Our Energy Challenge : Securing clean, affordable energy for the long term

A Response to the DTI Consultation Paper of January 2006

Professor C Coggins

With the publication of the Energy Review Consultation Paper in January 2006 and the Review of England's Waste Strategy Consultation Document in February 2006, I find it very surprising and rather sad that the Energy Review makes so few reference to the potential rile of residual waste as an energy resource. Biomass waste from MSW could provide 7.5 million tonnes (5 million tonnes of coal equivalent and residual combustible waste a further 5 million tonnes – representing c. one third of current coal consumption. There is a serious need for 'joined-up' thinking between energy and waste strategies.

Q1 What more could the government do on the demand or supply side for energy to ensure that the UK's long-term goal of reducing carbon emissions is met ?

Key issues are :-

awareness raising – do the public understand the importance of carbon emissions ?

diversity and security of supply are fundamental

with high prices for oil and gas likely to continue, the future issue will not be one of cheap energy, but the need to compete in the global market for scare and expensive energy imports

consideration of relevant fiscal instruments to influence pricing structures : e.g. ROCs for mixed waste (not just for CHP), reduced VAT for energy efficient products and duty on targeted biofuels

Q2 With the UK becoming a net energy importer and with big investments to be made over the next twenty years in generating capacity and networks, what further steps, if any, should the government take to develop our market framework for delivering reliable energy supplies ? In particular, we invite views on the implications of increased dependence on gas imports

With the publication of the Energy Consultation Paper in February 2006 and the Waste Strategy Consultation Paper in March 2006, there seems to be a fundamental lack of joined-up thinking :-

after waste prevention, reduction, re-se, recycling and composting residual waste could provide a very important UK-based source of energy

MSW could provide up to 12 million tonnes of combustible waste, with more from commercial and industrial sources

such an energy resource could be harnessed through incineration with combined heat and power CHP) and/or through the production of a fuel product from these waste streams for co-combustion

procurement policies could set targets for new-build residential and commercial/industrial developments to incorporate Decentralised Energy systems using local transmission grids – based on renewable energy or appropriate scale CHP plants using residual waste as a fuel

tighter regulation and emission standards set by the Waste Incineration Directive should ensure that such activities minimise any potential harm to the environment and/or human health

The following tables highlight the dilemma facing the government with 'conventional energy supplies' .
The first tables show the situation with reference to coal (and oil) power stations with reference to the Large Combustion Directive and fitting of Flue Gas Desulphurisation (FGD). Over a third of capacity will 'opt-out', involving significant reductions of generating capacity after 2008 due to restrictions imposed by the EU Large Combustion Plant Directive Note also the age of the power stations.

FGD Position in the United Kingdom and Northern Ireland (as at early 2006)

Coal-fired power stations opting for Emission Limit Values

		Installed Capacity (MW)	**Commissioned**
Cottam	EDF Energy	2,000	1969
Ferrybridge 3 & 4	Scottish & Southern Energy	1,000	1966
Fiddlers Ferry	Scottish & Southern Energy	2,000	1971
Ratcliffe on Soar	E.ON UK	2,000	1968
Rugely	International Power	1,000	1972
West Burton	EDF Energy	2,000	1967
Aberthaw	RWE Npower	1,500	1971
Uskmouth	Uskmouth Power Company	393	2000
Kilroot	AES	520	1981
Total		12,413	

Coal-fired power stations opting for National Plan

Drax	Drax Power Limited	3,960	1974
Eggborough	British Energy	2,000	1967
Longannet	Scottish Power	2,304	1970
Peterhead (+CCGT)	Scottish & Southern Energy	1,320	1980
Total		9,584	

Coal- and oil-fired power stations opted out

Kingsnorth (coal)	E.ON UK	2,000	1970
Ironbridge	E.ON UK	1,000	1970
Tilbury	E.ON UK	1.000	1968
Didcot A	RWE Npower	2,000	1972
Ferrybridge 1 & 2	Scottish & Southern Energy	1,000	1966
Cockenzie	Scottish & Southern Power	1,152	1967
Grain (oil)	E.ON UK	1,000	1979
Littlebrook D	RWE Npower	2,000	1982
Fawley	RWE Npower	1,000	1969
Total		12,972	

Source : Digest of UK Energy Statistics 2005 + ENDS March 2006.

The following table reinforces the declining role that nuclear power will play in the UK energy economy, and also how long they have been in operation. Currently supplying 23% of electricity, this figure is expected to fall to 4% after 2020.

Closure of UK Nuclear Power Stations

	Capacity (MW)	Commissioned	Expected closure
BNFL British Nuclear Group			
Sizewell A	420	1966	2006
Dungeness A	450	1965	2006
Oldbury	434	1967	2008
Wylfa	980	1971	2010
British Energy			
Hinkley Point B	1220	1976	2011
Hunterston B	1190	1976	2011
Hartlepool	1210	1984	2014
Heysham 1	1150	1984	2014
Dungeness B	1110	1983	2018
Heysham 2	1250	1988	2023
Torness	1250	1988	2023
Sizewell B	1188	1995	2035

Source : DT (2006). Our Energy Challenge : Securing clean, affordable energy for the long run.

Coupled with increased reliance on oil and gas imports, there is likely to be a significant energy gap after 2015/2020.

Q3 The Energy White Paper left open the option of nuclear new build. Are the particular considerations that should apply to nuclear as the government re-examines the issues bearing on new build, including long-term liabilities and waste management ? If so, what are these, and how should the government address them ?

The Sustainable Development Commission in 2006 has eloquently summarised the key issues associated with nuclear power, and these will be confirmed with the Easter 2006 publication of the latest report of the Parliamentary Environment Audit Committee :-

costs are high and uncertain : 10 reactors would be needed to keep the costs down to £14 billion ?

there is no agreed solution to the long-term waste problem : estimated to cost £70 billion in March 2006 by the Nuclear Decommissioning Authority

a major new programme could lock the UK into an inflexible centralised energy model : and reduce the development of Decentralised Energy (DE) and local distribution grid networks

a high-profile technical fix would undermine energy efficiency

it could encourage other countries to go down the nuclear path

Q4 Are there particular considerations that should apply to carbon abatement and other low-carbon technologies ?

There appears insufficient evidence to support these at the present time, and more R&D is required. They are unlikely to make major contributions in the short term (5-10 years).

Q5 What further steps should be taken towards meeting the government's goals for ensuring that every home is adequately and affordably heated ?

Section 106 Planning Agreements should be used to incorporate appropriate scale CHP developments, as part of Decentralised Energy systems, with any new-build housing developments

Further Issues as described in the text :-

The long term potential of energy efficiency measures in the transport, residential, business and public sectors, and how best to achieve that potential

Efficiency of energy recovery is covered in the draft Waste Framework Directive of December 2005.

For new-build, issues of design and facilities management need to be linked with energy efficiency.

Implications in the medium and long term for the transmission and distribution networks of significant new build in gas and electricity generation infrastructure

Arguments for Decentralised Energy (DE) and local transmission networks can be linked with appropriate scales CHP plants, and not linked with continued reliance on gas imports.

Opportunities for more joint working with other countries on our energy policy goals

Energy price increases and disruption of gas imports in late 2005 has focussed EU thinking about security and diversity of energy supplies.

Subsequent to the publication of the Energy Consultation Paper in February 2006, the EU has realised the importance of liberalising energy markets within EU Member States and instigated 'infringement proceedings' in April 2006 for Member States (including the UK) failing to take steps to open up energy markets for competition. They have been given until July 2007 to fully liberalise markets as part of a proposed common EU energy strategy.

iv. Potential measures to help bring forward technologies to replace fossil fuels in transport and heat generation in the medium and long term

Whilst the Waste Implementation Programme has allocated significant sums of money to 'advanced technologies to treat biodegradable municipal waste, the closure of contracts for Demonstrator Programmes has been very slow due to issues of due diligence, security of waste supplies, waste management and licensing problems and private-sector financial support.

It is likely that some of these new technologies may offer medium/long term solutions. In the short-term, however, incineration with CHP and/or co-combustion are more likely to be bankable and deliver more significant contributions to the UK energy supply mix.

The long-term future **might** reside with gas and/or gasification (from wastes) and the development of a hydrogen fuel-cell economy.

E&OE

Last updated 14th April 2006.

In submitting this response, the author assisted the Chartered Institution of Wastes Management in formulating a Position Statement on Energy from Waste in February 2006, supported by a 20 page text report and 60 pages of Technical Annexe *"Residual Waste as an Energy Resource"*.