



WASTE: AN OVERLOOKED ENERGY SOURCE FOR UK

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KEY UK ENERGY ISSUES



Two key issues

- security of supply
- climate change

Renewables (including waste) have major role in addressing these

Importance of waste as a current and future energy source has been largely ignored until recently

SECURITY OF SUPPLY



UK oil and gas reserves running down (6 years proven reserves left?)

Nuclear currently declining

- projected plant closures
- new build programme?

Coal declining

- new build programme and carbon capture and storage issues?

UK imports of oil and gas currently mainly from Norway

- but will increasingly come from more distant and riskier sources
- investment in gas storage provides temporary buffer and enables diversity of supply (but still leaves reliance on imports)

Energy prices peaked last year

- now much lower reflecting world economic slow down

Long term energy security remains key issue

THE RENEWABLE ENERGY CHALLENGE



UK targets to generate 15% of total electricity from renewables by 2015 and potentially 15% of total energy (30 to 40% of electricity) by 2020

- compared to 5% of electricity at present

Waste currently accounts for largest portion of UK renewables (30%) and has grown six-fold over the past 10 years

- represents around 1.5% of total UK electricity

Could account for much larger proportion of total UK electricity

- up to 17/20% per Institutions of both Civil and Mechanical Engineers

A huge and overlooked potential contribution to UK energy security and climate change strategy

THE WASTE MANAGEMENT CHALLENGE



UK faces major municipal landfill diversion challenge

- LATS targets and penalties
- recycling targets
- huge investment requirements (up to £30bn per ICE)

How can councils best fund the massive investment required and meet their diversion targets

- in face of large number of uncertainties and risks
- whilst taking account of potential synergies with other councils and industrial/commercial sector
- and maximising scope for renewable energy generation including CHP

WAYS OF RECOVERING ENERGY FROM WASTE (1)



Landfill gas

- currently the largest component of waste related energy (24% of total renewables; 1.2% of total UK electricity)
 - 600% growth in last 10 years
 - Some limited scope for further growth
- effectively large scale anaerobic digestion
- huge environmental benefit of converting methane (21 times as harmful as CO₂) into energy

Energy from waste combustion

- proven technology very widely used on continent
- probably most efficient way of recovering energy from waste especially if large scale
 - Lakeside EfW plant (Viridor/Grundon) 37MW on 400kt waste or 11kt per MW
- even better when combined with CHP
 - planned Runcorn plant (Viridor/Ineos/Laing) 750kt with 120MW (electricity plus heat) or under 7kt per MW
 - requires use of heat (see below)

WAYS OF RECOVERING ENERGY FROM WASTE (2)



Anaerobic digestion

- popular proposed route for food wastes
- c30kt source segregated food waste per MW power export
- also produces compost or compost like substance

Advanced thermal technologies such as pyrolysis and gasification

WASTE VERSUS OTHER FORMS OF RENEWABLE ENERGY



All the above waste solutions provide base load capacity generating 80% plus of the time

- compare wind

Distributed round the electricity network typically near major centres of population/industry

- source of waste inputs
- compare off shore wind and hydro/tidal

Generally much more economic than competing sources of renewable energy because a bi product of waste management

- wind typically twice as expensive
- tidal four times as expensive?

This is not to knock down other forms of renewables

- we need every source of energy possible

THE CHP CHALLENGE



Finding uses for heat is a key challenge on CHP

Planned Runcorn facility has large on site industrial use

- but not many sites like this in UK

Other possibilities

- leisure centres/swimming pools?
- greenhouses?
- flats/housing (as in Scandinavia)?
- etc

Requires changed mindset of putting waste facilities near to rather than away from other facilities

RENEWABLE OBLIGATION (RO)



Under RO generators of renewable energy are paid

- basic wholesale/brown energy price
- value of renewable obligation certificate ROC
- (climate change) levy exemption certificate

Brown energy price set by world supply/demand

ROC value depends on actual renewable production versus government targets; if we fall behind target, prices go up

- target 5% of electricity in 2005 rising to 10% in 2010 and 15% in 2015
- ROC face value £30 per MWH (plus inflation)
- if target were 10% and actual production 5% then ROC value is £60 (plus inflation)

Complex eligibility rules

- AD double ROCS
- pyrolysis/gasification eligible
- reduced eligibility (quarter ROC) for new landfill gas schemes
- good quality CHP now eligible

VIRIDOR RENEWABLE ENERGY PROJECTS



Landfill gas

- 101MW currently (compared to 28MW in 2002)

Lakeside joint venture with Grundon Waste Management

- 400kt pa and up to 37MW EfW plant at Colnbrook near Heathrow due to open this year
- £160m capex, 85% non-recourse debt with balance split equally between equity providers

GMWDA/Runcorn

- existing 9MW plant at Bolton
- planning permission for up to 750kt, 120MW CHP facility

Exeter

- 60kt pa 3MW electricity
- planning permission achieved

Other possible long-term EfW/CHP sites

- Trident Park, Cardiff (site acquired)
- Dunbar (existing Viridor site; planning application submitted)
- Ardley (existing Viridor site; planning application submitted)

6 proposed Anaerobic Digestion (AD) plants all with planning permission

- Greater Manchester 4 plus Beddington (Croydon) and Walpole (Somerset)
- total 10MW

SUMMARY



Waste is an overlooked strategic energy source for UK

Biggest prize is EfW/CHP

Challenge is to come up with combined waste and renewable energy strategies

- requires councils, government and waste contractors to work together