

CHP in the Renewables Obligation

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CHP Team

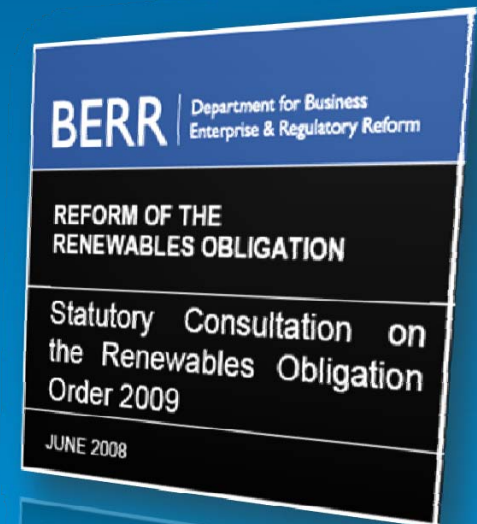
7th December 2010

Renewables Obligation Consultation

The Government envisage 15% of electricity from renewable resources in UK by 2015

In 2008 the Government consulted on changes to the RO regime

This new RO regime was implemented through the Renewables Obligation Order 2009



Renewables Obligation Order 2009

Key Features:

- Came into effect 1st April 2009
- Introduces the concept of “banding” which provides varying levels of support (ROCs/MWh) for different types of renewable generation
- Enhances support for schemes fuelled by energy crops
- Gives increased level of support to Good Quality CHP over power-only schemes
- Continues support for waste-fuelled GQ CHP

Biomass and Energy Crops

The term biomass is used to cover a broad range of biologically derived resources including:

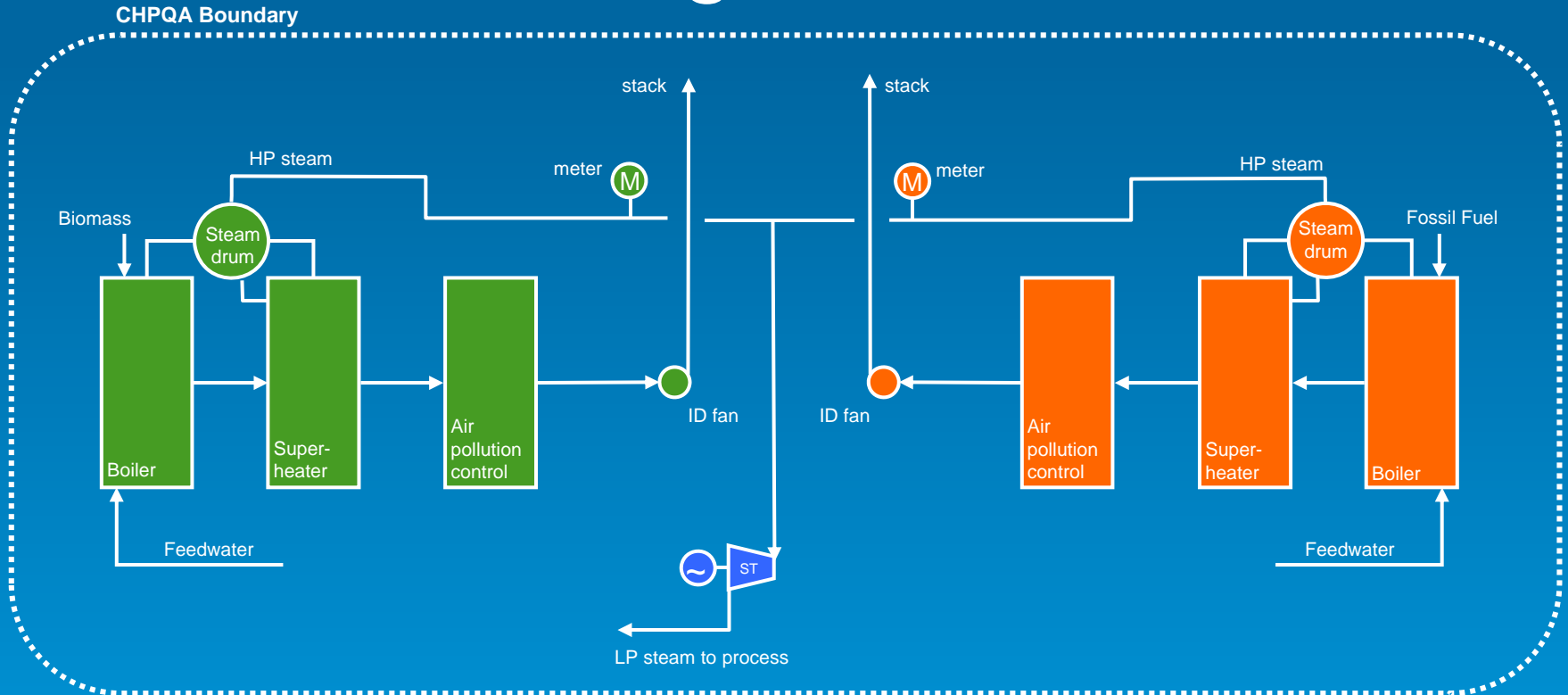
- Biodegradable fractions of municipal, commercial & industrial wastes
- Sewage sludge, animal slurries, poultry litter
- Food waste
- Forest wood fuel
- Agricultural residues
- Wood waste
- Specifically grown energy crops



ROCs Banding

Generation Type	Definition	ROCs / MWh
Energy from Waste with CHP	Electricity generation from the combustion of waste in a <u>qualifying</u> CHP plant	1
Gasification/Pyrolysis	Electricity generated from the conversion of waste or biomass into liquid/gaseous fuel(s) for use in a generating station by process of gasification, pyrolysis or both (fuel CV conditions apply)	2
Co-firing of biomass	Electricity generated from regular biomass in a month in which the generating station generates electricity partly from fossil fuel and partly from renewable sources	0.5
Co-firing of biomass with CHP	Electricity generated from regular biomass by a qualifying combined heat and power generating station in a month in which it generates electricity partly from fossil fuel and party renewable sources, <u>and where the fossil fuel and regular biomass have been burned in separate boilers or engines</u>	1
Co-firing of energy crops	Electricity generated from energy crops in a month in which the generating station generates electricity partly from fossil fuel and partly from renewable sources	1
Co-firing of energy crops with CHP	Electricity generated from energy crops by a qualifying combined heat and power generating station in a month in which it generates electricity partly from fossil fuel and energy crops, <u>and where the fossil fuel and regular biomass have been burned in separate boilers or engines</u>	1.5
Dedicated Biomass	Electricity generated from regular biomass in a month in which the generating station generates electricity only from biomass	1.5
Dedicated Biomass with CHP	Electricity generated from regular biomass by a qualifying combined heat and power generating station in a month in which the generating station generates electricity only from biomass	2
Dedicated Energy Crops (with or without CHP)	Electricity generated from energy crops in a month in which the generating station generates electricity only from energy crops or biomass	2

Co-firing with CHP



Co-firing of biomass with CHP

Electricity generated from regular biomass by a qualifying combined heat and power generating station in a month in which it generates electricity partly from fossil fuel and party renewable sources, and where the fossil fuel and regular biomass have been burned in separate boilers or engines

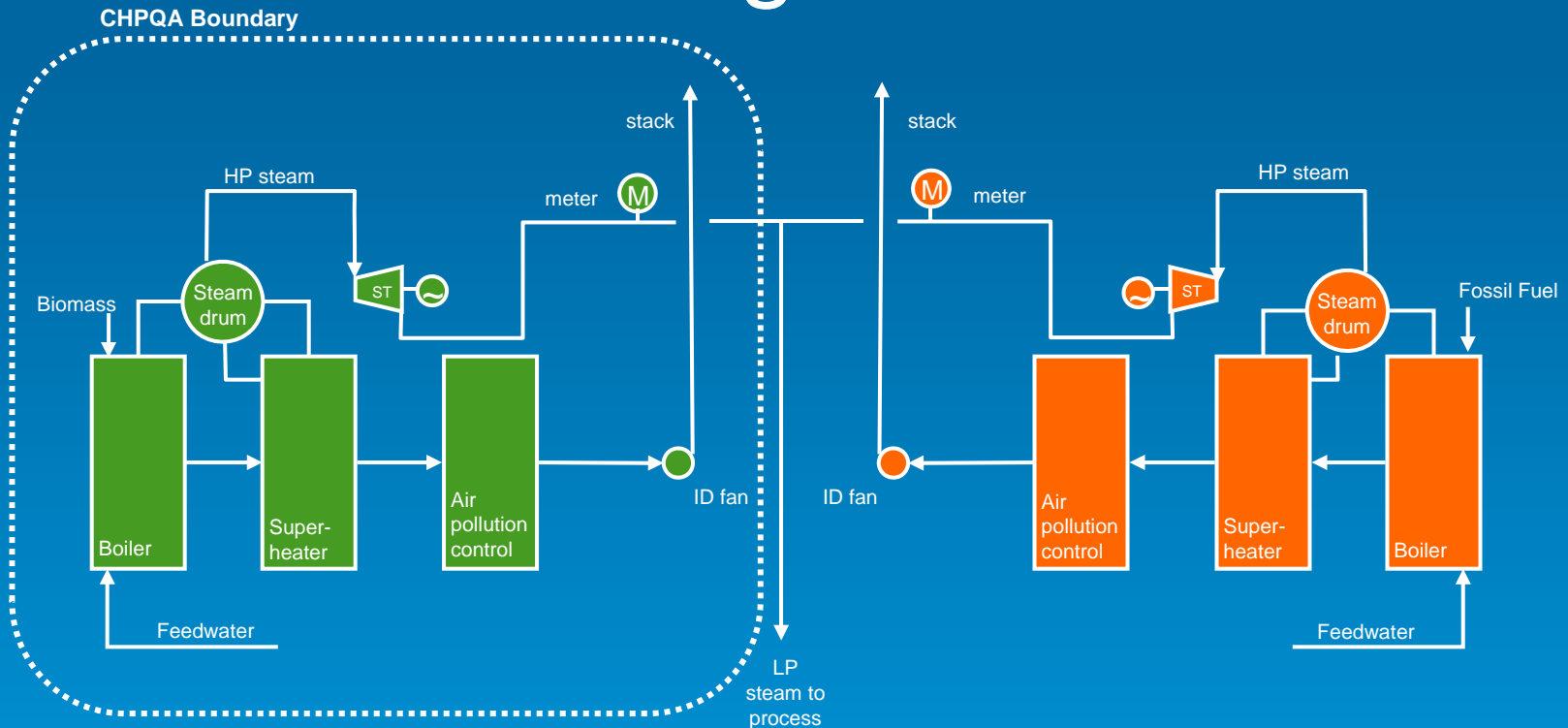
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Co-firing of energy crops with CHP

Electricity generated from energy crops by a qualifying combined heat and power generating station in a month in which it generates electricity partly from fossil fuel and energy crops, and where the fossil fuel and regular biomass have been burned in separate boilers or engines

1.5

Co-firing with CHP



Dedicated Biomass with CHP	Electricity generated from regular biomass by a qualifying combined heat and power generating station in a month in which the generating station generates electricity only from biomass	2
Dedicated Energy Crops with CHP	Electricity generated from energy crops by a qualifying combined heat and power generating station in a month in which the generating station generates electricity only from energy crops or biomass	2

ROC Eligibility - Fuels

Energy Crop: if fuel mix has biogenic energy content $\geq 90\%$, then electricity generated from the energy crop receives ROCs under banding for 'dedicated energy crops'

Regular Biomass: Electricity generated should receive the ROC entitlement for 'dedicated biomass with CHP' for power output deemed to be GQ CHP'

Waste: If the fuel has a biogenic energy content of $< 90\%$ then ROCs will be issued under banding for 'Energy from Waste with CHP' on the GQ CHP output of the scheme attributable to renewable content of the waste

ROC calculation for CHP

ROC award is based on relationship between QPO and TPO

ROCs given on GQ CHP element with a power-only band for any remaining output (for biomass/energy crops)

chp QA

Quality Certification for an existing CHP Scheme

CHPQA Certificate No: F01234567

Scheme: CHPQA Administrator
The Gemini Building
Harwell International Business Centre
Didcot
Oxfordshire
England
OX11 0QR

CHPQA Scheme Reference No: 1234 A

This is to Certify that the Self-Assessment of the above CHP Scheme undertaken by RESPONSIBLE PERSON of Scheme performance during the calendar year: 2006 has been Validated under the Combined Heat and Power Quality Assurance programme and that:

1. The Total Power Capacity of this Scheme is:	0.070 MWe
and the Qualifying Power Capacity is:	0.070 MWe
2. The threshold Power Efficiency criterion for this Scheme is:	20 %
and the Power Efficiency of this Scheme is:	26.92 %
3. The Qualifying Heat Output from this Scheme is:	0.12 MWh
and the Heat Efficiency of this Scheme is:	46.15 %
4. The threshold Quality Index criterion for this Scheme under Annual Operation is:	100
and the Quality Index of this Scheme is:	111.54
5. The Total Fuel Input to this Scheme is:	0.26 MWh
and the Qualifying Fuel Input is:	0.26 MWh
6. The Total Power Output from this Scheme is:	0.07 MWh
and the Qualifying Power Output is:	0.07 MWh
7. The fuel supply reference(s) and TRANSCO's meter reference nos. and/or other unique ID descriptors for this Scheme are:	(12345678)

6. The Total Power Output from this Scheme is:
and the Qualifying Power Output is:

0.07 MWh
0.07 MWh

ROC Eligibility

For GQ CHP the power output eligible for the award of ROCs is determined using:

$$\text{Eligible Power Output} = \text{GPO}^* \times \text{Biomass Content (\%)} \times \left(\frac{\text{QPO}}{\text{TPO}} \right) \times \left(\frac{\text{Net Power Output}}{\text{GPO}} \right)$$

NB: the above QPO figure is reported on a second, parallel, CHPQA Certificate that is not based on the QI definitions set out in the CHPQA Standard

* Gross Power Output

ROC Eligibility – QI Definitions

QI Definitions for ROCs Eligibility are provided in CHPQA Guidance Note GN44 – available from www.chpqa.com

For Schemes >25MWe

Table 1: QI Formulae For Various Types Of CHP Biomass Schemes >25MWe

Solid waste	$QI = 364 \times \eta_{power} + 140 \times \eta_{heat}$
Agricultural Biomass	$QI = 338 \times \eta_{power} + 130 \times \eta_{heat}$
Wood Fuels	$QI = 315 \times \eta_{power} + 120 \times \eta_{heat}$

For Schemes ≤ 25 MWe

Table 2: QI Formulae For Various Types Of CHP Biomass Schemes Equal To Or Less Than 25MWe

Solid waste	$QI = 370 \times \eta_{power} + 140 \times \eta_{heat}$
Agricultural Biomass	$QI = 370 \times \eta_{power} + 130 \times \eta_{heat}$
Wood Fuels	
≤ 1 MWe	$QI = 329 \times \eta_{power} + 120 \times \eta_{heat}$
>1 to ≤ 25 MWe	$QI = 315 \times \eta_{power} + 120 \times \eta_{heat}$

ROC Eligibility – QI Definitions

For Schemes using Advanced Conversion Technologies (ACTs)

- Gasification
- Pyrolysis
- Anaerobic Digestion

Table 3: QI Formulae For Advanced Conversion Technology Producing Syngas To Be Used In Reciprocating Engines Or Gas Turbines.

Syngas	
≤1MWe	$QI = 285 \times \eta_{power} + 120 \times \eta_{heat}$
>1 MWe	$QI = 251 \times \eta_{power} + 120 \times \eta_{heat}$

In the above cases the biogas/syngas will be considered as the input fuel to the scheme and not the biomass/waste that is supplied to the ACT plant

Dual Certification from CHPQA

Proposed Schemes

- Submit design data (F3) - For ECA's validation will be against Threshold Criteria using QI Defs in CHPQA Standard - Results in issue of 'Regular' CHPQA Certificate

Schemes under Normal Operation

- Submit annual operating data (F4) – Validation will be against Threshold Criteria using QI Defs in CHPQA Standard - Results in issue of 'Regular' CHPQA Certificate

Also – For Both Types of Scheme

- F3/F4 data validated against Threshold Criteria using QI Defs in GN44 - Results in issue of 'ROC Eligible' CHPQA Certificate

To summarise...

For Renewable & EfW CHP schemes to claim any of the benefits available for Good Quality CHP, it must be certified by CHPQA

CHPQA Contact details

Contact the Administrator:

Mail: CHPQA Programme
The Gemini Building
Fermi Avenue
Harwell
Didcot
OX11 0QR

e-mail: chpqainfo@chpqa.com

Tel: 0870 190 6196

Fax: 0870 190 6334

Website: www.chpqa.com