Quality Assurance for Combined Heat and Power

GUIDANCE NOTE 44

USE OF CHPQA TO OBTAIN RENEWABLES OBLIGATION CERTIFICATES (ROCs) INCLUDING UNDER A BANDED OBLIGATION

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Prepared by the Department of Energy and Climate Change, in consultation with other Government Departments, as well as the Scottish Executive, the National Assembly for Wales and the Northern Ireland Department of Enterprise, Trade and Investment.

GUIDANCE NOTE 44

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Scope

GN 44.1 One of the aims of the CHPQA programme is to ensure that entitlements to fiscal and other benefits are commensurate with, and incentivise, the energy efficient performance of CHP Schemes. Therefore to qualify for ROC allowances in respect of a CHP Scheme a CHPQA Certificate is required.

However, it must be emphasised that this is an additional CHPQA certificate based on a separate submission and QI formula (shown in GN 44.11) to that used to access other benefits available to GQCHP.

The purpose of this Guidance Note is to enable operators of biomass and waste-fuelled CHP Schemes to:

- Understand the role of the CHPQA Certificate in the ROC application process
- Interpret ROCs eligibility under specific circumstances, e.g. waste fuel use
- Determine the Qualifying Power Output (QPO) if their biomass or waste-fuelled scheme fails the Quality Index (QI) threshold using the QI formulae shown in GN 44.11.

GN 44.2 The Renewables Obligation (RO) places a mandatory requirement on UK electricity suppliers to source a growing percentage of electricity from eligible renewable generation capacity. Suppliers are required to produce evidence of their compliance with this obligation via certificates, referred to as Renewables Obligation Certificates (ROCs). Currently each ROC represents 1MWe of electricity generated from eligible renewable sources.

GN 44.3 A new Renewables Obligation Order came into force on 1st April 2009. The level of support (ROCs/MWh) now available to Good Quality CHP is:

- Schemes fuelled wholly by biomass - 2.0 ROCs/MWh
- Schemes fuelled by waste - 1.0 ROC/MWh

The Government's response to the consultation on the Renewables Obligation Banding Review, setting out support levels for renewable electricity technologies for the period 2013 to 2017, was published 25 July 2012. Subject to Parliamentary and EU State Aid approval, the regulations setting the new bands in law will take effect on 1 April 2013.

Certification

GN 44.4

All CHP schemes wishing to claim ROCs have to obtain dual certification, as shown below:

Proposed schemes

Certificate (1) Schemes that are at the final design stage should submit design data for validation using a self-assessment form F3. Validation will be made against the Threshold Criteria with QI formulae as described in the CHPQA Standard, resulting in the issue of a 'Regular' CHPQA Certificate and enabling a Secretary of State (CHP) Exemption Certificate to be obtained (see CHPQA GN 41.11). This will also allow access to benefits such as Enhanced Capital Allowances (refer to CHPQA GN42) and CCL Exemption (refer to CHPQA GN41).

Certificate (2) Those Schemes wishing to use CHPQA to claim ROCs must also submit their design data on a separate paper F3 which will be validated against the QI Threshold Criteria of 100 under "Normal Operating Conditions", using the appropriate QI formulae laid out in GN 44.11, resulting in the issue of a 'ROC Eligible' Certificate.

Schemes under Normal Operation

Certificate (1) Operating schemes should submit annual operating data using self-assessment form F4, which will be validated against the Threshold Criteria with QI formulae as described in the CHPQA Standard. This will result in the issue of a 'Regular' CHPQA Certificate and enable a Secretary of State (CHP) Exemption Certificate to be obtained or maintained (see CHPQA GN 41.11).

Certificate (2) Those Schemes wishing to use CHPQA to claim ROCs must also submit their annual operating data on self-assessment form F4, which will be validated against the QI Threshold Criteria of 100 under "Normal Operating Conditions" using the appropriate QI formulae laid out in GN 44.11. This will result in the issue of a 'ROC Eligible' Certificate.

Thus both proposed schemes and those under normal operation will receive two certificates from CHPQA that are valid until the end of the year of issue. Both certificates will require renewal by annual submission to CHPQA.

Important Notes:

- **For ROC eligibility, a CHP Scheme is not required to meet any power efficiency threshold, as eligibility will be based on achieved QI and QPO.**
- **However, a minimum power efficiency threshold must still be met in order to obtain Enhanced Capital Allowances (threshold power efficiency criteria are detailed in CHPQA Guidance Note 42). CHP Schemes failing to meet the relevant Threshold Power Efficiency Criterion do not qualify for Enhanced Capital Allowances on any expenditure incurred.**

GN 44.5 Policy responsibility for the RO lies with the Department of Energy and Climate Change (DECC) and is administered by the Office of Gas and Electricity Markets (Ofgem). This guidance has been prepared in consultation with DECC.

More detailed guidance on how the Renewable Obligation is administered is available from the Ofgem website: http://www.ofgem.gov.uk

The approach taken by Ofgem to the issue of ROCs for waste-fuelled CHP schemes under the RO is detailed in Appendix 6 of the "Renewables Obligation: Fuel Measurement and Sampling" Guidance document downloadable from the Ofgem website.

GN 44.6 This Guidance Note is based upon information found at:

- The Ofgem website: http://www.ofgem.gov.uk/
- The DECC website: http://www.decc.gov.uk/

These remain the definitive sources at the time of publication. Readers seeking further clarification over the procedures described herein should refer initially to these sites.

Glossary

GN 44.7 The following terms are used in this Guidance Note, the majority of which are defined in more detail in the CHPQA Standard, Issue 4, December 2012 (downloadable from: http://chpqa.decc.gov.uk/).

Certification is the issuing by the CHPQA Administrator of a certificate that a Scheme meets the criteria for Good Quality for all or part of its energy inputs, outputs and capacity, based on Validation of Self-Assessment submitted by a Responsible Person.

CHP Total Fuel Input is the total registered annual fuel input to a CHP Scheme (MWh) based on gross calorific value (GCV). See GN14.15 for guidance on fuels with variable moisture content and GN29 for guidance on energy inputs from alternative fuels including biomass and waste.

Qualifying Power Output (QPO) is the registered annual power generation from a CHP Scheme (MWh_e) that qualifies as Good Quality CHP.

Total Power Output (TPO) is the total annual power generation from a CHP Scheme (MWh_e), as measured at the generator terminals.

Useful Heat is the heat from a CHP Scheme delivered to satisfy an economically justifiable demand for heat or cooling. Heat used for drying the incoming biomass or waste fuel to the CHP plant may be classified as a useful CHP heat output, but only if it can be demonstrated that such a use of heat is an economically justifiable precursor to the combustion of the fuel within the CHP plant.

Applicants wishing to claim such a use of heat as a CHP heat output will be expected to provide an economic justification and calculations in support of their claim. For example, it must be demonstrated that the drying of the fuel independent of the CHP plant could be justified economically as an alternative to using CHP heat, taking account of the required capital expenditure, operating and maintenance costs and the resulting benefit (including the capital cost of the alternative boilers and the cost of the displaced fuel that would otherwise be used for the drying). A simple 'payback' analysis should be included:

Simple Payback=Capex of Alternative Boilers / [Theoretical benefit from improved efficiency-cost of fuel]

A statement of the Company's investment criteria should also be included that states what is considered to be an acceptable payback period.

ROC Eligibility

GN 44.8 ROCs are issued to CHP Schemes using biomass (defined in the RO as a fuel where at least 90% of the energy content is derived from plant or animal matter) or waste.

Energy Crops:
If the fuel is energy crops, and the overall fuel mix has an energy content derived from plant or animal matter that is greater than or equal to 90%, then all of the eligible electricity generated will receive ROCs at the designated entitlement for 'dedicated energy crops' i.e. 2 ROCs per MWh.

Biomass:
Eligible electricity generated from regular biomass (including wood fuels, waste wood (if at least 90% biomass) and liquid biofuels but not biogas and syngas) should receive the ROC entitlement for 'dedicated biomass with CHP' i.e. 2 ROCs per MWh when it meets the qualifying CHP definition i.e. according to the QPO/TPO ratio. Any remaining electricity that does not meet the qualifying CHP

definition will receive the ROC entitlement for 'dedicated biomass (without CHP)' i.e. 1.5 ROCs per MWh.

Waste:
Eligible electricity generated from a fuel mix with an energy content derived from plant or animal matter of less than 90% should get 'Energy from Waste with CHP' ROCs i.e. 1 ROC per MWh, according to the renewable content of the waste and the QPO/TPO ratio, with nothing on the remainder.

E.g. a CHP Scheme burning waste, where the biomass content of the fuel has been established or deemed at 50%, will receive ROCs on 50% of their eligible electricity if the QPO equals the TPO. However a plant using the same waste stream, but with QPO that is 70% of TPO, will receive ROCs on 35% (i.e. 70% of 50%) of their electricity generation.

ROCs will be issued for the QPO using the following calculation:

ROCs issued = gross output x biomass qualifying percentage x (qualifying power output ÷ total power output) x (net output / gross output)

The QPO and TPO will be based on the most recent certificate held by the generator but, unlike the Climate Change Levy (CCL), there will not be an end-of-year reconciliation process.

GN 44.9 Large CHP plants (installed generation capacity greater than 25MWe) must comply with the overall efficiency criteria required by the EC Cogeneration Directive (above 70% on Net Calorific Value). The QI formulae have been modified within the CHPQA methodology in order to ensure that Schemes who meet the QI threshold comply with this requirement (see CHPQA Standard, Issue 4, December 2012). This overall efficiency criteria can be met by large CHP Schemes using conventional fuels.

GN 44.10 However, it has been determined that large Energy from Waste (EfW) and solid biomass-fuelled CHP plants over 25MWe would be unable to comply with this criteria, so would not fully qualify for ROCs regardless of the level of Good Quality output they can attain. To overcome this we developed separate criteria in order for these EfW and biomass CHP Schemes over 25MWe to be fully eligible for ROCs.

Therefore, in order to qualify for allowances for ROCs, all EfW and biomass CHP Schemes over 25MWe must demonstrate at least

- 35% overall efficiency (gross calorific value), and
- 10% Primary Energy Savings (PES) when compared with the alternative for the separate generation of electricity and heat.

GN 44.11 The criteria above were accommodated within the CHPQA framework through the development of a specific set of CHPQA QI formulae. As part of the CHPQA Review, all CHPQA QI formulae for renewable fuels were reviewed with

efficiency criteria revised, where appropriate, so that all CHP schemes using such fuels passing the QI threshold met:

- At least 10% Primary Energy Savings (PES) for schemes of 1MWe and above (greater than 0% in the case of schemes below 1MWe)
- A minimum overall efficiency of 35% Gross Calorific Value (GCV) for >25MWe schemes
- A minimum heat efficiency of 10% for schemes of all sizes.

In addition all the fuel types used in CHPQA to obtain ROCs were reviewed:

- Biogas & Syngas
- Liquid Biofuels
- Liquid Biodegradable Waste
- Solid Waste
- Agricultural Biomass
- Waste Wood and
- Wood Fuels

to ensure that the fuels were grouped within each category according to the efficiencies of the prime mover technologies and thus a common QI formula was applicable.

The fuel categories are summarised in Table 1 below. A full description of fuel categories are shown in CHPQA Guidance Note 14.

Fuel Category	Fuels included
A	Gas produced by anaerobic digestion of biological material, Sewage gas, Landfill gas, Synthesis gas from gasification of biological material
B	Fatty Acid Methyl Esters, Bio DiMethyl Ether, Biomass To Liquid fuels, Virgin vegetable oil, Biomethanol, Bioethanol, Biobutanol, Bio Methyl Tertiary Butyl Ether, Bio Ethyl Tertiary Butyl Ether, Pyrolysis oil from pyrolysis of biological material
C	Tallow, Used cooking oil
D	The biological fraction of; Municipal solid waste, Industrial waste, Clinical waste, Refuse derived fuel, Solid recovered fuel, Poultry litter, Sewage sludge, Paper sludge
E	Logs, Roundwood, Energy crops, Agricultural residues, Prunings, Milling residues, Arboricultural & Forestry residues, Distillers grain
F	Contaminated waste wood (grades B-D of PAS 111)
G	Wood pellets, Dry wood chips, Straw, Bagasse, Nut shells, Husks and Cobs, Visibly clean waste wood (grade A of PAS 111)

The QI formulae for various types of CHP Renewable Schemes are incorporated in Table 1 below.

Table 1: QI Formulae for Various Types of CHP Renewable Schemes

Proposed QI Formulae								
Category A								
≤1MWe	QI =	220	x	η_{power}	+	120	x	η_{heat}
>1 to 25MWe	QI =	195	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	193	x	η_{power}	+	120	x	η_{heat}
Category B								
≤1MWe	QI =	245	x	η_{power}	+	120	x	η_{heat}
>1 to 25MWe	QI =	191	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	176	x	η_{power}	+	120	x	η_{heat}
Category C								
≤1MWe	QI =	245	x	η_{power}	+	120	x	η_{heat}
>1 to 25MWe	QI =	195	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	176	x	η_{power}	+	120	x	η_{heat}
Category D								
≤1MWe	QI =	362	x	η_{power}	+	130	x	η_{heat}
>1 to 10MWe	QI =	362	x	η_{power}	+	130	x	η_{heat}
>10 to 25MWe	QI =	362	x	η_{power}	+	130	x	η_{heat}
>25MWe	QI =	338	x	η_{power}	+	130	x	η_{heat}
Category E								
≤1MWe	QI =	348	x	η_{power}	+	130	x	η_{heat}
>1 to 10MWe	QI =	348	x	η_{power}	+	130	x	η_{heat}
>10 to 25MWe	QI =	348	x	η_{power}	+	130	x	η_{heat}
>25MWe	QI =	338	x	η_{power}	+	130	x	η_{heat}
Category F								
≤1MWe	QI =	352	x	η_{power}	+	120	x	η_{heat}
>1 to 10MWe	QI =	316	x	η_{power}	+	120	x	η_{heat}
>10 to 25MWe	QI =	316	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	295	x	η_{power}	+	120	x	η_{heat}
Category G								
≤1MWe	QI =	319	x	η_{power}	+	120	x	η_{heat}
>1 to 10MWe	QI =	293	x	η_{power}	+	120	x	η_{heat}
>10 to 25MWe	QI =	285	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	279	x	η_{power}	+	120	x	η_{heat}

For CHP schemes using advanced conversion technologies (i.e. gasification, pyrolysis or anaerobic digestion of solid waste or biomass), if the bio/syngas/pyrolysis oil is used in reciprocating engines or gas turbines it will be considered as the input fuel to the CHP scheme (the power efficiency is determined as total electricity generated divided by gas input).

GN 44.12 When a scheme fails to meet the QI threshold of 100 under “Normal Operating Conditions” using the appropriate QI formula from the tables above, or 95 in the case of a scheme primarily supplying heat through a District Heating Network during the first 5 years of its operation, the scale-back mechanism (as described in CHPQA GN 3 and 4 for proposed and existing schemes respectively) will be applied to determine the QPO/TPO ratio to be used in the ROCs eligibility formula shown in GN 44.8.

GN 44.13 If a scheme meets all of the relevant criteria shown in GN 44.11, but the QI formulae result in a QI of less than 100, the QI will be set to a value of 100.

GN 44.14 The responsibility for notifying Ofgem of any changes in eligibility for ROCs lie with the applicant and significant penalties are possible in the event of fraudulent or negligent claims.