emergence of carbon trading will slightly penalise gas, but it will punish coal, and it could begin to favour nuclear“

“Renewables will be limited -- nuclear will come back"

Source: Martin O'Neill, Chairman of the UK Parliament's Trade and Industry Select Committee. 29 September 2003
Reality Dawns

Power generation is squeezed by hard policy objective and soft policy implementation

**IMPLIED UK ENERGY POLICY ASPIRATION FOR CO2 EMISSIONS 1990 - 2020**

Source: DEFRA and author's estimates
An aggressive CCGT investment programme is required but price signals not clear yet.

### ACTUAL AND LIKELY FUTURE PLANT MIX 1990 - 2020

- **Source:** DEFRA and author's estimates
Reality Dawns

…. and renewables output will struggle to reach 10% of total but rapid growth in CHP

ACTUAL AND LIKELY FUTURE OUTPUT MIX 1990 - 2020

Source: DEFRA and author's estimates
Reality Dawns

However demand growth will undermine attempts to cut emissions in power generation...

ACTUAL AND LIKELY FUTURE PLANT MIX 1990 - 2020

Source: DEFRA and author's estimates
Reality Dawns

…. so it will never be able to deliver the entire burden of CO2 emission reduction

**ACTUAL AND LIKELY FUTURE POWER SECTOR EMISSIONS AND INTENSITY 1990 - 2020**

![Graph showing actual and likely future power sector emissions and intensity 1990-2020.](chart)

Source: DEFRA and author’s estimates
Energy policy in power generation is really being driven by EU ETS and LCPD….

**EU EMISSIONS TRADING SCHEME AND LARGE COMBUSTION PLANT DIRECTIVES**

**EU Emissions Trading Scheme**
- **Precursor** 2003 – 2004
- **National Plan Formulation**
- **Phase I** 2005 – 2007
  - CO2 only
  - Allocation only
- **Phase II** 2008 – 2012
  - CO2 + other gases
  - Allocation + Auctions

**EU Large Combustion Plant Directive**
- **Precursor** 2002 - 2003
- **National Plan Formulation**
- **Phase I** 2004 – 2007
  - SOx, NOx, dust
  - ELV or NP
- **Derogation Phase** 2008 – 2015
  - SOx, NOx, dust
  - ELV or 20k hr derogation
## Reality Dawns

.... with current UK schemes indicating wildly varying marginal CO2 abatement cost

### IMPLIED MARGINAL VALUES OF CO2 EMISSIONS FROM POWER GENERATION

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Cost Details</th>
<th>Equivalent to CO2 Emission Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU ETS</td>
<td>£ 5.50 / MtCO2 abated</td>
<td>£ 5.50 / MtCO2</td>
</tr>
<tr>
<td>CCL</td>
<td>£ 4.30 / MWh supplied</td>
<td>£ 6.50 / MtCO2</td>
</tr>
<tr>
<td>VAT (Household)</td>
<td>£ 4.50 / MWh supplied</td>
<td>£ 6.75 / MtCO2</td>
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<tr>
<td>UK ETS</td>
<td>£15.00 / MtCO2 abated</td>
<td>£17.50 / MtCO2</td>
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<tr>
<td>ROCs</td>
<td>£40.00 / MWh supplied</td>
<td>£45.00 / MtCO2</td>
</tr>
</tbody>
</table>

Source: Author’s estimates
Pragmatic solution is to buy JI/CDM credits as well as EU ETS permits
An Alternative 20:20 Agenda

The value of CO2 abatement will not cover renewable build costs until after 2020…

EXPECTED MARGINAL COST OF GENERATION IN 2005 - 2010

Source: Author’s estimates. See also www.oxfordenergy.org Oxford Energy Comment “UK Offshore Wind Generation Capacity: A Return to Picking Winners”
An Alternative 20:20 Agenda

…. but road transport CO2 could be cut with a fiscal incentive to switch to DERV

EMISSION FACTORS FOR PETROL AND DERV

<table>
<thead>
<tr>
<th></th>
<th><strong>PETROL</strong></th>
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<th><strong>DERV</strong></th>
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<tbody>
<tr>
<td></td>
<td><strong>kg CO2 equivalent emissions / km</strong></td>
<td><strong>kg CO2 equivalent emissions / km</strong></td>
<td></td>
</tr>
<tr>
<td>Small Car</td>
<td>0.22</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>2.0 litre or under</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Large Car</td>
<td>0.25</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>2.0 litre or over</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Car</td>
<td>0.20</td>
<td>0.12</td>
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</tr>
</tbody>
</table>

Source: DEFRA
John Bower is a Senior Research Fellow at the Oxford Institute for Energy Studies which is an independent research charity affiliated to Oxford University and dedicated to advanced research in the social science aspects of energy. John joined OIES in November 2001 and his research interest is in the emergence and evolution of integrated cross-border electricity and gas markets. Specifically, the development of efficient pricing and investment mechanisms for energy, transmission capacity, and emissions.

Before joining the OIES, John completed his PhD at London Business School and his previous career was in the commodity industry. His experience ranges from energy trading, at Marc Rich & Co, to risk management consultancy, with Coopers & Lybrand, advising commodity traders, producers and processors in base metal, precious metal, ‘softs’ and energy markets. Immediately prior to his PhD he was Global Controller Metals/Commodities at Deutsche Morgan Grenfell.

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