Driving the Uptake of Renewable Heat

PRASEG and Green Alliance Seminar
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npower Cogen

> Since 1993 npower Cogen has invested over £360m in gas-fired CHP plants developing 16 sites across England, Wales & Ireland.

> Following contract signing in September 2009, the new plant at the Tullis Russell paper mill in Scotland will be npower’s first biomass CHP and is planned to commission in Q1 2012.

> The focus of this presentation is on the barriers and potential for large scale renewable CHP, but we will also touch upon issues relating to renewable heat in the domestic and SME sectors.
Tullis Russell Biomass CHP Project
RWE’s biomass CHP project at Tullis Russell

> RWE is constructing a 45MW biomass CHP plant at Tullis Russell’s paper mill located at Markinch in Fife.

> Tullis Russell is an employee owned premium paper and board manufacturer with 550 employees at the Markinch site.

> The paper mill is currently supplied with steam and electricity from a coal fired CHP plant which will be replaced by the new biomass CHP resulting in a reduction in CO₂ in excess of 250,000 tonnes per annum.

> The project has secured an £8.1million grant from the Scottish Government’s Regional Selective Assistance programme.
Tullis Russell Project Details

> The CHP plant will use circulating fluidised bed boiler technology and will be Waste Incineration Directive compliant which will allow a wide range of biomass fuels to be used.

> The CHP plant will be fuelled on approximately 400,000 tonnes of used wood and virgin wood each year and will be sourced from a wide range of local and national sources.

> The project will secure double ROCs under the Renewables Obligation.

> Construction work commenced during September 2009, with commercial operation of the CHP plant in 2012.

> The project will cost circa £200m and is part of RWE’s €1 billion per annum investment programme in renewable electricity projects across Europe.
Tullis Russell Site - Current
Heat dominates UK energy use …..

> Heat (including electric heating) constitutes 49% of UK energy consumption and 47% of carbon emissions. (EWP 2007).
Renewable heat for industry?

> Domestic heat emissions are 20% and industrial heat emissions are 20% with the remaining 7% from services (EWP 2007).

> Technologies such as solar thermal and heat pumps deliver at low temperature for domestic and commercial.

> Biomass can deliver high temperature heat and is therefore well suited to industry with high temperature requirements.

> Industrial use of biomass also facilitates CHP which will make best use of the limited resource:
Biomass heat potential …..

> UK resourced biomass is limited (RES 2008)

> Industry well placed to utilise biomass given limited alternatives to gas to provide high temperature steam
Financing Renewable CHP: Regulatory Risk

> Renewable CHP already benefits from a “FiT” - the RO

> Renewable CHP already benefits from a “RHI” - an extra 0.5 ROCs

> How do we treat CHP when the RHI is introduced?

  – Grandfathering of RO rights for committed projects is vital

  – Projects benefiting from RO support need to be on a level playing field with RHI based projects when RHI is introduced from 2011.
What could go wrong for CHP? Missing the “sweet spot”:

Fuel → CHP → Heat

Primary Energy Savings:
- 20%
- 10%

Heat Only → CHP → Power Only

CHP sweet spot
Renewable heat in the domestic sector?

> Currently a niche market but with significant potential

> Biomass for residential raises air quality issues and questions over sustainability (clean wood vs. recycled wood)

> Policy must support all domestic sectors – not just the affluent

> RHI alone may not be enough – upfront capital costs is an issue that could be resolved by ongoing support from CERT/HESS

*1.5Mt per annum, best case: 2: Forestry Commission 08/09 Sales Projections [http://www.forestry.gov.uk/forestry/infd-7chmtn](http://www.forestry.gov.uk/forestry/infd-7chmtn)*
Renewable heat in the domestic sector?

> All policies need to align to best effect (RHI, CERT/HESS, fiscal incentives)

> Linkages between property values and technology investment important

> Straightforward consumer interface essential

> Local Authorities can play significant roles in planning & coordination / the understanding of local needs
Renewable Heat for SMEs and other businesses

> Have SMEs been the missing link in policy development?

> RHI can help us engage with this sector

> Awareness and engagement – the building stock and landlord/tenant relationship are particular issues

> SMEs will need support in terms of advice and finance (capital)

> The needs of the larger business (e.g. service sector) where heat use is for space heating must be considered – heat networks, solar thermal and heat pumps

> Businesses need to prioritise energy efficiency more – current economic climate is helping to drive interest in measures

> Trade associations and Local Authorities have key roles to play
Summary

> Investor certainty should be maintained as RHI is introduced for CHP.

> The CHP RHI banding should be used to ensure CHP is still incentivised compared to power only / heat only. The value of the RHI needs to keep an existing CHP balanced (in the sweet spot).

> Significant potential for domestic renewable heat, but greater support measures and targeting is required. RHI unlikely to deliver on its own.

> We must strike a balance – the RHI will impact upon energy bills – vulnerable customers must be protected.
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RWE Experience of Biomass CHP Projects

> **Biomass CHP Plant Kehl**
  - Circulating Fluidised Bed (CFB) furnace
  - Plant output: 59 t/h - 90 bar - 500°C – 8.9 MW<sub>el</sub> / 35 MW<sub>th</sub>
  - Fuel: 110,000 t waste wood

> **Wood CHP Plant Berlin-Neukölln**
  - Grate Firing system
  - Plant Output: 2 x 60 t/h - 64 bar - 445°C - 20 MW<sub>el</sub> / 66 MW<sub>th</sub>
  - Fuel: 220,000 t waste wood

> **Biomass Power plant Bergkamen**
  - Circulating Fluidised Bed (CFB) furnace
  - Plant Output: 80 t/h - 90 bar - 500°C - 20 MW<sub>el</sub> / max. 20 MW<sub>th</sub>
  - Fuel: 140,000 t waste wood

> **Industrial CHP Plant Baienfurt**
  - Circulating Fluidised Bed (CFB) furnace
  - Plant Output: 17 t/h - 42 bar - 440°C – combination with CCGT (38 MW<sub>el</sub>)
  - Fuel: 15,000 t paper sludges plus approx. 35,000 t bark plus industrial waste wood