chpQA

Quality Assurance for Combined Heat and Power

GUIDANCE NOTE 44

Use of CHPQA in respect of the Renewables Obligation and Contracts for Difference

Issue 7

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Prepared by CHPQA on behalf of the Department for Business, Energy and Industrial Strategy.

GUIDANCE NOTE 44

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, measures specifically designed to support the electrical output from renewable CHP Schemes may include requirements for a CHPQA Guidance Note 44 (GN44) Certificate.

However, it must be emphasised that the CHPQA GN44 certificate is an additional CHPQA certificate based on separate QI formulae to those used to access other benefits available to Good Quality CHP.

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

- Understand the role of the CHPQA GN44 Certificate in support measures for the electrical output of renewable CHP, specifically the Renewables Obligation (RO) and Contracts for Difference (CfDs).

- Determine the Qualifying Power Output (QPO) based on the QI formulae provided in the relevant issue of GN44, including where appropriate for the implementation of the investor safeguard, (see GN 44.19).

The various QI formulae set out in this Guidance Note 44 and the means by which those formulae are to be applied are subject to any amendments or revisions necessary to assist the United Kingdom in complying with any obligation arising under or in connection with European law.

Having reviewed responses to the Call for Evidence[1], the government is concerned that the current energy efficiency requirements set out in GN44 are no longer sufficient to ensure that only good quality CHP receives CfD support. Currently, renewable CHP schemes can qualify for high levels of CfD support whilst producing low levels of useful heat and consequently achieving low levels of overall efficiency. The government consulted[2] and responded[3] to the proposals to increase the overall efficiency of dedicated biomass with combined heat and power (CHP) and energy from waste with CHP schemes participating in the third CfD allocation round.

The intention to increase efficiency requirements in GN44 to ensure that going forward CfD subsidy is directed towards:

- Best available technology and application of renewable CHP; and

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[1] Call for Evidence - Contracts for Difference: A call for evidence on fuelled and geothermal technologies in the Contracts for Difference (CfD) scheme, November 2016, found on Gov.UK

[2] Contracts for Difference for renewable electricity generation: Consultation on proposed amendments to the scheme, December 2017, found on Gov.UK

[3] Contracts for Difference for renewable electricity generation: proposed amendments to the scheme – response part A, June 2018, found on Gov.UK

- Schemes which deliver high levels of overall efficiency and make best use of biomass resources.

These changes will only affect future schemes who qualify for CfD under the third and subsequent allocation rounds. The X and Y values for CfD schemes currently certified under the CHPQA and GN44 will be grandfathered.

The government considers that renewable CHP schemes of all sizes are capable of achieving a 70% overall efficiency (based on Net Calorific Value (NCV)), provided an appropriate heat off-taker is in place. Currently, CHP schemes which qualify for a CfD need to meet the following set of criteria currently set out under 'Fuel Categories and QI Formulae' in Issue 6 of GN44:

For CHP schemes under 25MWe to have a minimum:

- Primary energy saving of 10%, and

- Heat efficiency of 10% Gross Calorific Value (GCV)

For CHP schemes equal to and over 25MW to have a minimum:

- Primary energy saving of 10%,

- Heat efficiency of 10% GCV, and

- Overall efficiency of at least 35% GCV

Following the consultation, the government has decided to apply the following criteria:

For CHP schemes of all sizes to have a minimum:

- Primary energy saving of 10%,

- Heat efficiency of 10% GCV, and

- Overall efficiency of 70% NCV

The X and Y values for both currently certified and new schemes under the RO are unaffected by the change for CfD schemes.

The various QI formulae set out in this Guidance Note 44 and the means by which those formulae are to be applied are subject to any amendments or revisions necessary to assist the United Kingdom in complying with any obligation arising under or in connection with European law.

Glossary

GN 44.2 The following terms are used in this Guidance Note. Readers may also find it helpful to refer to the CHPQA Standard for further definitions of CHPQA terminology. The Standard is downloadable from:

https://www.gov.uk/guidance/combined-heat-power-quality-assurance-programme

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 Qualifying Multiplier (CHPQM) is the QPO/TPO as calculated using the relevant GN44 QI formula. However, in the case of CfDs for biomass CHP <u>only</u>, the Investor Safeguard allows that a Scheme's Responsible Person may elect to use QPO and TPO from the F3 design certificate for the purposes of calculating the CHPQM, rather than figures from their F4 operational submission. They may do this for a maximum of five certification years (which do not have to be consecutive), in addition to the normal use of the F3 QPO in their first year of operation.

CHP Qualifying Power Output (CHP$_{QPO}$) is the registered annual power generation from a CHP Scheme (MWh$_e$) that either fully or partially qualifies as Good Quality CHP. For Schemes that meet the relevant Threshold QI Criterion for Good Quality CHP, the CHP$_{QPO}$ equals the total power output (CHP$_{TPO}$). For a Scheme that does not achieve the Threshold QI Criterion for Good Quality CHP, the CHP$_{QPO}$ is that portion of the power output from a Scheme that would have achieved the Threshold QI Criterion, based on the qualifying heat supplied (CHP$_{QHO}$).

CHP Total Fuel Input (CHP$_{TFI}$) is the total registered annual fuel input to a CHP Scheme (MWh), based on Gross Calorific Value (GCV). This includes any fuel used for pilot burners or other 'parasitic' uses and fuels of all types whether Conventional or Alternative. 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.

CHP Total Power Output (CHP$_{TPO}$) is the total power generation from a CHP Scheme (MWh$_e$), as measured at the generator terminals, plus the electrical equivalent of any qualifying mechanical power supplied by the Scheme.

Heating/Cooling Network is a network for the delivery of heat in the form of hot water or steam, or cooling in the form of chilled water, to:

- buildings or processes on more than one site[4] or,
- to more than one building on building developments which were new[5] at the time of their connection to the CHP scheme, or

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[4] "site" is understood to mean a separate parcel of land, not necessarily bounded by a highway. A single industrial estate could therefore contain more than one site, where separate commercial entities are located on the same industrial estate.

[5] "new" building developments are (i) developments where at least one of the buildings intended to be connected to the network has been unoccupied up to the time of the connection of the first user to the network.

- to more than one industrial or commercial user[6].

Useful Heat is the heat from a CHP Scheme delivered to satisfy an economically justifiable demand for heat or cooling. Evidence of this demand should be available (e.g. a business case, contract or memorandum of understanding). It is not sufficient for a Scheme to be simply "CHP ready" without clear plans to supply heat.

Heat used for drying incoming biomass or waste fuel to a 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:

$$Simple\ payback = \frac{Capex\ of\ alternative\ boilers}{(Theoretical\ benefit\ from\ improved\ efficiency - Cost\ of\ fuel)}$$

Where: *'Cost of fuel'* is the theoretical cost of the alternative boilers' fuel.

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

Renewables Obligation

GN 44.3 The Renewables Obligation (RO) places a mandatory requirement on electricity suppliers to submit to Ofgem a specified number of Renewables Obligation Certificates (ROCs) each year, or make a payment, in respect of each megawatt hour of electricity they supply to UK customers. ROCs are issued to generators in respect of the electricity they generate from eligible renewable sources.

Since the introduction of banding in April 2009, the level of support (ROCs/MWh) available for the generation of electricity from eligible renewable sources varies depending on a number of factors such as the method of generation, the fuel used and the date on which the station was accredited under the RO.

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and also (ii) developments where construction was not complete at the time of the connection of the first user to the CHP Scheme.

[6] "user" here relates to operations owned or operated by separate commercial entities.

GN 44.4 The detailed rules for support levels under the RO are set out in the Renewables Obligation Orders.[7] The following CHP technologies could be[8] eligible to receive a higher level of support under the RO for their electricity generation (in recognition of the extra costs and benefits of CHP plants over electricity-only generation and because the technologies are not eligible for the Renewable Heat Incentive):

- High, mid and low-range co-firing CHP;
- Low range co-firing of relevant energy crops CHP;
- Co-firing of regular bioliquid CHP;
- Station/unit conversion CHP that has converted from co-firing CHP;
- Dedicated biomass CHP in Northern Ireland only (whilst the NI RHI is suspended);
- Dedicated bioliquid CHP; and
- Energy from waste CHP (non-CHP energy from waste receives no RO support).

In order to be eligible for the additional support, Schemes in these categories must demonstrate that the station is certified under CHPQA.

For RO accredited CHP Schemes, ROCs are issued for the CHP Qualifying Power Output (CHP$_{QPO}$) using the following calculation:

$$ROCs\ issued = gross\ output\ (MWh) \times biomass\ qualifying\ percentage \times \frac{CHP_{QPO}}{CHP_{TPO}}$$

$$\times \frac{net\ output\ (MWh)}{gross\ output\ (MWh)} \times ROCs\ per\ MWh\ for\ the\ generation\ type$$

The CHP$_{QPO}$ and CHP Total Power Output (CHP$_{TPO}$) are the values specified on the most recent CHPQA GN44 certificate held by the generator. Unlike the Climate Change Levy (CCL), there is no end-of-year reconciliation process for ROCs issued.

QI formulae applicable under the RO

GN 44.5 The QI formulae for large CHP plants (those with installed generation capacity greater than 25MWe) within the CHPQA Standard are designed to ensure that Schemes who meet the QI threshold have an overall efficiency above 70% (Net Calorific Value). This overall efficiency criterion can be met by large CHP Schemes using conventional fuels.

GN 44.6 However, many large Energy from Waste (EfW) and solid biomass-fuelled CHP plants over 25MWe were not designed with a sufficient heat offtake relative to power capacity which would be required to meet such high overall efficiencies and, as a result, rarely meet this criterion, so would not fully qualify for RO or CfD purposes

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[7] These are the Renewables Obligation Order 2015 (RO Order 2015) (England and Wales), the Renewables Obligation (Scotland) Order 2009, as amended (RO Order Scotland) and the Renewables Obligation Order (Northern Ireland) 2009, as amended (RO Order Northern Ireland).

[8] Refer to Ofgem and the Renewables Obligation Orders for definitive guidance on eligibility requirements and limitations.

regardless of the level of Good Quality CHP output they attain. For this reason, Guidance Note 44 Quality Index formulae were derived using criteria that did not include a 70% (NCV) overall efficiency requirement. Instead, the criteria were:

- The minimum primary energy saving (PES) requirement of 10% (0% for Schemes <1MW electrical capacity).
- A minimum heat efficiency of 10% (gross calorific value).
- An overall efficiency of at least 35% (gross calorific value) for Schemes >25MW electrical capacity.

The government intends to retain this set of criteria for any new schemes accredited under the RO and under CfD prior to publication of this document. It considers that new schemes entering a CfD contract on or after publication of this document should be designed and operated with sufficient heat offtake relative to power capacity to meet an overall efficiency of 70% (NCV).

GN 44.7

Existing Schemes

For existing Schemes that were operational or where the operator was able to demonstrate they reached financial close prior to 26 July 2012, the GN44 QI formulae and associated fuel categories under which such Schemes were originally certified will continue to apply. These are set out in Annex A, Table A1.

For these purposes existing Schemes also includes those Schemes that were not operational before 26 July 2012 (and did not achieve financial close prior to this date) but received an F3 or an F4 CHPQA certificate prior to 1 January 2016. These Schemes will also continue to receive CHPQA certification based on the QI formulae under which they were originally certified. These formulae are set out in Annex A, Table A2, and QI formulae in Annex A, Table A3 apply to all renewable CHP Schemes accredited under the RO which have received an F3 or F4 CHPQA certificate for the first time on or after 1 January 2016.

New Schemes

The GN44 Issue 6 QI formulae in Annex A, Table A3 will also apply to all new renewable CHP Schemes accredited under the RO after publication of this document.

Certification for RO purposes

GN 44.8 For the types of CHP Scheme described in paragraphs GN 44.4 to be recognised and supported as Good Quality CHP under the RO, operators must obtain dual certification as described below:

New 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 F3 Certificate and enabling a Secretary of State (CHP) Exemption Certificate to be obtained (see CHPQA GN41). This will also allow access to benefits such as Enhanced Capital

Allowances (refer to the Energy Technology List[9] and CHPQA Guidance) and Climate Change Levy (CCL) Exemption if applicable (refer to CHPQA GN41).

Certificate (2) Operators of Schemes wishing to use CHPQA to claim ROCs must state as such on the same form F3, and their design data will be validated against the QI Threshold Criteria of 100 under "Normal Operating Conditions", using the appropriate formula from Annex A, Table A3 (Issue 6 QI formulae), resulting in the issue of a CHPQA GN44 F3 Certificate.

Existing 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 F4 Certificate and will enable a Secretary of State (CHP) Exemption Certificate to be obtained or maintained (see CHPQA GN41).

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 relevant GN44 QI formulae. This will result in the issue of a CHPQA GN44 F4 Certificate.

Thus, both new Schemes and existing Schemes under normal operation will receive two certificates from CHPQA. Both certificates will require renewal via annual submission to CHPQA.

Important Notes:

- **For CHPQA GN44 certification, a CHP Scheme is not required to meet any power efficiency threshold, as treatment in respect of the RO will be based on the achieved CHP_{TPO} and CHP_{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 44.9 Policy responsibility for the RO lies with the Department for Business, Energy and Industrial Strategy (BEIS) and the RO is administered by the Office of Gas and Electricity Markets (Ofgem).

More detailed guidance on how the RO is administered is available from the Ofgem website: https://www.ofgem.gov.uk/environmental-programmes/renewables-obligation-ro

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

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[9] https://www.gov.uk/guidance/energy-technology-list

Contracts for Difference (CfDs)

GN 44.10 A generator party to a CfD is paid the difference between the 'strike price' (a price for electricity reflecting the cost of investing in a particular low carbon technology) and the 'reference price' (a measure of the average market price for electricity in the GB market). In the event that the reference price exceeds the strike price the generator pays the difference to the Low Carbon Contracts Company (LCCC).

Certain generation types can be awarded CfDs on a 'with CHP' basis and as such must be certified under CHPQA. Details of those generation technologies that are required or have the option to enter into a CfD on a 'with CHP' basis are made available prior to the commencement a CfD allocation round. Therefore, scheme developers contemplating bidding into a particular CfD allocation round should refer to the applicable CfD standard terms and conditions, CfD standard terms notice, allocation framework document, the CfD regulations and other information made available at the time.

Where a CfD has been awarded on a 'with CHP' basis, CfD support will be paid only on the proportion of metered electrical output assessed by CHPQA to be QPO. This is applied via a CHP Qualifying Multiplier (CHPQM) to the total electrical output of the plant. The CHPQM will be recorded on the plant's GN44 certificate and, in normal circumstances, will be the ratio QPO/TPO, the QPO being determined by reference to the appropriate GN44 QI formula (see GN 44.12, below).

The CHPQM will continue to be used for this purpose and be recalculated annually as part of the CHPQA recertification process. Responsible Persons will need to maintain their CHPQA certification annually once operating and for the duration of any CfD offered in order to continue to receive support.

Schemes receiving a certificate for the purposes of CfDs will be audited in their first year of operation to confirm that they are constructed to the design specified in the F3 design certification and that their electrical efficiency is as per the F3 design certification value. In the event that the audit identifies that the ratio of QPO/TPO is lower than that in the design certification as a result of a lower than envisaged electrical efficiency, the F3 certificate will be reissued.

The plant will also be required to provide evidence of their intended heat load in their F3 submission.

Investor Safeguard

GN 44.11 In relation only to CfDs for Dedicated Biomass with CHP, CHPQA certified schemes will be protected against the risk of loss of heat customer(s) for up to five years (five CHPQA certification periods) through the application of an "investor safeguard". Under this safeguard, a Responsible Person may elect to have the CHP Qualifying Multiplier assessed on the basis of the most recent CHPQA F3 'design' Certificate, rather than on the operation during the last CHPQA certification period. This process is administered by CHPQA, and Responsible Persons wishing to invoke the investor safeguard should submit a written request to the CHPQA Administrator.

For the avoidance of doubt, the investor safeguard is entirely separate from the "safeguard provision", described in paragraph GN 44.20.

QI formulae applicable to CfDs

GN 44.12 The CHP Qualifying Multiplier applicable to any Scheme in relation to which a CfD has been awarded on a 'with CHP' basis will be set out in its GN44 certificate.

CfD contracts entered into on or after the publication of GN44 Issue 7

GN44 certificates issued in relation to any Scheme in respect of which a 'with CHP' CfD contract is entered into on or after the publication of this Guidance Note 44 (Issue 7) will be issued using the QI values in Table 2 (Issue 7 QI formulae).

CFD contracts entered into prior to the publication of GN44 Issue 7

The standard terms of CfD contracts entered into prior to the publication of this Guidance Note 44 (Issue 7) provide that the Scheme's CHP Qualifying Multiplier will be set out in a GN44 certificate issued in accordance with Guidance Note 44 as published as at the CfD Agreement Date.

Certification for CfD purposes

GN 44.13 In order to be recognised and supported as Good Quality CHP under CfDs, operators must obtain dual certification as described below:

New CfD 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 F3 Certificate and enabling a Secretary of State (CHP) Exemption Certificate to be obtained (see CHPQA GN41). This will also allow access to benefits such as Enhanced Capital Allowances (refer to the Energy Technology List[10] and CHPQA Guidance) and Climate Change Levy (CCL) Exemption if applicable (refer to CHPQA GN41).

Certificate (2) Operators of Schemes intending to use CHPQA in connection with any 'with CHP' CfD entered into, or to be entered into, on or after the date of the publication of this Guidance Note 44 (Issue 7) should state as such on the same F3 form and their design data will be validated against the QI Threshold Criteria of 100 under "Normal Operating Conditions" using the relevant formula at Table 2 (Issue 7 QI formulae), resulting in the issue of a CHPQA F3 GN44 Certificate.

The Operator of any Scheme which enters into a CfD on or after the date of the publication of this Guidance Note 44 (Issue 7) and which is the holder of a CHPQA F3 GN44 Certificate issued using any QI formula other than the revised formula at Table 2 will be required to apply for a new CHPQA F3 GN44 Certificate using the revised Issue 7 QI formula.

The standard terms of CfD contracts entered into prior to the publication of this Guidance Note 44 (Issue 7) provide that the applicable CHP Qualifying Multiplier

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[10] https://www.gov.uk/guidance/energy-technology-list

CfD Schemes under normal operation

Certificate (1) Operators of Schemes in respect of which a CfD has been entered into 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 F4 Certificate and will enable a Secretary of State (CHP) Exemption Certificate to be obtained or maintained (see CHPQA GN41).

Certificate (2) Operators of Schemes in respect of which a CfD has been entered into must also submit their annual operating data on Self-Assessment form F4 to be validated against the relevant GN44 QI formulae, resulting in the issuance of a CHPQA GN44 F4 Certificate.

CHPQA GN44 certificates issued in relation to any Scheme in respect of which a 'with CHP' CfD contract is entered into on or after the publication of this Guidance Note 44 (Issue 7) will be issued using the QI formulae in Table 2.

The standard terms of CfD contracts entered into prior to the publication of this Guidance Note 44 (Issue 7) provide that the applicable CHP Qualifying Multiplier will be set out in a GN44 certificate issued in accordance with Guidance Note 44 as published as at the CfD Agreement Date.

Thus, all Schemes will receive two certificates from CHPQA. Both certificates will require renewal via annual submission to CHPQA.

Important Notes:

- **For CHPQA GN44 certification, a CHP Scheme is not required to meet any power efficiency threshold, as treatment in respect of the CfDs will be based on the achieved CHP_{TPO} and CHP_{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.**

- **For CHPQA certification for CfD purposes, the validity of the GN44 certificate will continue on, and not cease on its expiry date, until such time as a new GN44 certificate is obtained. However, the continued validity of a GN44 certificate after its expiry date will apply only in respect of electricity generated during periods when the reference price is above the strike price and the term of the CfD has not expired.**

- **The various QI formulae set out in this Guidance Note 44 and the means by which those formulae are to be applied are subject to any amendments or revisions necessary to assist the United Kingdom in complying with any obligation arising under or in connection with European law.**

Policy responsibility for CfDs lies with BEIS, however a CfD is a private law contract between a low carbon electricity generator and the LCCC, a government-owned company.

For more detail on how CfDs are administered, please refer to:

https://www.gov.uk/government/collections/electricity-market-reform-contracts-for-difference and:

https://www.emrdeliverybody.com/cfd/home.aspx

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.

Fuel Categories for RO and CfD Schemes

GN 44.14 The renewable fuel categories for the purpose of this Guidance Note, are summarised in Table 1 below. A full description of fuel categories is provided in CHPQA Guidance Note 14 (GN14).

Table 1: Renewable Fuel Categories

Fuel category	Default fuels included
A	Gas produced by anaerobic digestion of biological material Sewage gas Landfill gas
B	Synthesis gas from gasification of biological material
C	Fatty acid methyl esters Bio dimethyl ether Biomass to liquid fuels Virgin vegetable oil Pyrolysis oil from pyrolysis of biological material Hydrogenated vegetable oil Bio methanol Bio ethanol Bio butanol Bio methyl tertiary butyl ether Bio ethyl tertiary butyl ether
D	Tallow, Used cooking oil

Fuel category	Default fuels included
E	The biological fraction of: Municipal solid waste Industrial waste Clinical waste Refuse derived fuel Solid recovered fuel Poultry litter De-watered sewage sludge Paper sludge
F	Logs Roundwood Energy crops Agricultural residues Prunings Milling residues Arboriculture & forestry residues Distillers grain
G	Contaminated waste wood (grades B-D of PAS 111)
H	Wood pellets Dry wood chips Straw Bagasse Nut shells, Husks and Cobs Visibly clean waste wood (grade A of PAS 111)

Each category specifies a default list of fuels included. Developers may however submit evidence to the CHPQA administrator in support of a categorisation, where their fuel is not listed, or in support of an alternative categorisation. This evidence must demonstrate that the category is applicable based on the maximum potential prime mover efficiency and physical state of the fuel (solid, liquid, gaseous) at normal temperature and pressure (see GN14).

GN 44.15 As explained in GN44.1 above, the government has set out new X values which increase efficiency requirements in Guidance Note 44. This will ensure that CfD subsidy is directed towards best available technology and application of renewable CHP schemes which deliver high levels of overall efficiency and make best use of biomass resources. The new X values are as set out in Table 2.

GN 44.16 These changes will only affect future schemes who qualify for CfD under the third and subsequent allocation rounds. These revised X and Y values apply for the purposes of GN44 certificates issued in relation to any Scheme in respect of which a 'with CHP' CfD contract is entered into on or after the publication of this document (Guidance Note 44 (Issue 7)). The X and Y values for CfD schemes currently certified under the CHPQA and GN44 will be grandfathered.

The X and Y values for currently certified and new Schemes under the RO are unaffected by the change for CfD Schemes. The values for RO Schemes are set out in tables A1 to A3.

GN 44.17 When an RO or CfD Scheme fails to meet the QI threshold of 100 under "Normal Operating Conditions" using the appropriate GN44 QI formula, (or the QI threshold of 95 in the case of certain Schemes primarily supplying heat through a Heating/Cooling Network during the first five years of its operation (see GN 44.21)), the scale-back mechanism (as described in CHPQA GN3 and GN4 for proposed and existing Schemes respectively) will be applied to determine the QPO/TPO ratio to be used in the ROC formula shown in GN 44.4 and in calculating the CHP Qualifying Multiplier for CfDs.

Table 2: GN44 Issue 7 QI formulae for renewable CHP Schemes entering a CfD contract on or after publication of this document.

Size of Scheme (CHP$_{TPC}$)	QI Formula							
ALTERNATIVE FUEL SCHEMES								
Category A (e.g. AD gas, sewage gas, landfill gas)								
≤1MWe	QI =	175	x	η_{power}	+	120	x	η_{heat}
>1 to ≤25MWe	QI =	173	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	173	x	η_{power}	+	120	x	η_{heat}
Category B (e.g. synthesis gas)								
≤1MWe	QI =	195	x	η_{power}	+	120	x	η_{heat}
>1 to ≤25MWe	QI =	184	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	184	x	η_{power}	+	120	x	η_{heat}
Category C (e.g. fatty acid methyl ester, pyrolysis oil etc.)								
≤1MWe	QI =	168	x	η_{power}	+	120	x	η_{heat}
>1 to ≤25MWe	QI =	168	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	168	x	η_{power}	+	120	x	η_{heat}
Category D (e.g. tallow, used cooking oil)								
≤1Mwe	QI =	171	x	η_{power}	+	120	x	η_{heat}
>1 to ≤25MWe	QI =	171	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	171	x	η_{power}	+	120	x	η_{heat}
Category E (e.g. municipal waste, sewage sludge, paper sludge etc.)								
≤1MWe	QI =	223	x	η_{power}	+	120	x	η_{heat}
>1 to ≤10MWe	QI =	230	x	η_{power}	+	120	x	η_{heat}
>10 to ≤25MWe	QI =	230	x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	221	x	η_{power}	+	120	x	η_{heat}
Category F (e.g. logs, energy crops, agricultural residues etc.)								
≤1MWe	QI =	221	x	η_{power}	+	120	x	η_{heat}
>1 to ≤10MWe	QI =	238	x	η_{power}	+	120	x	η_{heat}
>10 to ≤25MWe	QI =	226	x	η_{power}	+	120	x	η_{heat}
>25MWe to ≤50MWe	QI =	218	x	η_{power}	+	120	x	η_{heat}
>50MWe	QI =	196	x	η_{power}	+	120	x	η_{heat}
Category G (e.g. contaminated waste wood)								
≤1MWe	QI =	213	x	η_{power}	+	120	x	η_{heat}
>1 to ≤10MWe	QI =	231	x	η_{power}	+	120	x	η_{heat}
>10 to ≤25MWe	QI =	204	x	η_{power}	+	120	x	η_{heat}
>25MWe to ≤50MWe	QI =	190	x	η_{power}	+	120	x	η_{heat}
>50MWe	QI =	190	x	η_{power}	+	120	x	η_{heat}
Category H (e.g. wood pellets, straw, clean waste wood etc.)								
≤1MWe	QI =	209	x	η_{power}	+	120	x	η_{heat}
>1 to ≤10MWe	QI =	214	x	η_{power}	+	120	x	η_{heat}
>10 to ≤25MWe	QI =	204	x	η_{power}	+	120	x	η_{heat}
>25MWe to ≤50MWe	QI =	190	x	η_{power}	+	120	x	η_{heat}
>50MWe	QI =	187	x	η_{power}	+	120	x	η_{heat}

GN 44.18 If an RO or CfD Scheme meets all of the relevant criteria shown in GN 44.6, but fails to meet the QI threshold of 100, it can use the Safeguard Provision described in GN 44.20.

GN 44.19 The responsibility for notifying Ofgem of any changes in eligibility for ROCs lies with the applicant and significant penalties are possible in the event of fraudulent or negligent claims. Where changes apply to CfDs, the LCCC is the applicable body.

Safeguard Provision for RO and CfD Schemes

GN 44.20 For GN44 Issue 6 (applicable to schemes accredited under the RO or entering a CfD contract prior to publication of this document) the Quality Index (QI) formulae were derived with the objective of satisfying the following three policy criteria:

- The minimum primary energy saving requirement of 10% (0% for Schemes
- <1MW electrical capacity).
- A minimum heat efficiency of 10% (gross calorific value).
- An overall efficiency of at least 35% (gross calorific value) for Schemes >25MW electrical capacity.

For GN44 Issue 7 (applicable to schemes entering a CfD contract on or after publication of this document) the proposed Quality Index (QI) formulae were derived based on the following three policy criteria:

- A minimum primary energy saving requirement of 10% for schemes of all sizes.
- A minimum heat efficiency of 10% (gross calorific value).
- An overall efficiency of 70% (net calorific value) for Schemes of all sizes.

Primary energy saving shall be calculated according to Directive 2012/27/EU Annex II part (b) and using such reference efficiency values and corrections as have been set out in Commission Decisions (e.g. Commission Decision 2011/877/EU or any subsequent Decision revising these values).

However, the QI formulae cannot perfectly ensure that any scheme which meets all of the relevant policy criteria fully qualifies as Good Quality CHP. To address this, for the purposes of GN44, there is a safeguard provision available that CHPQA will use to ensure that new Schemes that meet all relevant policy criteria but do not achieve a QI of 100 using the relevant GN44 QI formulae, will be awarded a QI of 100 regardless, and an appropriate X value will be developed as shown below.

To avoid introducing a "cliff-edge" effect in support levels, in the event of a subsequent reduction in a Scheme's performance, the safeguard is implemented by recalculation of the X coefficient. This procedure is based on determination of the operating point at which a Scheme would just meet all of the relevant policy criteria and recalculation of the X coefficient in order to give a QI of 100 at this point. Scale-back of Qualifying Power Output will then be conducted using the normal CHPQA rules and based on the GN44 QI formula with the recalculated X coefficient. This recalculation will only be conducted on a Scheme's design data with the revised X value now used to calculate QI and QPO for this Scheme at all operating conditions for its lifetime. There

will be no subsequent recalculation of the X value based on the Scheme's F4 operational data.

The various QI formulae set out in this Guidance Note 44 and the means by which those formulae are to be applied are subject to any amendments or revisions necessary to assist the United Kingdom in complying with any obligation arising under or in connection with European law.

An example of this procedure under GN44 Issue 7 is shown as follows.
40 MWe waste wood fuelled CHP, fully exporting, 33kV transmission grid connected, commissioned after 2016.

$\eta_{overall\ threshold}$ = 70%NCV * 0.9020 = 63.14% GCV

$\eta_{power\ (Fully\ Condensing\ Design)}$ = 38.00% GCV

z ratio[11] = 5

Actual η_{heat} = 32.00% GCV

Actual $\eta_{power\ (CHP)}$ = 38%-32%/5 = 31.60% GCV

Actual $\eta_{overall}$ = 63.60% GCV

So, scheme exceeds overall efficiency criterion

It also exceeds the other criteria which are easier to meet

Guidance Note 44 QI formula: QI = 190 η_{power} + 120 η_{heat}

     = 190 x 0.316 + 120 x 0.32

     = 98.44

Determine operating point at which scheme is just compliant with the minimum overall efficiency threshold (the hardest criterion to meet)

η_{heat} = ($\eta_{overall\ threshold}$ - $\eta_{power\ (Fully\ Condensing\ Design)}$) / (1-1/Z)

η_{heat} = 63.14%-38% / (1-1/5) = 31.43% GCV

$\eta_{power\ (CHP)}$ = 38%-31.43%/5 = 31.71% GCV

PES = 41.2%

Recalculate X to satisfy QI = 100

100 = X η_{power} + 120 η_{heat}

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[11] As defined in Guidance Note 28 procedures.

$$X = (100 - 120\, \eta_{heat}) / \eta_{power}$$

$$X = (100 - 120 \times 0.3143) / 0.3171$$

$$X = 196.42$$

New Renewable CHP primarily supplying Heating/ Cooling Networks

GN 44.21 For the purposes of this Guidance Note 44 (Issue 7)**,** a QI threshold of 95 for an initial period of operation of five years will be allowed for new renewable CHP primarily supplying a Heating/Cooling Network where the Business Plan for heat load development demonstrates either:

    i)   that the CHP Scheme will achieve a QI of 100, by the sixth full calendar year from the start of operation of the CHP Scheme, or by the sixth full calendar year from the date of first connection to the network, whichever is the later; and

    ii)   that it will achieve this by means of network connection to heat loads in additional buildings, on additional sites or to additional industrial or commercial users.

Or:

    iii)   that the QI of the CHP Scheme in the first calendar year in which it operates will be increased by at least 5 points by the sixth full calendar year from the start of operation of the CHP Scheme or by the sixth full calendar year from the date of first connection to the network, as appropriate; and

    iv)   that this will be achieved by means of network connection to heat loads in additional buildings, on additional sites or to additional industrial or commercial users.

The full power output of such new Schemes meeting the QI threshold of 95 will qualify and the power output of schemes which do not fully meet this threshold will be scaled-back against the threshold of 95. This five-year period starts from the date of first firing[12] plus the following full five calendar years. After this period Schemes will be validated against a QI threshold of 100 under "Normal Operating Conditions".

GN 44.22 In order to benefit from the reduced QI threshold, it is necessary to provide a Business Plan with the F3 submission[13] that provides confidence that the development of the Heating/Cooling Network will go ahead and that the criteria in paragraph GN 44.21 will be met. There is no fixed format for the Business Plan, but we would expect it to include the following:

- A timetable for the development of the project (including the network) from now through to commissioning.

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[12] Or from the date the Scheme first connects to a Heating/Cooling Network, if later.

[13] Or, in the case of a Scheme that first connects to a Heating/Cooling Network after its initial operation, the Business Plan may be provided with the F4 submission in the calendar year in which it first connects to the network.

- Current status with regard potential heat customers (e.g. heat sale contracts, memoranda of agreement).
- Financing approval.
- Planning permission and other necessary consents for the project (including the network).

Annex A: Historic QI formulae for grandfathering purposes

Table A1: GN44 QI formulae for RO Schemes pre- 26 July 2012

These QI formulae were originally set out in GN44 Issue 2, November 2008 and subsequently as Table 3 in GN44 Issue 4, December 2013. They will continue to apply for Schemes that were operational or where the operator was able to demonstrate they reached financial close prior to 26 July 2012.

Size of Scheme (CHP_{TPC})	QI Formula						
ALTERNATIVE FUEL SCHEMES							
Biogas							
≤1MWe	QI =	285	x	η_{power}	+	120	x η_{heat}
>1 to ≤25MWe	QI =	251	x	η_{power}	+	120	x η_{heat}
>25MWe	QI =	193	x	η_{power}	+	120	x η_{heat}
Syngas							
≤1MWe	QI =	285	x	η_{power}	+	120	x η_{heat}
>1	QI =	251	x	η_{power}	+	120	x η_{heat}
Liquid biofuels							
≤1MWe	QI =	275	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}
Liquid waste							
≤1MWe	QI =	275	x	η_{power}	+	120	x η_{heat}
>1 to ≤25MWe	QI =	260	x	η_{power}	+	120	x η_{heat}
>25MWe	QI =	176	x	η_{power}	+	120	x η_{heat}
Solid waste							
≤25MWe	QI =	370	x	η_{power}	+	140	x η_{heat}
>25MWe	QI =	364	x	η_{power}	+	140	x η_{heat}
Agricultural biomass							
≤25MWe	QI =	370	x	η_{power}	+	130	x η_{heat}
>25MWe	QI =	338	x	η_{power}	+	130	x η_{heat}
Wood fuels							
≤1MWe	QI =	329	x	η_{power}	+	120	x η_{heat}
>1 to ≤25MWe	QI =	315	x	η_{power}	+	120	x η_{heat}
>25MWe	QI =	315	x	η_{power}	+	120	x η_{heat}

Table A2: GN44 QI formulae for RO and CfD Schemes 26 July 2012 to 31 December 2015

These QI formulae were originally set out in GN44 Issue 4, December 2013 and subsequently in GN44 Issue 5, September 2014. They will continue to apply for Schemes that were not operational before 26 July 2012 (and did not achieve financial close prior to this date) but which received an F3 or an F4 CHPQA certificate prior to 1 January 2016 (other than in circumstances in which, on or after the publication of GN44 Issue 6, a Contract for Difference is awarded in respect of the Scheme).

Size of Scheme (CHP_{TPC})	QI Formula
ALTERNATIVE FUEL SCHEMES	
Category A (e.g. AD gas, sewage gas, landfill gas)	
≤1MWe	QI = $238 \times \eta_{power} + 120 \times \eta_{heat}$
>1 to ≤25MWe	QI = $225 \times \eta_{power} + 120 \times \eta_{heat}$
>25MWe	QI = $193 \times \eta_{power} + 120 \times \eta_{heat}$
Category B (e.g. synthesis gas)	
≤1MWe	QI = $275 \times \eta_{power} + 120 \times \eta_{heat}$
>1 to ≤25MWe	QI = $251 \times \eta_{power} + 120 \times \eta_{heat}$
>25MWe	QI = $193 \times \eta_{power} + 120 \times \eta_{heat}$
Category C (e.g. fatty acid methyl ester, pyrolysis oil etc.)	
≤1MWe	QI = $245 \times \eta_{power} + 120 \times \eta_{heat}$
>1 to ≤25MWe	QI = $191 \times \eta_{power} + 120 \times \eta_{heat}$
>25MWe	QI = $176 \times \eta_{power} + 120 \times \eta_{heat}$
Category D (e.g. tallow, used cooking oil)	
≤1MWe	QI = $245 \times \eta_{power} + 120 \times \eta_{heat}$
>1 to ≤25MWe	QI = $226 \times \eta_{power} + 120 \times \eta_{heat}$
>25MWe	QI = $176 \times \eta_{power} + 120 \times \eta_{heat}$
Category E (e.g. municipal waste, sewage sludge, paper sludge etc.)	
≤1MWe	QI = $370 \times \eta_{power} + 130 \times \eta_{heat}$
>1 to ≤10MWe	QI = $370 \times \eta_{power} + 130 \times \eta_{heat}$
>10 to ≤25MWe	QI = $370 \times \eta_{power} + 130 \times \eta_{heat}$
>25MWe	QI = $350 \times \eta_{power} + 130 \times \eta_{heat}$
Category F (e.g. logs, energy crops, agricultural residues etc.)	
≤1MWe	QI = $348 \times \eta_{power} + 130 \times \eta_{heat}$
>1 to ≤10MWe	QI = $348 \times \eta_{power} + 130 \times \eta_{heat}$
>10 to ≤25MWe	QI = $348 \times \eta_{power} + 130 \times \eta_{heat}$
>25MWe	QI = $338 \times \eta_{power} + 130 \times \eta_{heat}$
Category G (e.g. contaminated waste wood)	
≤1MWe	QI = $352 \times \eta_{power} + 120 \times \eta_{heat}$
>1 to ≤10MWe	QI = $338 \times \eta_{power} + 120 \times \eta_{heat}$
>10 to ≤25MWe	QI = $338 \times \eta_{power} + 120 \times \eta_{heat}$
>25MWe	QI = $318 \times \eta_{power} + 120 \times \eta_{heat}$
Category H (e.g. wood pellets, straw, clean waste wood etc.)	
≤1MWe	QI = $329 \times \eta_{power} + 120 \times \eta_{heat}$
>1 to ≤10MWe	QI = $293 \times \eta_{power} + 120 \times \eta_{heat}$
>10 to ≤25MWe	QI = $286 \times \eta_{power} + 120 \times \eta_{heat}$
>25MWe	QI = $279 \times \eta_{power} + 120 \times \eta_{heat}$

Table A3: GN44 QI formulae for all RO schemes after 1 January 2016 and for CfD schemes after 1 Jan 2016 and before publication of this document.

These QI formulae were originally set out in GN44 Issue 6, October 2016. They will continue to apply for all Schemes which received an F3 or an F4 CHPQA certificate on or after 1 January 2016 (other than in circumstances in which, on or after the publication of this GN44 Issue 7, a Contract for Difference is awarded in respect of the Scheme).

Size of Scheme (CHP_{TPC})	QI Formula					
ALTERNATIVE FUEL SCHEMES						
Category A (e.g. AD gas, sewage gas, landfill gas)						
≤1MWe	QI =	238 x	η_{power}	+	120	x η_{heat}
>1 to ≤25MWe	QI =	225 x	η_{power}	+	120	x η_{heat}
>25MWe	QI =	193 x	η_{power}	+	120	x η_{heat}
Category B (e.g. synthesis gas)						
≤1MWe	QI =	275 x	η_{power}	+	120	x η_{heat}
>1 to ≤25MWe	QI =	223 x	η_{power}	+	120	x η_{heat}
>25MWe	QI =	193 x	η_{power}	+	120	x η_{heat}
Category C (e.g. fatty acid methyl ester, pyrolysis oil etc.)						
≤1MWe	QI =	225 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 D (e.g. tallow, used cooking oil)						
≤1MWe	QI =	226 x	η_{power}	+	120	x η_{heat}
>1 to ≤25MWe	QI =	226 x	η_{power}	+	120	x η_{heat}
>25MWe	QI =	176 x	η_{power}	+	120	x η_{heat}
Category E (e.g. municipal waste, sewage sludge, paper sludge etc.)						
≤1MWe	QI =	370 x	η_{power}	+	120	x η_{heat}
>1 to ≤10MWe	QI =	370 x	η_{power}	+	120	x η_{heat}
>10 to ≤25MWe	QI =	364 x	η_{power}	+	120	x η_{heat}
>25MWe	QI =	350 x	η_{power}	+	120	x η_{heat}
Category F (e.g. logs, energy crops, agricultural residues etc.)						
≤1MWe	QI =	346 x	η_{power}	+	120	x η_{heat}
>1 to ≤10MWe	QI =	347 x	η_{power}	+	120	x η_{heat}
>10 to ≤25MWe	QI =	303 x	η_{power}	+	120	x η_{heat}
>25 to ≤50MWe	QI =	292 x	η_{power}	+	120	x η_{heat}
>50MWe	QI =	238 x	η_{power}	+	120	x η_{heat}
Category G (e.g. contaminated waste wood)						
≤1MWe	QI =	346 x	η_{power}	+	120	x η_{heat}
>1 to ≤10MWe	QI =	331 x	η_{power}	+	120	x η_{heat}
>10 to ≤25MWe	QI =	303 x	η_{power}	+	120	x η_{heat}
>25 to ≤50MWe	QI =	292 x	η_{power}	+	120	x η_{heat}
>50MWe	QI =	238 x	η_{power}	+	120	x η_{heat}
Category H (e.g. wood pellets, straw, clean waste wood etc.)						
≤1MWe	QI =	329 x	η_{power}	+	120	x η_{heat}
>1 to ≤10MWe	QI =	291 x	η_{power}	+	120	x η_{heat}
>10 to ≤25MWe	QI =	284 x	η_{power}	+	120	x η_{heat}
>25 to ≤50MWe	QI =	279 x	η_{power}	+	120	x η_{heat}
>50MWe	QI =	238 x	η_{power}	+	120	x η_{heat}