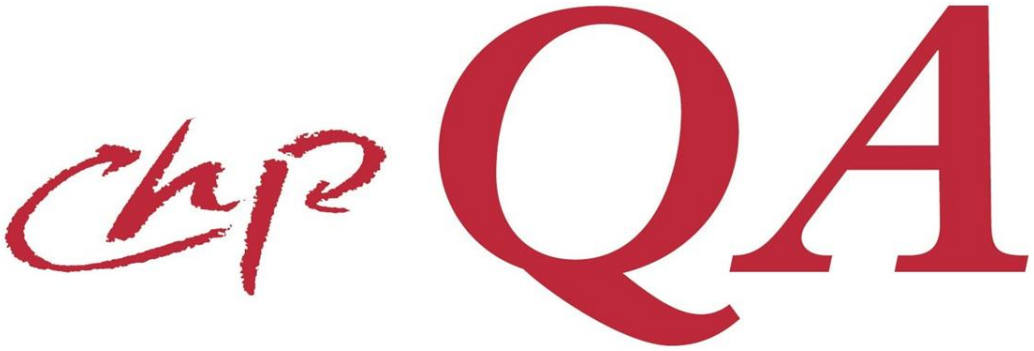

Combined Heat and Power Quality Assurance Scheme Stakeholder Engagement, 2016

Revisions to the design and implementation of the Combined Heat and Power Quality Assurance Scheme

28 April 2016

Contents

Glossary of terms ii
List of Questions for Stakeholders v
1. Introduction and background 1
The Combined Heat and Power Quality Assurance Programme 1
The purpose of this document 2
Responding to this document 2
2. Review of X and Y coefficients 3
The Quality Index 3
Review of X and Y coefficients 4
Rationale for changes 4
EU Efficiency Reference Values 5
Derivation of X and Y coefficients for the CHPQA Standard 11
Derivation of X and Y coefficients for Guidance Note 44 18
3. Clarification of definitions 23
4. Implementation of changes 25
X and Y values 25
Clarification of definitions 26
Renewable Heat Incentive (RHI) and support for CHP 26
Renewables Obligation (RO) and support for CHP 26
The Contract for Difference (CFD) Regime and Support for CHP 31
Appendix 1: Net to gross calorific value conversions 32

Glossary of terms

Alternative fuels are fuels other than ***Conventional Fuels*** and they fall into broad categories for the purposes of the ***CHPQA*** (see Table 2).

Annual Operation (AO) represents the calendar year when the ***Scheme*** is in operation; the period from 1st January to 31st December inclusive.

NB: This is the existing definition, clarification of which is proposed in Chapter 3.

Certification is the issuing by the CHPQA of a certificate that a Scheme meets the criteria for ***Good Quality*** for all or part of its energy inputs, outputs and capacity.

CHPQA is the Combined Heat and Power Quality Assurance programme.

The CHPQA Standard (the Standard) is the document that sets out definitions, criteria and methodologies for the operation of the CHPQA. It is supported by the CHPQA Guidance Notes, which provide detailed guidance on compliance with the Standard and information on how the Standard is interpreted by the CHPQA, government departments and agencies.

CHP Scheme (Scheme) means the equipment and operating system, including monitoring systems, for the CHP installation that is registered under the CHPQA at any stage of development from design to actual operation. A Scheme's boundary may be defined to include associated auxiliary or back-up boilers or generators.

CHP Total Fuel Input (CHP_{TFI}) is the total registered annual fuel input to a CHP Scheme (MWh), on a ***gross calorific value*** (GCV) basis.

NB: This is the existing definition, clarification of which is proposed in Chapter 3.

CHP Qualifying Fuel Input (CHP_{QFI}) is the registered annual fuel input to a CHP Scheme qualifying as input to Good Quality CHP (MWh), based on gross calorific value (GCV). Most Schemes will meet the ***Threshold Power Efficiency Criterion*** for Good Quality CHP in ***Annual Operation*** and therefore CHP_{QFI} is the total annual fuel input (CHP_{TFI}). For a Scheme that does not achieve the Threshold Power Efficiency Criterion for Good Quality CHP, CHP_{QFI} is that portion of the annual fuel input to a Scheme that would have achieved the Power Efficiency Criterion, based on the actual annual power generation (CHP_{TPO}).

CHP Total Power Output (CHP_{TPO}) is the total annual electricity generated, as measured at the generator terminals, plus the electrical equivalent of any mechanical power supplied by the Scheme.

CHP Qualifying Power Output (CHP_{QPO}) is the registered annual power generation from a CHP Scheme (MWh_e) that qualifies as Good Quality CHP. For Schemes that meet the relevant ***Threshold QI Criterion*** for Good Quality CHP in Annual Operation CHP_{QPO} equals the total power output (CHP_{TPO}). For a Scheme that does not achieve the Threshold QI Criterion for Good Quality CHP, CHP_{QPO} is that portion of the annual power output from a Scheme that would have achieved the Threshold QI Criterion, based on the actual annual heat supplied (CHP_{QHO}).

CHP Qualifying Heat Output (CHP_{QHO}) is the total annual heat supplied by the CHP Scheme that is used in a manner that demonstrably displaces heat that would otherwise be supplied from other energy sources.

Condensing efficiency is the maximum electrical efficiency of a generator when no heat is being extracted from it.

Conventional fuels are those described as taxable commodities under the Finance Act, 2000, Schedule 6, or oil as defined in the Hydrocarbon Oil Duties Act, 1979. See also ***Alternative fuels***.

EED is the EU Directive 2012/27/EU on energy efficiency.

F3 Certificate is a certificate granted by the CHPQA to a Responsible Person based on the technical design data of a proposed new CHP scheme (which is at the final design stages or under construction), or based on technical design data of an upgrade of the prime mover of an existing CHP scheme. The F3 Certificate is based on design data provided to the CHPQA in an F3 (or F3(s)) Form[1]. Further details and description of the data requirements in completing an F3 submission is provided in CHPQA Guidance Note 3[2].

F4 Certificate is a certificate granted by the CHPQA to a Responsible Person for schemes which have at least one month of operational data and reflects the actual performance of the scheme. The purpose of the F4 certification is to ascertain the portions of inputs, outputs and capacity that qualify as Good Quality CHP. The F4 Certificate is based on operational data provided to the CHPQA in an F4 (or F4(s)) Form[1]. Further details and description of the data requirements in completing an F4 submission is provided in CHPQA Guidance Note 4[3].

Gross calorific value (GCV) of a fuel is the total energy available from that fuel (solid, liquid or gas) when it is completely burnt. It is expressed as heat per unit weight or volume of fuel. 'Gross' signifies that the water formed or liberated during combustion is condensed to the liquid phase, i.e. that the GCV includes the energy of evaporation of that water. See also ***Net calorific value (NCV).***

Good Quality - A Scheme that qualifies as Good Quality CHP for its entire annual energy inputs and outputs is one where the ***Power Efficiency*** equals or exceeds 20% and the ***Quality Index*** equals or exceeds 100. Otherwise the energy inputs and/or outputs qualifying as Good Quality are scaled back – see ***CHP_{QFI}*** and ***CHP_{QPO}***.

Guidance Note 44 (GN44) is the CHPQA guidance document entitled ***"****Use of CHPQA to obtain Renewable Obligation Certificates for Electricity generated by Biomass, Bioliquid and Waste fuelled CHP and for the purpose of qualifying for Contracts for Difference support for Biomass and Energy from Waste CHP".* For the purposes of calculating the Quality Index for Renewable Obligation Certificates eligibility, GN44 values are used, rather than those in the CHPQA Standard. GN44 values are also used in place of those in the CHPQA Standard by the Contracts for Difference regime, where they are a factor in calculating the payments that CHP plants receive under the Contract.

Heat efficiency is the ***CHP Qualifying Heat Output*** divided by the ***CHP Total Fuel Input.***

Initial Operation (IO) starts when the ***Responsible Person*** notifies the Administrator that the Scheme has begun operating. For a Scheme serving an individual user or site, IO ends after the first complete AO. For a Scheme serving Community Heating Initial Operation ends after the first two complete AOs.

---

[1] https://www.gov.uk/guidance/combined-heat-power-quality-assurance-programme#simple-scheme-submission-forms

[2] https://www.chpqa.com/guidance_notes/GUIDANCE_NOTE_03.pdf

[3] *https://www.chpqa.com/guidance_notes/GUIDANCE_NOTE_04.pdf*

NB: This is the existing definition, clarification of which is proposed in Chapter 3.

MWe refers to megawatts of electricity.

MW_{th} refers to megawatts of heat.

Net calorific value (NCV) of a fuel is the energy available from that fuel (solid, liquid or gas) when it is completely burnt. It is expressed as heat per unit weight or volume of fuel. 'Net' signifies that the NCV excludes the energy that evaporates water formed or liberated during combustion. See also ***Gross calorific value (GCV).***

Power efficiency is the ***CHP Total Power Output*** divided by the ***CHP Total Fuel Input.***

Primary Energy Saving (PES) is the reduction in fuel used by CHP as compared with that which would be used in conventional boilers and power stations of the same fuel type to generate the same amount of heat and power separately. Primary Energy Saving is calculated according to the formula shown in Annex II of the ***EED***, and using the reference values for the separate production of heat and electricity.

***Quality Index (QI*)** is one of two key parameters for assessing a Scheme (the other being Power Efficiency). QI is an indicator of the energy efficiency and environmental performance of a Scheme, relative to the generation of the same amounts of heat and power by separate, alternative means.

Responsible Person means that person or corporate body registered with the CHPQA as responsible for the operation of a Scheme.

Threshold Power Efficiency Criterion is the threshold below which not all input fuel to a CHP Scheme qualifies for relevant benefits such as the CCL exemption. The threshold is 20%.

X and Y coefficients are values used in the calculation of a CHP Scheme's Quality Index depending on the size of Scheme and fuel(s) used. X is a coefficient related to alternative power supply options, and Y is related to alternative heat generation options. There are two sets of X and Y coefficients: one is set out in the CHPQA Standard and the other in Guidance Note 44.

Z ratio is the ratio of heat extracted from a pass-out condensing steam turbine to the resulting reduction in power output.

List of Questions for Stakeholders

Stakeholder Questions	
1.	Are the assumed connection voltages for each CHPQA fuel/size category reasonable? Please provide evidence to support your response.
2.	Are the assumed percentages of electricity exported for each CHPQA fuel/size category reasonable? Please provide evidence to support your response.
3.	Do you agree with the proposed split of the CHPQA > 25 MWe category for fuel categories F, G and H into >25 - ≤100 MWe and >100 MWe? Please provide evidence to support your response.
4.	Do you agree with the assumed efficiencies when operating in full condensing mode (i.e. with no heat extraction)? Please provide evidence to support your response.
5.	Do you agree with the proposed X and Y coefficients for the CHPQA Standard? Please provide evidence to support your response.
6.	Do you agree with the proposed X and Y coefficients for Guidance Note 44? Please provide evidence to support your response.
7.	Do you find the expanded definitions provided clear? If not, why not?
8.	Are there any other definitions that you think need to be clarified or added to the CHPQA Standard?
9.	Do you agree with the proposed grandfathering arrangements? If not please provide evidence.
10.	Do you agree that, under the Renewables Obligation, the proposed Issue 6 of the CHPQA Standard and revised Guidance Note 44 are only likely to be relevant to dedicated biomass with CHP in Northern Ireland, dedicated bioliquid CHP throughout the UK, and energy from waste CHP throughout the UK? If not, please provide evidence to support your response.
11.	Do you agree with our proposal for amending the Renewables Obligation legislation for: a) England and Wales; b) Scotland; and c) Northern Ireland,

	to incorporate the updated Issue 6 of the CHPQA Standard and the revised Guidance Note 44? If not, please provide evidence to support your response, and state the country or countries on which you are commenting.
12.	Do you agree with our proposal for amending the Contracts for Difference (Definition of Eligible Generator) Regulations 2014 to incorporate the updated issue 6 of the CHPQA Standard? If not please explain why.

1. Introduction and background

The Combined Heat and Power Quality Assurance Programme

1.1. The Combined Heat and Power Quality Assurance programme (***CHPQA***) is a government initiative providing a practical, determinate method for assessing the efficiency of all types and sizes of Combined Heat & Power (CHP) schemes throughout the UK. CHP (or cogeneration) is the simultaneous generation of heat and power in a single process, and provides one of the most cost-effective approaches for making carbon savings. The CHPQA aims to ensure that any CHP plant (fully or partially qualified) that claims policy benefits is highly efficient, making real ***primary energy savings***, in line with the requirements of the EU Directive 2012/27/EU on Energy Efficiency, (the ***EED***). In doing so it aims to provide clear signals to users and suppliers of CHP, to develop new ***CHP Schemes*** and upgrade or improve existing schemes so as to be more efficient.

1.2. CHPQA ***certification*** grants access, depending on specific circumstances, to a number of benefits[4]:

- Climate Change Levy (CCL) exemption
- Carbon Price Support (CPS) tax exemption
- Enhanced Capital Allowances (ECAs)
- Business rating exemption
- Renewables Obligation Certificates (ROCs)
- Contracts for Difference (CFD)
- ***Renewable Heat Incentive (RHI)***

NB: CFDs are ordinarily allocated through a competitive auction process. CHPQA certification is an eligibility requirement for some technologies in this scheme but does not itself a guarantee that a CFD will ultimately be awarded.

1.3. A Scheme that qualifies wholly as ***Good Quality*** CHP is one for which, based on annual performance, the ***power efficiency*** equals or exceeds 20%, and where the ***Quality Index*** (QI) equals or exceeds the QI Threshold, which is usually 100.

1.4. The ***CHPQA Standard***[5] (the Standard), currently Issue 5, sets out definitions, criteria and methodologies for the operation of the programme. It is supported by the CHPQA Guidance Notes[6], which provide detailed guidance on compliance with the Standard and information on how the Standard is interpreted by the CHPQA, government departments and agencies.

[4] See also: https://www.gov.uk/guidance/combined-heat-and-power-incentives

[5] https://www.gov.uk/government/publications/chpqa-standard

[6] https://www.gov.uk/chpqa-guidance-notes

The purpose of this document

1.5. This document presents proposals for modifications to the CHPQA Standard and ***Guidance Note 44*** (GN44), which are necessary to incorporate the EU's updated energy efficiency reference values. It invites stakeholder comments on these, and lays out the next steps for implementing the proposed changes. The questions for stakeholders relate to the CHPQA's proposals for updating the CHPQA Standard and GN44, rather than the EU's updated energy efficiency reference values from which these stem.

1.6. The proposals mainly take the form of revisions to the QI formula ***X and Y coefficients***, following a review of and changes to the EU harmonised efficiency reference values for the separate production of electricity and heat. This is a routine exercise carried out by the European Commission every 4-5 years, to ensure that the reference values keep pace with technology improvements. The revised X and Y coefficients are in line with UK Government policy and will also correct for assumptions previously made that have in practice proved unrepresentative of CHP Schemes being implemented. The proposed revisions and the rationale for them are set out in Chapter 2.

1.7. Chapter 3 includes additional proposals for improving the definitions of certain CHPQA terminology, so that they provide greater clarity for CHP operators and developers.

1.8. The revised X and Y coefficients will apply to new Schemes that receive CHPQA certification on or after 1 January 2017, and Schemes that receive an F3 CHPQA certificate for the first time between 1 January and 31 December 2016. **Existing Schemes that received CHPQA certification prior to 1 January 2016 will be unaffected by the proposed changes.** Further details of these grandfathering arrangements can be found in Chapter 4.

1.9. The proposed changes are by their nature technical; the CHPQA is engaging with industry stakeholders through the targeted circulation of this document and a number of stakeholder seminars.

1.10. Terms defined in the glossary are shown in bold italics on their first use in the main text.

Responding to this document

1.11. Should you have any comments on the proposals, particularly in response to the specific questions in this document, please send these by e-mail to:

CHPQAstakeholder2016@chpqa.com including the phrase "CHPQA stakeholder response" in the e-mail's title.

1.12. The closing date for responses is **Thursday 26 May 2016.**

2. Review of X and Y coefficients

The Quality Index

2.1. The CHPQA Quality Index (QI) is one of two criteria used for determining the extent to which a CHP qualifies as Good Quality, the other being power efficiency. These two criteria are therefore key in determining the degree to which particular CHP installations can qualify for the benefits listed in paragraph 1.2.

2.2. The Quality Index for CHP Schemes is defined as a function of their power efficiency (the electrical[7] power output as a proportion of fuel input energy) and ***heat efficiency*** (the useful heat output as a proportion of fuel input energy)[8].

$$QI = X \times \eta_{power} + Y \times \eta_{heat}$$

X is a coefficient related to alternative power supply options. Similarly, Y is a coefficient for heat generation, related to alternative heat supply options. η_{power} and η_{heat} are the power and heat efficiencies respectively, defined thus:

$$\eta_{power} = \frac{CHP_{TPO}}{CHP_{TFI}} \qquad \text{and} \qquad \eta_{heat} = \frac{CHP_{QHO}}{CHP_{TFI}}$$

Where:

CHP_{TPO} is the ***CHP Total Power Output***
CHP_{QHO} is the ***CHP Qualifying Heat Output***
CHP_{TFI} is the ***CHP Total Fuel Input***

2.3. A Scheme that qualifies wholly as Good Quality CHP is one for which, based on annual performance, the power efficiency equals or exceeds 20% and where the QI equals or exceeds the QI Threshold, which is usually 100[9].

2.4. Schemes meeting these two conditions are eligible for maximum benefits available on fuel input and power output. Otherwise, the benefits on fuel input and/or power output are scaled back according to the achieved power efficiency and/or QI respectively.

2.5. For Schemes that fail to achieve a power efficiency of 20% the ***CHP Qualifying Fuel Input (CHP_{QFI})*** must be calculated. This is the fuel input that would have achieved a power efficiency of 20% assuming the same quantity of electricity is generated. Benefits such as the CCL exemption on conventional fuel are awarded in line with CHP_{QFI}.

2.6. For Schemes that fail to achieve the QI Threshold the ***CHP Qualifying Power Output (CHP_{QPO})*** must be calculated. This is the annual power generation that would have achieved the relevant QI Threshold given the actual annual heat supplied. The balance of power output is not considered to be generated by Good Quality CHP. CHP_{QPO} is used to determine the ROC eligibility, the Climate Change Levy (CCL) exemption on electricity and is also a factor relevant to the calculation of total payments to be made under CFD agreements in relation to which the CHP Qualifying Multiplier is expressed to apply.

[7] Also includes mechanical power output where applicable, with an adjustment to electrical equivalence.

[8] All efficiencies used in CHPQA are calculated on the basis of the Gross Calorific Value (GCV) of the fuel.

[9] The QI Threshold is 105 when performance is based on design data and 95 during Initial Operation.

Review of X and Y coefficients

2.7. The Quality Index definitions are subject to periodic review to ensure that:

a. The values of X and Y remain appropriate for each size and type of CHP Scheme.

b. CHP that is certified as Good Quality will continue to provide significant environmental and other benefits compared to conventional energy supply alternatives.

c. The QI definitions provide a challenging threshold for all CHP Schemes and promote the continuous improvement of CHP plant.

d. The QI definitions remain consistent with the EU reference efficiency values used for calculating ***primary energy savings*** (PES) as required by Annex II of the EED, specifically:

- For Schemes ≤ 1MWe, a PES ≥ 0%.
- For Schemes > 1MWe, a PES ≥ 10%.
- For Schemes > 25MWe, a total efficiency ≥ 70% ***net calorific value*** (NCV) basis.

2.8. The values of X and Y vary for different fuel categories and sizes of Scheme. Where a Scheme uses a mixture of fuels in different fuel categories, weighted mean values for X and Y are used for the definition and calculation of QI.

2.9. There are also two separate sets of X and Y values:

(i). The 'Standard values' as specified in the CHPQA Standard, which are applied for all purposes other than as described in (ii).

(ii). The 'GN44 values' as specified in CHPQA Guidance Note 44[10] (GN44) (currently Issues 4 and 5 are live), which are relevant to renewable power generation support measures. In particular, GN44 values are used to determine the QI for ROC eligibility, and are a factor relevant to the calculation of total payments to be made under CFD agreements in relation to which the CHP Qualifying Multiplier is expressed to apply.

Rationale for changes

2.10. There are three reasons for undertaking a review of the existing values of the X and Y coefficients and making consequential adjustments in both the Standard and GN44:

- The reference efficiencies used to calculate the primary energy savings from cogeneration schemes using the methodology in Annex II of the Energy Efficiency Directive, 2012/27/EU (EED) have recently been reviewed and the outcome published as Commission Delegated Regulation (EU) 2015/2402[11]. This review is a routine exercise that the Commission undertakes every 4-5 years to reflect the latest technological developments. The new reference efficiencies are in line with UK

[10] http://www.chpqa.com/guidance_notes/GUIDANCE_NOTE_44_Issue_5.pdf

[11] Commission Delegated Regulation (EU) 2015/2402 of 12 October 2015 reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2012/27/EU of the European Parliament and of the Council and repealing Commission Implementing Decision 2011/877/EU http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R2402&from=EN

Government policy. To maintain compliance with the EED, the CHPQA must be consistent with the revised reference efficiencies for new schemes.

- In addition, some biomass CHP Schemes are achieving significantly higher electrical efficiencies than anticipated at the last review. As a consequence some biomass Schemes above 25 MWe could fully qualify as good quality CHP, against the Standard X and Y values, with an overall efficiency less than the minimum 70% (NCV basis) required by the EED.
- Furthermore with regard to the GN44 values, some Schemes are currently receiving substantial benefit under the Renewables Obligation without meeting the minimum heat efficiency requirement of 10% (GCV basis) or the overall efficiency requirement of 35% (GCV basis).

2.11. It is therefore proposed to make changes to both the Standard values and GN44 values of the X and Y coefficients. These changes will apply to all new CHP Schemes that receive CHPQA certification for the first time on or after 1 January 2017, and Schemes that receive an F3 CHPQA certificate for the first time between 1 January and 31 December 2016. The timing of the proposed changes to the Standard and GN44, and what will constitute a new Scheme, is presented in Chapter 4.

EU Efficiency Reference Values

2.12. This section presents the changes that have been made to the EU efficiency reference values and explains how they have been re-expressed in terms consistent with the CHPQA.

2.13. Table 1 sets out the previous and new EU reference efficiencies. Those that have changed are highlighted. Most of the changes to the reference values relate to renewable and other ***alternative fuels***, and reflect changes to the average performance of technologies using these. The “Other” category is new and, with the exception of O14, relate to fuels/energy sources that are not currently used by CHP plants in the UK.

Table 1: EU reference efficiencies for the separate generation of electricity and heat, before and after 2016[12]

		Year of construction:	Electrical reference efficiencies (NCV basis)		Heat reference efficiencies (NCV basis)					
			Before 2016	From 2016	Before 2016			From 2016		
Category		Type of fuel			*Hot Water*	*Steam[13]*	*Direct use of exhaust gases[14]*	*Hot Water*	*Steam*	*Direct use of exhaust gases*
Solids	S1	Hard coal including anthracite, bituminous coal, sub-bituminous coal, coke, semi-coke, pet coke	44.2%	44.2%	88.0%	83.0%	80.0%	88.0%	83.0%	80.0%
	S2	Lignite, lignite briquettes, shale oil	41.8%	41.8%	86.0%	81.0%	78.0%	86.0%	81.0%	78.0%
	S3	Peat, peat briquettes	39.0%	39.0%	86.0%	81.0%	78.0%	86.0%	81.0%	78.0%
	S4	Dry biomass including wood and other solid biomass including wood pellets and briquettes, dried woodchips, clean and dry waste wood, nut shells and olive and other stones	**33.0%**	**37.0%**	86.0%	81.0%	78.0%	86.0%	81.0%	78.0%
	S5	Other solid biomass including all wood not included under S4 and black and brown liquor.	**25.0%**	**30.0%**	80.0%	75.0%	72.0%	80.0%	75.0%	72.0%
	S6	Municipal and industrial waste (non-renewable) and renewable/ bio-degradable waste	25.0%	25.0%	80.0%	75.0%	72.0%	80.0%	75.0%	72.0%
Liquids	L7	Heavy fuel oil, gas/diesel oil, other oil products	44.2%	44.2%	**89.0%**	**84.0%**	81.0%	**85.0%**	**80.0%**	81.0%
	L8	Bio-liquids including bio-methanol, bioethanol, bio-butanol, biodiesel and other bio-liquids	44.2%	44.2%	**89.0%**	**84.0%**	81.0%	**85.0%**	**80.0%**	81.0%
	L9	Waste liquids including biodegradable and non-renewable waste (including tallow, fat and spent grain).	**25.0%**	**29.0%**	**80.0%**	**75.0%**	72.0%	**75.0%**	**70.0%**	72.0%
Gaseous	G10	Natural gas, LPG, LNG and biomethane	**52.5%**	**53.0%**	**90.0%**	**85.0%**	82.0%	**92.0%**	**87.0%**	82.0%
	G11	Refinery gases hydrogen and synthesis gas	44.2%	44.2%	**89.0%**	**84.0%**	81.0%	**90.0%**	**85.0%**	81.0%
	G12	Biogas produced from anaerobic digestion, landfill, and sewage treatment	42.0%	42.0%	**70.0%**	**65.0%**	62.0%	**80.0%**	**75.0%**	62.0%
	G13	Coke oven gas, blast furnace gas, mining gas, and other recovered gases (excluding refinery gas)	35.0%	35.0%	80.0%	75.0%	72.0%	80.0%	75.0%	72.0%
Other	O14	Waste heat (including high temperature process exhaust gases, product from exothermic chemical reactions)		**30.0%**	**0.0%**	**0.0%**	0.0%	**92.0%**	**87.0%**	0.0%
	O15	Nuclear		33.0%	0.0%	0.0%	0.0%	92.0%	87.0%	0.0%
	O16	Solar thermal		30.0%	0.0%	0.0%	0.0%	92.0%	87.0%	0.0%
	O17	Geothermal		19.5%	0.0%	0.0%	0.0%	92.0%	87.0%	0.0%
	O18	Other fuels not mentioned above		30.0%	0.0%	0.0%	0.0%	92.0%	87.0%	0.0%

2.14. The reference efficiencies for hot water are higher than those for steam systems or direct use of exhaust gases, since hot water generation makes greater use of available heat from fuels, being lower in temperature. The majority of CHP systems in the UK generate hot water or steam, so the reference values for direct heat have not been considered when applying these EU reference efficiencies to the UK's CHPQA programme. For

[12] Annexes 1 and 2 of Commission Delegated Regulation (EU) 2015/2402 of 12 October 2015

[13] If steam plants do not account for the condensate return in their calculation of CHP heat efficiencies, the steam efficiencies shown in the table above should be increased by 5 percentage points.

[14] Values for direct use of exhaust gases should be used if the temperature is 250 °C or higher.

steam systems, the heat requirement can be reduced by returning hot condensate to boilers rather than producing steam entirely from cold feed water. To encourage energy efficiency rather than maximisation of QHO, the CHPQA allows useful heat for steam systems to be calculated as if no condensate were returned, i.e. without deducting the heat contained in condensate returned to the boiler, whether or not this occurs. The Directive allows this but where this method is applied, requires reference efficiencies for steam to be increased by 5 percentage points which brings them into line with those for hot water. Therefore, the reference heat efficiencies assumed in analysis undertaken are the same as those for hot water in Table 1.

2.15. Category O14 covers waste heat from industrial processes that is subsequently used for generating power (e.g. via an Organic Rankine Cycle plant), with the remaining heat (i.e. after passing through the power generation process) put to good use. The heat reference efficiency has been taken to be that of waste heat recovery boilers, i.e. 87% for steam and 92% for hot water. For electricity generation from waste heat the same reference efficiency of 30% as that for category S5 has been applied.

Fuel categorisation

2.16. The fuel categorisations used by the CHPQA are set out in Guidance Note 14[15]. These are labelled differently from those used for the EU reference efficiencies, due to the fact that the CHPQA programme pre-dates these. Consequently the EU categories and their reference efficiencies have been mapped to the CHPQA fuel categories as per Table 2.

Table 2: CHPQA and equivalent EU fuel categories

CHPQA		EU	
Category	**Type of fuel**	**Category**	**Type of fuel**
Conventional Fuels			
Natural Gas	Any gas in a gaseous state that is of a kind supplied by a gas utility, any petroleum gas, other gaseous hydrocarbon, in a liquid state	G10	Natural gas, LPG, LNG and bio-methane
Oil	Hydrocarbon oil or road fuel gas within the meaning of the Hydrocarbon Oil Duties Act 1979 (HODA)	L7	Heavy fuel oil, gas/diesel oil, other oil products
Coal	Coal and lignite; Coke, and semi-coke, of coal or lignite; Petroleum coke	S1	Hard coal including anthracite, bituminous coal, sub-bituminous coal, coke, semi-coke, pet coke
Fuel Cells	Natural gas assumed	G10	Natural gas, LPG, LNG and bio-methane
Alternative Fuels			
Cat A	Gas produced by the anaerobic digestion (AD) of biological materials, Sewage gas, Landfill gas.	G12	Biogas produced from anaerobic digestion, landfill, and sewage treatment
Cat B	Synthesis gas from gasification of biological material	G11	Refinery gases hydrogen and synthesis gas
Cat 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, Bioethanol, Bio-butanol, Bio Methyl Tertiary Butyl Ether, Bio Ethyl Tertiary Butyl Ether.	L8	Bio-liquids including bio-methanol, bioethanol, bio-butanol, biodiesel and other bio-liquids
Cat D	Tallow, Used cooking oil.	L9	Waste liquids including biodegradable and non-renewable waste (including tallow, fat and spent grain
Cat E	The biological fraction of Municipal solid waste, Industrial waste, Clinical waste, Refuse derived fuel, Solid recovered fuels, Poultry litter, De-watered sewage sludge, Paper sludge.	S6	Municipal and industrial waste (non-renewable) and renewable/ bio-degradable waste
Cat F	Logs, Roundwood, Energy crops, Agricultural residues, Prunings, Milling residues, Aboricultural & Forestry residues, Distillers grain.	S5	Other solid biomass including all wood not included under S4 and black and brown liquor.

[15] http://www.chpqa.com/guidance_notes/GUIDANCE_NOTE_14.pdf

CHPQA		EU	
Category	**Type of fuel**	**Category**	**Type of fuel**
Cat G	Contaminated waste wood (Grades B-D of PAS 111).	S5	Other solid biomass including all wood not included under S4 and black and brown liquor.
Cat H	Wood pellets, Dry wood chips, Straw, Bagasse, Nut shells, Husks and Cobs, Visibly clean waste wood (grade A of PAS 111).	S4	Dry biomass including wood and other solid biomass including wood pellets and briquettes, dried woodchips, clean and dry waste wood, nut shells and olive and other stones
Cat I	By-product gases produced in industrial processes, for example blast furnace gas, coke oven gas and refinery fuel gas, which may include constituents such as hydrogen, ethane, propane, etc.	G11	Refinery gases hydrogen and synthesis gas
Cat J	Waste gases (such as carbon monoxide or volatile organic compounds), Waste heat (such as the exhaust gas from high temperature processes, or as a product of exothermic chemical reactions).	O14	Waste heat (including high temperature process exhaust gases, product from exothermic chemical reactions)
Cat K	Non-renewable liquid waste	L9	Waste liquids including biodegradable and non-renewable waste (including tallow, fat and spent grain

Net to gross calorific value ratio

2.17. The EU reference efficiencies are expressed on the basis of net calorific values (NCVs), whereas CHPQA fuel and efficiency parameters are expressed in ***gross calorific value*** (GCV) terms, in line with usual UK practice. For use in the CHPQA, therefore, the EU reference efficiencies have been re-expressed on a gross calorific value basis, details of which are provided in Appendix 1.

Electricity grid loss correction factors

2.18. As well as the reference efficiencies, Delegated Regulation (EU) 2015/2402 specifies correction factors that are applied to the electrical reference efficiencies to account for the avoided electricity grid (network) losses associated with local power generation (Table 3). These factors are dependent on the connection voltage and whether the generated power is consumed on-site or off-site (i.e. exported).

Table 3: EU grid correction factors, from 2016

Voltage level of connection	Correction factor (off-site)	Correction factor (on-site)
≥ 345 kV	1.000	0.976
≥ 200 - < 345 kV	0.972	0.963
≥ 100 - < 200 kV	0.963	0.951
≥ 50 - < 100 kV	0.952	0.936
≥ 12 - < 50 kV	0.935	0.914
≥ 0.45 - < 12 kV	0.918	0.891
< 0.45 kV	0.888	0.851

2.19. Grid connection factors have been allocated to each CHPQA fuel category-electrical capacity combination as shown in Table 4, by making assumptions regarding connection voltages and export fractions. These assumptions have been made since the X and Y values in the CHPQA depend only on the fuel category and plant electrical capacity. They are inevitably broad, but are based on averages obtained from analysis of CHPQA data.

Table 4: Assumed grid correction factors for CHPQA fuel/size categories

CHPQA Fuel Category	Electrical capacity	Assumed connection voltage	Assumed % electricity exported	Grid correction factor
Natural Gas	≤1 MWe	<0.45 kV	0%	0.851
	>1 - ≤10 MWe	≥12 - <50 kV	10%	0.916
	>10 - ≤25 MWe	≥50 - <100 kV	10%	0.938
	>25 - ≤50 MWe	≥50 - <100 kV	20%	0.939
	>50 - ≤100 MWe	≥100 - <200 kV	40%	0.956
	>100 - ≤200 MWe	≥345 kV	40%	0.986
	>200 - ≤500 MWe	≥345 kV	70%	0.993
	>500 MWe	≥345 kV	100%	1.000
Oil, coal, I and J	≤ 1MWe	<0.45 kV	0%	0.851
	>1-≤25 MWe	≥50 - <100 kV	0%	0.936
	>25 MWe	≥345 kV	100%	1.000
Fuel cells	All	≥12 - <50 kV	0%	0.914
A, B, C, D and K	≤ 1MWe	<0.45 kV	20%	0.858
	>1 - ≤25 MWe	≥50 - <100 kV	50%	0.944
	>25 MWe	≥100 - <200 kV	100%	0.963
E	≤1 MWe	<0.45 kV	20%	0.858
	>1 -≤10 MWe	≥12 - <50 kV	50%	0.925
	>10- ≤25 MWe	≥50 - <100 kV	50%	0.944
	>25 MWe	≥100 - <200 kV	100%	0.963
F, G and H	≤1 MWe	<0.45 kV	20%	0.858
	>1 - ≤10 MWe	≥12 - <50 kV	50%	0.925
	>10 - ≤25 MWe	≥50 - <100 kV	50%	0.944
	>25 - ≤100 MWe	≥100 - <200 kV	100%	0.963
	>100MWe	≥345 kV	100%	1.000

Stakeholder Question	
1.	Are the assumed connection voltages for each CHPQA fuel/size category reasonable? Please provide evidence to support your response.

Stakeholder Question	
2.	Are the assumed percentages of electricity exported for each CHPQA fuel/size category reasonable? Please provide evidence to support your response.

Summary of reference efficiencies in CHPQA terms

2.20. The revised reference efficiencies derived by the CHPQA for each CHPQA fuel and size category are shown in Table 5. These are expressed in GCV terms and adjusted for electrical network loss factors as described in the previous sections.

Table 5: Summary of reference values and minimum PES requirements

CHPQA Fuel Category	Electrical capacity	Corrected reference electrical efficiency (GCV)	Reference heat efficiency (GCV)
Natural Gas	≤1MWe	40.59%	82.80%
	>1 to ≤10MWe	43.60%	
	>10 to ≤25MWe	44.65%	
	>25 to ≤50MWe	45.41%	
	>50 to ≤100MWe	45.94%	
	>100 to ≤200MWe	46.36%	
	>200 to ≤500MWe	47.70%	
	>500MWe	47.70%	
Oil	≤1MWe	35.36%	79.90%
	>1 to ≤25MWe	38.89%	
	>25MWe	41.55%	
Coal	≤1MWe	35.73%	83.60%
	>1 to ≤25MWe	39.30%	
	>25MWe	41.99%	
Fuel Cells	All	43.60%	82.80%
A	≤1MWe	32.48%	72.07%
	>1 to ≤25MWe	35.72%	
	>25MWe	36.44%	
B	≤1MW	34.18%	81.08%
	>1 to ≤25MWe	37.59%	
	>25MWe	38.35%	
C	≤1MWe	36.04%	80.74%
	>1 to ≤25MWe	39.63%	
	>25MWe	40.43%	
D and K	≤1MWe	23.65%	71.24%
	>1 to ≤25MWe	26.00%	
	>25MWe	26.53%	
E	≤1MWe	20.39%	75.99%
	>1 to ≤10MWe	21.95%	
	>10 to ≤25MWe	22.42%	
	>25MWe	22.87%	
F and G	≤1MWe	24.46%	75.99%
	>1 to ≤10MWe	26.35%	
	>10 to ≤25MWe	26.90%	
	>25 to ≤100MWe	27.44%	
	>100MWe	28.50%	
H	≤1MWe	30.17%	81.69%
	>1 to ≤10MWe	32.49%	
	>10 to ≤25MWe	33.18%	
	>25 to ≤100MWe	33.85%	
	>100MWe	35.15%	
I	≤1MWe	33.89%	81.08%
	>1 to ≤25MWe	37.27%	
	>25MWe	39.82%	
J	≤1MWe	24.25%	87.40%
	>1 to ≤25MWe	26.68%	
	>25MWe	28.50%	

2.21. The figures in Table 5 form the basis for deriving revised sets of X and Y values for the CHPQA Standard and GN44. In the following sections the derivation of each set is described in turn.

Derivation of X and Y coefficients for the CHPQA Standard

2.22. X and Y coefficients are designed to ensure that CHP Schemes operating with an electrical efficiency of anywhere between 20% (the minimum power efficiency threshold to fully qualify as Good Quality CHP) and the maximum possible ***condensing efficiency*** cannot achieve a QI ≥100 (the minimum QI threshold to fully qualify as good quality CHP) unless the Primary Energy Saving (PES) meets or exceeds the minimum threshold (>0% for ≤1 MWe Schemes and 10% for >1 MWe Schemes).

2.23. Where reference efficiencies have increased, the PES of a Scheme with given heat and electrical efficiencies is now lower based on the new reference efficiencies than with the previous values. To ensure that the CHPQA is in line with the EED, CHPQA X and/or Y coefficients must therefore be reduced for some categories to ensure that the QI does not equal or exceed 100 when the PES falls short of the minimum threshold.

2.24. In addition, some biomass CHP Schemes in fuel categories F, G and H are actually achieving significantly higher electrical efficiencies than was allowed for when designing the existing X and Y coefficients. As a consequence, some biomass schemes greater than 25 MWe can fully qualify as Good Quality CHP with an overall efficiency less than the minimum 70% (NCV basis) required under EED Annex II. The proposed new Standard X and Y values have been designed to address this, so that we remain in line with EED requirements.

Addition of new size category

2.25. Biomass CHP Schemes have a wide range of maximum efficiencies depending on the size of the plant. If X and Y values for all >25 MWe plant are designed according to the largest and most efficient plant, smaller plants will struggle to qualify as Good Quality CHP, thus dis-incentivising the market for smaller units.

2.26. For biomass fuel categories F, G and H it is therefore proposed to split the >25 MWe categories into two based on a capacity threshold of 100 MWe.

Stakeholder Question	
3.	Do you agree with the proposed split of the CHPQA > 25 MWe category for fuel categories F, G and H into >25 - ≤100 MWe and >100 MWe? Please provide evidence to support your response.

2.27. Table 6 summarises the overall efficiency requirements in NCV and GCV terms for each of the CHPQA fuel and size categories.

Table 6: Summary of minimum overall efficiency requirements for CHPQA Standard to meet EED requirements

CHPQA fuel category	Electrical capacity	Min overall efficiency threshold (NCV)	Min overall efficiency threshold (GCV)
Natural Gas	≤1MWe	N/A	N/A
	>1 to ≤10MWe		
	>10 to ≤25MWe		
	>25 to ≤50MWe	70%	63.09%
	>50 to ≤100MWe		
	>100 to ≤200MWe		
	>200 to ≤500MWe		
	>500MWe		
Oil	≤1MWe	N/A	N/A
	>1 to ≤25MWe		
	>25MWe	70%	65.81%
Coal	≤1MWe	N/A	N/A
	>1 to ≤25MWe		
	>25MWe	70%	66.50%
Fuel Cells	All	70%	63.09%
A and B	≤1MWe	N/A	N/A
	>1 to ≤25MWe		
	>25MWe	70%	63.06%
C and D	≤1MWe	N/A	N/A
	>1 to ≤25MWe		
	>25MWe	70%	66.49%
E	≤1MWe	N/A	N/A
	>1 to ≤10MWe		
	>10 to ≤25MWe		
	>25MWe	70%	66.49%
F, G and H	≤1MWe	N/A	N/A
	>1 to ≤10MWe		
	>10 to ≤25MWe		
	>25 to ≤100MWe	70%	66.49%
	>100MWe		
I	≤1MWe	N/A	N/A
	>1 to ≤25MWe		
	>25MWe	70%	63.06%
J	≤1MWe	N/A	N/A
	>1 to ≤25MWe		
	>25MWe	70%	66.50%
K	≤1MWe	N/A	N/A
	>1 to ≤25MWe		
	>25MWe	70%	66.49%

2.28. To develop revised coefficients the limiting case assumptions shown in Table 7 have been employed. Assumptions of the maximum condensing efficiency and ***Z ratio*** for each fuel/size category are based on performance data from existing CHP Schemes under the CHPQA and proposed Schemes certified on the basis of design data.

Table 7: Quality Index Review – Limiting Case Input Assumptions

CHPQA fuel category	Electrical capacity	Prime mover technology	Maximum condensing electrical efficiency (GCV)	Z Ratio
Natural Gas	≤1MWe	Reciprocating engine/ gas turbine	34.2%	N/A
	>1 to ≤10MWe		34.2%	
	>10 to ≤25MWe		36.1%	
	>25 to ≤50MWe	Reciprocating engine/ gas turbine	38.0%	
	>50 to ≤100MWe	CCGT	42.8%	5
	>100 to ≤200MWe		45.1%	
	>200 to ≤500MWe		47.5%	
	>500MWe		48.0%	
Oil	≤1MW	Reciprocating engine/ gas turbine	34.2%	N/A
	>1 to ≤25MWe		38.0%	
	>25MWe		38.0%	
Coal	≤1MW	Pass-out condensing steam turbine	28.5%	6
	>1 to ≤25MWe		38.0%	
	>25MWe		38.0%	
Fuel Cells	All	Fuel Cell	34.2%	N/A
A	≤1MW	Reciprocating engine/ gas turbine	36.9%	N/A
	>1 to ≤25MWe		39.0%	
	>25MWe		39.0%	
B	≤1MW	Reciprocating engine/ gas turbine	32.0%	N/A
	>1 to ≤25MWe		34.0%	
	>25MWe		34.0%	
C	≤1MW	Reciprocating engine/ gas turbine	38.9%	N/A
	>1 to ≤25MWe		38.9%	
	>25MWe		38.9%	
D and K	≤1MW	Reciprocating engine/ gas turbine	38.9%	N/A
	>1 to ≤25MWe		38.9%	
	>25MWe		38.9%	
E	≤1MWe	Biomass air turbine/ ORC†	23.0%	N/A
	>1 to ≤10MWe	Pass-out condensing steam turbine/ ORC†	25.0%	6.0
	>10 to ≤25MWe	Pass-out condensing steam turbine	25.8%	
	>25MWe		25.9%	
F	≤1MWe	Biomass air turbine/ ORC†	25.4%	N/A
	>1 to ≤10MWe	Pass-out condensing steam turbine/ ORC†	27.0%	6.0
	>10 to ≤25MWe	Pass-out condensing steam turbine	30.7%	
	>25 to ≤100MWe		31.8%	
	>100MWe		38.6%	
G	≤1MWe	Biomass air turbine/ ORC†	25.4%	N/A
	>1 to ≤10MWe	Pass-out condensing steam turbine / ORC†	28.2%	6.0
	>10 to ≤25MWe	Pass-out condensing steam turbine	30.7%	
	>25 to ≤100MWe		31.8%	
	>100MWe		38.6%	
H	≤1MWe	Biomass air turbine/ ORC†	25.4%	N/A
	>1 to ≤10MWe	Pass-out condensing steam turbine / ORC†	31.0%	6.0
	>10 to ≤25MWe	Pass-out condensing steam turbine	31.0%	
	>25 to ≤100MWe		33.0%	
	>100MWe		38.6%	
I	>1 to ≤10MWe	Reciprocating engine/ gas turbine	28.5%	N/A
	>10 to ≤25MWe		31.4%	
	>25MWe		33.3%	
J	>1 to ≤10MWe	Reciprocating engine/ gas turbine	28.5%	N/A
	>10 to ≤25MWe		31.4%	
	>25MWe		33.3%	

† Organic Rankine Cycle

Stakeholder Question	
4.	Do you agree with the assumed efficiencies when operating in full condensing mode (i.e. with no heat extraction)? Please provide evidence to support your response.

Derivation Steps

2.29. The following presents an overview of the steps undertaken to derive the value of the X (power) and Y (heat) coefficients for each fuel/plant size category.

2.30. For natural gas categories it is the reference heat efficiencies rather than electrical efficiencies that have changed most significantly. It is therefore proposed that Y values for natural gas be reduced from 115 to 113. It is proposed that Y values for oil and coal be retained at 115, and set to 120 for fuel cells and all non-conventional fuel categories.

2.31. Given these proposed Y values, X values must be set low enough to ensure that Schemes when in operation cannot achieve a QI greater than 100 without meeting the minimum PES and overall efficiency requirements.

2.32. The X value that results in QI equalling 100 varies over the spectrum of possible power and heat efficiencies. The required X value is the minimum required for any possible combination. For each fuel and size category, this has been determined by:

(i). Calculating the heat efficiency required for Schemes to achieve the minimum PES threshold at a power efficiency of 20% (the minimum threshold for Good Quality CHP), then calculating the X value which would give QI = 100 for these power and heat efficiencies, and rounding the X value down to the nearest whole number.

(ii). Calculating the heat efficiency required for Schemes to achieve the minimum PES threshold at the maximum possible electrical efficiency where this can occur, then calculating the X value which would give QI = 100 for these power and heat efficiencies and rounding the X value down to the nearest whole number.

(iii). For Schemes with installed capacity greater than 25 MWe, calculating the minimum heat and maximum electrical efficiency combination[16] required for Schemes to achieve the minimum overall efficiency threshold of 70% (NCV), then calculating the X value that would give QI = 100 for these power and heat efficiencies, and rounding the X value down to the nearest whole number.

(iv). Selecting the minimum of the X values as calculated in (i), (ii) and (iii), or the existing X value if still appropriate.

2.33. The proposed X coefficients resulting from these calculations are shown below alongside the existing values in Tables 8, 9 and 10; changes are shown shaded. Table 8 shows that for natural gas fired Schemes, the change in X values is minimal and only affects Schemes in the size range of 1 to 25 MWe. The main changes are to the X values for fuel categories F, G and H as shown in Table 10.

[16] Since X is larger than Y, the maximum QI which can be achieved for a given overall efficiency occurs at the maximum electrical efficiency and minimum heat efficiency corresponding to the overall efficiency threshold.

Table 8: Current and proposed X and Y values for the CHPQA Standard - fossil fuels

	Current Standard (Issue 5)		Proposed Standard (Issue 6)	
Size Range	***X***	***Y***	***X***	***Y***
Natural gas (incl. Reciprocating Engines)				
≤1 MWe	249	115	249	113
>1 to ≤10 MWe	195	115	194	113
>10 to ≤25 MWe	191	115	189	113
>25 to ≤50 MWe	186	115	186	113
>50 to ≤100 MWe	179	115	179	113
>100 to ≤200 MWe	176	115	176	113
>200 to ≤500MWe	173	115	173	113
>500 MWe	172	115	172	113
Oil				
≤1 MWe	249	115	249	115
>1 to ≤25 MWe	191	115	191	115
>25 MWe	176	115	176	115
Coal				
≤1 MWe	249	115	249	115
>1 to ≤25 MWe	191	115	191	115
>25 MWe	176	115	176	115

Table 9: Current and proposed X and Y values for the CHPQA Standard - special cases

	Current Standard (Issue 5)		Proposed Standard (Issue 6)	
Size Range	***X***	***Y***	***X***	***Y***
Fuel Cells				
All	180	120	175	120

Table 10: Current and proposed X and Y values for the CHPQA Standard - alternative fuels

	Current Standard (Issue 5)		Proposed Standard (Issue 6)	
Size Range	***X***	***Y***	***X***	***Y***
Category A (e.g. AD gas, sewage gas, landfill gas)				
≤1 MWe	238	120	238	120
>1 to ≤ 25MWe	225	120	225	120
>25 MWe	193	120	182	120
Category B (e.g. synthesis gas)				
≤1 MWe	275	120	275	120
>1 to ≤25 MWe	251	120	218	120
>25 MWe	193	120	191	120
Category C e.g. Fatty Acid Methyl Ester, Pyrolysis oil etc.)				
≤1 MWe	245	120	226	120
>1 to ≤ 25MWe	191	120	191	120
>25 MWe	176	120	171	120

	Current Standard (Issue 5)		Proposed Standard (Issue 6)	
Size Range	***X***	***Y***	***X***	***Y***
Category D (e.g. Tallow, Used Cooking Oil)				
≤1 MWe	245	120	226	120
>1 to ≤ 25MWe	226	120	226	120
>25 MWe	176	120	171	120
Category E (e.g. Municipal waste, sewage sludge, paper sludge etc.)				
≤ 1MWe	370	120	370	120
>1 to ≤10 MWe	370	120	370	120
>10 to ≤25 MWe	370	120	364	120
>25 MWe	220	120	220	120
Category F (e.g. Logs, Energy crops, Agricultural residues etc.)				
≤1 MWe	348	130	346	120
>1 to ≤10 MWe	348	130	339	120
>10 to ≤25 MWe	348	130	303	120
>25 to ≤100 MWe	220	120	201	120
>100 MWe	220	120	181	120
Category G (e.g. Contaminated waste wood)				
≤1 MWe	352	120	346	120
>1 to ≤10 MWe	338	120	331	120
>10 to ≤25 MWe	338	120	303	120
>25 to ≤100 MWe	220	120	201	120
>100 MWe	220	120	181	120
Category H (e.g. Wood pellets, straw, clean waste wood etc.)				
≤1 MWe	329	120	329	120
>1 to ≤10 MWe	293	120	257	120
>10 to ≤25 MWe	286	120	250	120
>25 to ≤100 MWe	220	120	196	120
>100 MWe	220	120	181	120
Category I: By-product gases (e.g. blast furnace gas, coke oven gas, refinery fuel gas, hydrogen, ethane, propane etc.)				
≤1 MWe	294	120	294	120
>1 to ≤ 25MWe	221	120	221	120
>25 MWe	193	120	193	120
Category J: Waste gases (e.g.CO, VOCs) and Waste heat (e.g. from high temperature processes or exothermic chemical reactions).				
≤1 MWe	329	120	329	120
>1 to ≤25 MWe	299	120	299	120
>25MWe	193	120	193	120
Category K: (liquid waste-non-renewable)				
≤1 MWe	275	120	275	120
>1 to ≤25 MWe	260	120	260	120
>25 MWe	176	120	171	120

Stakeholder Question	
5.	Do you agree with the proposed X and Y coefficients for the CHPQA Standard? Please provide evidence to support your response.

Impact of the revised Standard X and Y coefficients

2.34. It is proposed that X and Y values for existing Schemes be grandfathered as outlined in Chapter 4. However, to illustrate the likely impact of the proposed Standard X and Y values on new Schemes, the impact of applying the proposed changes to existing certified Schemes in their first year of operation or in design has been assessed. Note that these impacts are for illustrative purposes only and do not reflect reality.

2.35. The results for non-renewable and renewable Schemes are presented in Tables 11 and 12 respectively. Each table breaks the Schemes down into four categories:

1. Those currently with a QI greater than 100, and are greater or equal to 100 with the proposed X and Y values;
2. Those where QI does not change;
3. Those where the QI falls from 100 or more to below 100; and
4. Those where the QI is less than 100 currently and is lower still with the proposed X and Y values.

2.36. Each table shows the total number of Schemes in each of these categories, the Total Power Capacity (TPC), Total Power Output (TPO), the current and proposed Qualifying Power Output (QPO), and the ratio of QPO to TPO.

Table 11: Illustrative impact of applying proposed CHPQA Standard changes to non-renewable Schemes in their first year of operation or in design.

Category	Number of Schemes	TPC MWe	TPO MWh	Current QPO MWh	Proposed QPO MWh	Current QPO/TPO	Proposed QPO/TPO
1. QI remaining ≥100	93	128.4	687,312	687,312	687,312	100%	100%
2. QI unchanged	0	0	0	0	0	0%	0%
3. QI falling from ≥100 to <100	3	3.3	14,290	14,290	14,107	100%	99%
4. QI falling from <100 to <<100	13	7.7	24,546	18,691	18,391	76%	75%
Total	**109**	**139.5**	**726,148**	**720,293**	**719,810**	**99%**	**99%**

2.37. Schemes qualify for the CCL CHP exemption on QPO. In this assessment, the majority of non-renewable CHP is in Category 1 and so unaffected by the proposed changes, with all power generated continuing to quality for the CCL exemption. The smaller numbers of Schemes in Categories 3 and 4 are affected by a small drop in QPO under the revised X and Y values; similar Schemes in the future would experience a slightly lower eligibility for the CCL exemption than currently.

2.38. Overall most non-renewable Schemes developed in the future are unlikely to be affected, but the proposed changes will increase the pressure for Schemes to be designed in line with the heightened EED efficiency standards.

Table 12: Impact of retrospectively applying proposed CHPQA Standard changes to renewable Schemes in their first year of operation or in design.

Category	No. of Schemes	TPC MWe	TPO MWh	Current QPO MWh	Proposed QPO MWh	Current QPO/TPO	Proposed QPO/TPO
1. QI remaining ≥100	21	74.8	543,051	543,051	543,051	100%	100%
2. QI unchanged	36	189.2	1,202,836	300,034	300,034	25%	25%
3. QI falling from ≥100 to <100	7	112.1	835,460	835,460	547,722	100%	66%
4. QI falling from <100 to <<100	16	580.8	4,203,823	400,482	298,983	10%	7%
Total	**80**	**957.1**	**6,785,169**	**2,079,027**	**1,689,790**	**31%**	**25%**

2.39. QPO under the CHPQA Standard is of little consequence to renewable Schemes whose main benefits are determined by their performance under GN44 rather than the Standard. The changes to GN44 and impacts of these are discussed in the next section.

2.40. Table 13 shows the impact on individual Schemes that were certified in 2015 and passed the QI threshold despite not meeting the minimum PES threshold[17]. With the proposed X and Y values, these Schemes would have failed the QI threshold, demonstrating that the proposed X and Y values should address this issue for Schemes developed in the future.

Table 13: Impact on individual Schemes passing QI threshold based on current Standard X and Y coefficients without meeting minimum PES threshold

CHPQA Category	Capacity MWe	Electrical efficiency (GCV)	Heat efficiency (GCV)	PES	Total efficiency NCV	Current QI	"Proposed" QI	Proposed QPO/TPO
Natural gas and Oil	1.2	21.9%	50.5%	9.8%	80.4%	100.8	99.6	99%
F	24.0	22.8%	18.8%	9.3%	43.8%	103.8	91.6	56%
F	3.1	11.7%	46.3%	5.5%	61.1%	100.9	95.2	92%
F and G	24.0	26.2%	8.5%	8.6%	36.5%	100.0	89.6	34%

Derivation of X and Y coefficients for Guidance Note 44

2.41. The derivation method for GN44 is the same as for the Standard, except that the overall efficiency requirement for >25 MWe Schemes is 35% GCV rather than 70% NCV, and there is an additional requirement to ensure Schemes do not achieve a QI equal or greater than 100 with a heat efficiency of less than 10%. Table 14 summarises the minimum overall and heat efficiency requirements for GN44.

Table 14: Summary of minimum heat and overall efficiency requirements for GN44

CHPQA category	Electrical Capacity	Min overall efficiency threshold (GCV)	Min heat efficiency threshold (%GCV)
A and B	≤1MWe	n/a	10%
	>1 to ≤25MWe		
	>25MWe	35.00%	
C and D	≤1MWe	n/a	
	>1 to ≤25MWe		
	>25MWe	35.00%	
E	≤1MWe	n/a	
	>1 to ≤10MWe		
	>10 to ≤25MWe		
	>25MWe	35.00%	
F, G and H	≤1MWe	n/a	
	>1 to ≤10MWe		
	>10 to ≤25MWe		
	>25 to ≤100MWe	35.00%	
	>100MWe		

[17] All schemes are >1 MWe so the PES threshold is 10%. Regarding the overall efficiency requirement, no >25 MWe schemes greater than 25 MWe passed the QI threshold with an overall efficiency less than the threshold.

2.42. For each fuel and size category, the necessary X value has been determined by:

(i). Taking, as calculated for the Standard, the two X values required to achieve QI = 100: one where PES = the minimum threshold at a power efficiencies of 20%; and the other where PES = the minimum threshold at the maximum possible power efficiency.

(ii). For >25 MWe Schemes only, calculating the minimum heat and maximum electrical efficiency combination[18] required for Schemes to achieve the minimum overall efficiency threshold of 35% GCV. Then calculating the X value that would give QI = 100 for these power and heat efficiencies, and rounding the X value down to the nearest whole number.

(iii). Calculating the X value that would give QI = 100 for a heat efficiency of 10% GCV and the maximum possible power efficiency.

(iv). Selecting the minimum of these X values and the existing X value.

2.43. The proposed X and Y coefficients resulting from these calculations are shown alongside the existing values in Table 15; changes are shown shaded.

Table 15: Current and proposed X and Y values for GN44

	Current GN44 (Issue 5)		Proposed GN44 (Issue 6)	
Size Range	***X***	***Y***	***X***	***Y***
Category A (e.g. AD gas, sewage gas, landfill gas)				
≤1MWe	238	120	238	120
>1 to ≤25MWe	225	120	225	120
>25MWe	193	120	193	120
Category B (e.g. synthesis gas)				
≤1MWe	275	120	275	120
>1 to ≤25MWe	251	120	218	120
>25MWe	193	120	193	120
Category C e.g. Fatty Acid Methyl Ester, Pyrolysis oil etc.)				
≤1MWe	245	120	226	120
>1 to ≤25MWe	191	120	191	120
>25MWe	176	120	176	120
Category D (e.g. Tallow, Used Cooking Oil)				
≤1MWe	245	120	226	120
>1 to ≤25MWe	226	120	226	120
>25MWe	176	120	176	120
Category E (e.g. Municipal waste, sewage sludge, paper sludge etc.)				
≤1MWe	370	130	370	120
>1 to ≤10MWe	370	130	370	120
>10 to ≤25MWe	370	130	364	120
>25MWe	350	130	350	120

[18] Because X is larger than Y, the maximum QI which can be achieved for a given overall efficiency occurs at the maximum electrical efficiency and minimum heat efficiency corresponding to the overall efficiency threshold.

	Current GN44 (Issue 5)		Proposed GN44 (Issue 6)	
Size Range	***X***	***Y***	***X***	***Y***
Category F (e.g. Logs, Energy crops, Agricultural residues etc.)				
≤1MWe	348	130	346	120
>1 to ≤10MWe	348	130	339	120
>10 to ≤25MWe	348	130	303	120
>25 to ≤100MWe	338	130	292	120
>100MWe	338	130	238	120
Category G (e.g. Contaminated waste wood)				
≤1MWe	352	120	346	120
>1 to ≤10MWe	338	120	331	120
>10 to ≤25MWe	338	120	303	120
>25 to ≤100MWe	318	120	292	120
>100MWe	318	120	238	120
Category H (e.g. Wood pellets, straw, clean waste wood etc.)				
≤1MWe	329	120	329	120
>1 to ≤10MWe	293	120	257	120
>10 to ≤25MWe	286	120	250	120
>25 to ≤100MWe	279	120	245	120
>100MWe	279	120	234	120

Stakeholder Question	
6.	Do you agree with the proposed X and Y coefficients for Guidance Note 44? Please provide evidence to support your response.

Impact of the revised GN44 X and Y coefficients

2.44. To illustrate the likely impact of the proposed GN44 X and Y values on new Schemes, the impact of applying the proposed changes to existing certified Schemes in their first year of operation or in design has been assessed. Please note that these impacts are for illustrative purposes only and do not reflect reality.

2.45. In a similar way to Table 12 for the Standard X and Y values, Table 16 below shows the impact of the proposed changes to GN44 (GN44) on the QPO from renewable Schemes. Under GN44, the QPO/TPO ratio determines the proportion of power eligible for ROCs and is a factor relevant to the calculation of total payments to be made under CFD agreements in relation to which the CHP Qualifying Multiplier is expressed to apply.

Table 16: Illustrative impact of applying proposed GN44 changes to renewable Schemes in their first year of operation or in design.

Category	Number of Schemes	TPC MWe	TPO MWh	Current QPO MWh	Proposed QPO MWh	Current QPO/TPO	Proposed QPO/TPO
1. QI remaining ≥100	21	74.8	543,051	543,051	543,051	100%	100%
2. QI unchanged	33	41.0	224,347	190,156	190,156	85%	85%
3. QI falling from ≥100 to <100	10	488.0	3,758,058	3,758,058	819,128	100%	22%
4. QI falling from <100 to <<100	16	353.2	2,259,713	1,115,323	807,547	49%	36%
Total	**80**	**957.1**	**6,785,169**	**5,606,588**	**2,359,883**	**83%**	**35%**

2.46. For the recent renewable Schemes assessed, most fall within in Categories 1 or 2 where QPO/TPO is unaffected by the proposed changes. However around 90% of the power capacity of these recent Schemes falls within Categories 3 and 4.

2.47. For Schemes in Categories 3 and 4 the proposed changes significantly reduce the proportion of QPO to TPO. This reflects the fact that currently a significant amount of power from certified biomass Schemes is QPO despite Schemes failing to meet the minimum PES threshold, the heat efficiency threshold of 10% GCV or, for Schemes >25 MWe, the overall efficiency threshold of 35%. The proposed changes are designed to address this and are fully in line with UK Government policy.

2.48. Table 17 below shows the impact on individual Schemes certified in 2015 that passed the QI threshold despite not meeting the PES or efficiency criteria. PES and efficiencies that do not meet the minimum thresholds are highlighted.

Table 17: Impact on renewable Schemes passing QI threshold based on the current GN44 X and Y coefficients without meeting PES and/or efficiency criteria

CHPQA Category	Capacity MWe	Electrical efficiency (GCV)	Heat efficiency (GCV)	PES	Total efficiency (GCV)	Current QI	Proposed QI	Proposed QPO/TPO
F	30.0	31.2%	***5.1%***	17.9%	36.3%	112.1	97.2	46%
F	24.0	22.8%	18.8%	***9.3%***	41.6%	103.8	91.6	56%
F	3.1	11.7%	46.3%	***5.5%***	58.0%	100.9	95.2	92%
G	50.0	32.0%	***1.6%***	16.7%	***33.6%***	103.7	95.4	18%
F and G	24.0	26.2%	***8.5%***	***8.6%***	34.7%	100.0	89.6	34%
H	300.0	39.3%	***0.4%***	11.0%	39.7%	110.1	92.4	4%

Impact on Schemes using the Safeguard provision

2.49. A Scheme meeting all of the PES and efficiency criteria but that fails to meet the QI threshold of 100 can use the Safeguard Provision set out in GN44.

2.50. The Quality Index (QI) is the established approach to Good Quality CHP certification in the UK. It offers the benefit of a well understood scale-back mechanism for partially qualifying plant. However, on its own the QI approach cannot perfectly ensure that all Schemes meeting the PES and efficiency criteria will achieve a QI of 100, whilst at the same time Schemes failing to meet the criteria do not achieve a QI of 100.

2.51. The proposed GN44 X and Y values have been developed to preclude Schemes that do not meet the criteria from achieving a QI of 100. However, some Schemes that do meet the criteria fail to achieve a QI of 100 under these formulae. To avoid unfairly disadvantaging these, a safeguard provision already exists to allow such Schemes a QI of 100 if they can demonstrate they meet the criteria, regardless of the results from the

formulae. This is implemented by recalculation of the X coefficient, based on determination of the operating point at which a Scheme would just meet the PES and efficiency criteria in order to give a QI of 100 at this point. This is a once-only event based on a Scheme's design data with the revised X coefficient used to calculate QI and QPO in the normal way for at all operating conditions for its lifetime.

2.52. Recent Schemes that would be eligible to apply for the safeguard are shown in Table 18.

Table 18: Impact on renewable Schemes eligible for safeguard based on the current and proposed GN44 X and Y coefficients

CHPQA Category	Capacity MWe	Electrical efficiency (GCV)	Heat efficiency (GCV)	PES	Total efficiency GCV	Proposed QI without applying safeguard
A and natural gas	6.0	30.3%	28.1%	17.0%	58.4%	99.3
A	0.3	28.9%	25.0%	19.6%	53.9%	98.8
F	15.0	19.7%	32.1%	13.9%	51.8%	98.2
F	13.0	23.0%	19.5%	10.6%	42.5%	93.1
F	11.0	17.3%	36.0%	10.9%	53.3%	95.6
G	22.0	28.7%	10.0%	17.2%	38.7%	99.0

3. Clarification of definitions

3.1. The CHPQA Standard and relevant Guidance Notes are being reviewed to identify where definitions of terminology can be made clearer or further definitions usefully added. This exercise is not intended to change the CHPQA's interpretation of the Standard or Guidance Notes, merely to provide greater clarity to CHP operators and developers, and smooth the administration of the CHPQA Scheme.

CHP Total Fuel Input

3.2. ***CHP Total Fuel Input (CHP_{TFI})*** is currently defined in the CHPQA Standard as:

"*the total registered annual fuel input to a CHP Scheme (MWh), based on GCV."*

3.3. It is proposed to expand this definition to avoid any doubts as to the meaning, thus:

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

Initial Operation and Annual Operation

3.4. ***Initial Operation*** (IO) is currently defined in the CHPQA Standard as:

*"the period that commences when the **Responsible Person** notifies the Administrator that the Scheme in question has begun operating. For a Scheme serving an individual user or site, IO ends after the first complete **Annual Operation (AO)**. For a Scheme serving Community Heating, Initial Operation ends after the first two complete AOs."*

Where:

"Annual Operation (AO) is the period commencing on 1st January and finishing on 31st December and is normally 8,760 hours except for leap years."

3.5. To clarify the meaning of Initial Operation, it is proposed to expand the definition thus:

"Initial Operation (IO) is the period that commences when the Scheme in question has begun operating as CHP, generating electricity and at the same time supplying heat to one or more users. For the purpose of CCL exemption, and the use of a QI threshold of 95, a CHP Scheme serving an individual user or site ends IO after the first complete AO. For a CHP Scheme serving Community Heating or a District Heating network, Initial Operation ends after the first two complete AOs."

And:

"Annual Operation (AO) represent the calendar year when the Scheme is in operation; the period from 1st January to 31st December inclusive."

Operational

3.6. It is proposed to add the following additional definition:

> *"**Operating** or **operational** in respect of a CHP Scheme means that the Scheme is generating power and supplying useful heat to one or more heat users for at least one month."*

	Stakeholder Question
7.	Do you find the definitions provided clear? If not, why not?
8.	Are there any other definitions that you think need to be clarified or added to the CHPQA Standard?

4. Implementation of changes

X and Y values

4.1. The revised X and Y values will be implemented through the publication of new issues of the CHPQA Standard (Issue 6) and Guidance Note 44 (Issue 6). It is intended that these will be published on the CHPQA web-pages during July of this year, and we will inform Stakeholders once these are available.

4.2. Amendments will be made to legislation as necessary to give effect to the new CHPQA Standard and GN44, including:

i) The Renewables Obligation Order 2015 (RO Order 2015);

ii) The Renewables Obligation (Scotland) Order 2009, as amended;

iii) The Renewables Obligation Order (Northern Ireland) 2009, as amended;

iv) Renewables Obligation (Closure) Order 2014

v) Renewable Heat Incentive Scheme Regulations 2011

vi) Contracts for Difference (Definition of Eligible Generator) Regulations 2014

vii) Climate Change Levy (Combined Heat and Power Stations) Exemption Certificate Regulations 2001

viii) Climate Change Levy (General) Regulations 2001

ix) Climate Change Levy (Combined Heat and Power) Regulations 2005

x) The Emissions Performance Standard Regulations 2015

xi) Guarantees of Origin of Electricity Produced from High-efficiency Cogeneration Regulations 2007

xii) Hydrocarbon Oils Duties (Reliefs for Electricity Generation) Regulations 2005

New Schemes from 1 January 2017

4.3. It is DECC's intention that the new X and Y values will apply to all new Schemes that receive an F3 or an F4 CHPQA certificate on or after 1st January 2017, where they have not received an F3 or an F4 certificate prior to 1st January 2016. This is because the design of the CHPQA scheme means plants' operational performance in 2016, which the EU states should be covered by the updated energy efficiency standards, will not be used in the CHPQA's F4 assessments until 1st January 2017.

Existing Schemes before 1 January 2016

4.4. Existing schemes that received an F3 or an F4 CHPQA certificate prior to 1st January 2016 on the basis of existing X and Y values will continue to receive CHPQA certification on the basis of those values going forward (i.e. be 'grandfathered'), subject to any change necessitated by EU legislation.

Schemes accredited between 1st January and 31st December 2016

4.5. DECC proposes that all new Schemes that received an F3 CHPQA certificate for the first time between 1st January and 31st December 2016 on the basis of existing X and Y values will, on or after 1st January 2017, have the new X and Y values applied to them, subject to any changes required by EU legislation.

4.6. Schemes that received an F4 CHPQA certificate for the first time between 1st January and 31st December 2016 will be treated as existing schemes, and so will also continue to receive CHPQA certification on the basis of those values going forward (i.e. be 'grandfathered'), subject to any change necessitated by EU legislation.

Stakeholder Question	
9.	Do you agree with the proposed grandfathering arrangements? If not please provide evidence.

Clarification of definitions

4.7. Any modified definitions will be incorporated within Issue 6 of the CHPQA Standard and revised Guidance Notes as appropriate. The definitions will apply from the date of publication.

Renewable Heat Incentive (RHI) and support for CHP

4.8. A dedicated tariff for new solid biomass-CHP plant was introduced into the Non-Domestic RHI scheme in May 2014.

4.9. To be eligible for this specific solid biomass CHP-tariff, systems must be certified under the CHPQA scheme.

4.10. As such, and subject to the proposed grandfathering arrangements outlined above, new solid biomass-CHP plants coming forward will need to meet the requirements of the updated CHPQA scheme in order to be eligible for the solid biomass-CHP tariff under the RHI scheme. RHI Regulations will be updated to reflect this requirement.

Renewables Obligation (RO) and support for CHP

4.11. The RO works on the basis of three complementary obligations on suppliers, one covering England and Wales, and one each covering Scotland and Northern Ireland. The RO is implemented through legislation which includes the rules on eligible technologies (including CHP), accreditation, and the support levels (called "bands") for different ways of generating electricity. The key pieces of legislation are:

- In England and Wales, the Renewables Obligation Order 2015 (RO Order 2015);
- In Scotland, the Renewables Obligation (Scotland) Order 2009, as amended. (RO Order Scotland); and

- In Northern Ireland, the Renewables Obligation Order (Northern Ireland) 2009, as amended (RO Order Northern Ireland).

Current support for renewable CHP under the RO

4.12. Although the RO is focused on support for electricity generation, CHP stations may, in certain circumstances, claim additional support under the RO via separate CHP ROC bands. This support is provided in acknowledgement of the additional capital costs of CHP plant and the additional energy and CO2 savings they deliver.

4.13. From 1 April 2015 onwards in Great Britain (and from 1 October 2015 in Northern Ireland), CHP stations, and additional capacity added to existing stations, are only eligible for one of the specific CHP support bands if their technology or fuel is **not** eligible for support under the Renewable Heat Incentive (RHI). If they **are** eligible under the RHI, they can only apply for the electricity support bands under the RO, but they can apply for support for heat use under the RHI. Ofgem has published details of the technologies and fuels available for support under the RHI[19]

4.14. The support available under the RO for eligible CHP stations depends on the technology used, the accreditation date of the station (or the additional capacity added), and its geographical location. Full details are set out in the Renewables Obligation Orders for each country[20] and in Ofgem's guidance note[21].

4.15. To be eligible for one of the specific CHP ROC bands, a station must comply with the definition of a "qualifying CHP station" as set out in the RO Orders. A qualifying CHP station is a CHP station which has been certified under the CHPQA. Currently, the CHPQA is defined by reference to Issue 5 of the CHPQA Standard and Guidance Note 44.

CHP technologies under the RO that do not need to comply with the CHPQA standards

4.16. The following technologies receive the same support under the RO for generation of electricity through CHP generation as they would for generating electricity without CHP:

- Advanced conversion technologies of gasification or pyrolysis;
- Anaerobic digestion;
- Landfill gas; and
- Sewage gas.

4.17. These technologies are not required under the RO to demonstrate that the CHP station is a qualifying CHP station. Such stations are therefore **not** affected by the proposed change to the CHPQA Standard.

CHP technologies under the RO that may need to comply with the CHPQA standards

[19] Tariffs that apply for Non-Domestic RHI for Great Britain: https://www.ofgem.gov.uk/environmental-programmes/non-domestic-renewable-heat-incentive-rhi/tariffs-apply-non-domestic-rhi-great-britain
The RHI in Northern Ireland has been suspended to new applications from 29 February 2016.

[20] The RO Orders for England and Wales, Scotland and Northern Ireland are available at: http://www.legislation.gov.uk/title/renewables%20obligation?page=1

[21] Ofgem's guidance: Renewables Obligation: Guidance for Generators: https://www.ofgem.gov.uk/sites/default/files/docs/ro_guidance_for_generators.pdf

4.18. The following CHP technologies are not eligible to receive the RHI but they are 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):

- High, mid and low-range co-firing CHP;
- 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, as the NI RHI is currently suspended);
- Dedicated bioliquid CHP; and
- Energy from waste CHP.

4.19. These technologies must therefore demonstrate that the station is a qualifying CHP plant in order to be eligible for the additional support. Such stations may therefore be affected by the proposed change to the CHPQA Standard.

4.20. In practice however, the proposed new Issue 6 of the CHPQA Standard and revised Guidance Note 44 is likely to have a limited impact on the RO. Of the technologies required to demonstrate compliance with the new Standard, it is likely that the only new stations (or additional capacity) will be dedicated biomass with CHP in Northern Ireland, dedicated bioliquid CHP throughout the UK, and energy from waste CHP throughout the UK. In addition, the time available for new stations to accredit under the RO is limited.

4.21. In general, the RO closes to new capacity on 31 March 2017. However, grace periods extend the closure date for new and additional capacity for certain technologies in certain situations.

4.22. The relevant grace periods available to CHP projects that are: (a) not eligible to receive the RHI; and (b) are required under the RO to demonstrate that they are a qualifying CHP station if they wish to receive a CHP ROC band; are as follows:

- Enabling financial decisions grace period: an 18 month grace period available to dedicated biomass CHP projects (and so relevant to bioliquid CHP projects) that had demonstrated evidence of substantial financial decisions and investments by a specified date (available in Great Britain only);
- Grid connection delay grace period: a 12-month grace period for all technologies to address grid connection delays;
- Signed investment contracts grace period: a 12-month grace period for dedicated biomass with CHP projects which signed an investment contract under Final Investment Decision Enabling for Renewables, should these contracts fall away or be terminated for reasons under certain specific circumstances (available in England only).

4.23. The full details are set out in Ofgem's guidance[22].

[22] Ofgem's guidance:
Renewables Obligation: The 'enabling financial decisions' grace period guidance, at:

Applying for CHP ROCs

4.24. In order to be eligible to apply for CHP ROCs under the RO, a station must be issued with a "ROC Eligible" Certificate under the CHPQA programme. This demonstrates that it is a 'qualifying CHP station'. The station will be assessed against the relevant X and Y values as set out in paragraphs 4.3 – 4.6 above.

4.25. In the first year that a generating station is eligible for CHP ROCs, these will be issued from the date that the CHPQA "ROC Eligible" Certificate was issued, provided the CHP station has also been commissioned and the station has been granted accreditation under the RO with Ofgem. For each subsequent year, the station will need to apply to the CHPQA programme for annual renewal of their certification. Ofgem apply this renewal certificate to the new obligation period (1 April – 31 March).

Implementing the updated issue 6 CHPQA standards and revised Guidance Note 44 in the UK Renewables Obligation Orders

4.26. Implementing the proposed updated Issue 6 of the CHPQA Standard and the revised Guidance Note 44 into the RO will require some small technical amendments to the definitions set out in Article 2 of the RO Order 2015, RO Order Scotland and RO Order Northern Ireland.

4.27. Currently, the RO Orders refer to the CHPQA as set out in the table below.

	England and Wales	Scotland & Northern Ireland
Definition of CHPQA	"CHPQA" means the Combined Heat and Power Quality Assurance Standard, Issue 5 published by the Department of Energy and Climate Change in November 2013 and Guidance Note 44 (Use of CHPQA to obtain support for electrical output from renewable CHP under the renewables obligation), Issue 4, published by the Department of Energy and Climate Change in December 2013	
Other definitions relevant to the CHPQA definition	"qualifying CHP station" means a CHP station which has been certified under the CHPQA; "qualifying power output", in relation to a qualifying CHP station, has the meaning given to it in the CHPQA; "qualifying proportion", in relation to electricity generated by a qualifying CHP station, is the proportion which the qualifying power output of the station bears to its total power output;	"qualifying combined heat and power generating station" means a combined heat and power generating station which has been accredited under the CHPQA; "qualifying power output" in relation to a qualifying combined heat and power generating station, has the meaning given to [it/them] in the CHPQA; "total power output", in relation to a qualifying combined heat and

https://www.ofgem.gov.uk/publications-and-updates/renewables-obligation-enabling-financial-decisions-grace-period-guidance; and

Renewables Obligation (RO): Guidance on the transition period and closure of the RO, at: https://www.ofgem.gov.uk/publications-and-updates/renewables-obligation-ro-guidance-transition-period-and-closure-ro

	"total power output", in relation to a qualifying CHP station, has the meaning given to it in the CHPQA.	power generating station has the meaning given to it in the CHPQA.

4.28. We therefore propose to amend the definition of CHPQA in Article 2 of the RO Orders for each country to include reference to the revised Issue 6 of the CHPQA Standard and the revised Guidance Note 44.

Implementing the updated Issue 6 CHPQA standards in the Renewables Obligation Closure Order 2014

4.29. The CHPQA standard is also referred to in the Renewables Obligation Closure Order 2014[23], which sets out the closure grace periods available in Great Britain. The relevant articles are as follows:

- Article 2 – Interpretation: This defines CHPQA 3 and 5; and
- Article 8 - The circumstances relating to certain generating stations that have been allocated a place within the dedicated biomass cap on electricity-only generation. It makes reference to situations where a generating station has not been certified under CHPQA 3 or CHPQA 5 at any time before it was commissioned (relevant to England and Wales only).

We therefore propose to amend these Articles to add a reference to CHPQA 6 as well.

4.30. In Northern Ireland, the Renewables Obligation Closure Order (Northern Ireland) 2015[24] sets out the grace periods that are available. For CHP stations, these are the grace periods for grid delays and for advanced conversion technologies. The legislation therefore does not refer to the CHPQA Standard and so does not need to be amended.

Stakeholder Questions	
10.	Do you agree that, under the Renewables Obligation, the proposed Issue 6 of the CHPQA Standard and revised Guidance Note 44 are only likely to be relevant to dedicated biomass with CHP in Northern Ireland, dedicated bioliquid CHP throughout the UK, and energy from waste CHP throughout the UK? If not, please provide evidence to support your response.

11.	Do you agree with our proposal for amending the Renewables Obligation legislation for: a) England and Wales; b) Scotland; and c) Northern Ireland,

[23] The Renewables Obligation Closure Order 2014 is available at: http://www.legislation.gov.uk/uksi/2014/2388/contents/made

[24] The Renewables Obligation Closure Order (Northern Ireland) 2015 is available at: http://www.legislation.gov.uk/nisr/2015/346/contents/made

	to incorporate the updated Issue 6 of the CHPQA Standard and the revised Guidance Note 44? If not, please provide evidence to support your response, and state the country or countries on which you are commenting.

The Contract for Difference (CFD) Regime and Support for CHP

4.31. The Contracts for Difference (Definition of Eligible Generator) Regulations 2014 (the CFD Eligibility Regulations) define the term 'eligible generator' for the purposes of Chapter 2 of Part 2 of the Energy Act 2013. Pursuant to the terms of the Energy Act 2013 only an 'eligible generator' may enter into a CFD with the CFD Counterparty.

4.32. The CFD Eligibility Regulations provide that a generator is an 'eligible generator' to the extent that (amongst other things) it intends to carry out a 'generating activity' in respect of a 'dedicated biomass with CHP station' or 'energy from waste with CHP station' or is 'associated' with a person who intends to carry out such activity.

4.33. In order to constitute a 'dedicated biomass with CHP station' or 'energy from waste with CHP station' for the purposes of the CFD Eligibility Regulations, that station must (amongst other things) be 'accredited under the CHPQA'.

4.34. The CFD Eligibility Regulations define the 'CHPQA' as 'the Combined Heat and Power Quality Assurance Standard, Issue 5, November 2013'. We propose to update this definition to refer to the revised CHPQA Issue 6, once it is in force.

Stakeholder Question	
12.	Do you agree with our proposal for amending the Contracts for Difference (Definition of Eligible Generator) Regulations 2014 to incorporate the updated issue 6 of the CHPQA Standard? If not please explain why.

Appendix 1: Net to gross calorific value conversions

Table A1.1: Conversion between NCV and GCV for various fuels[25]

Fuel	NCV GJ/tonne	GCV GJ/tonne	Ratio of NCG/GCV
Aviation Spirit	45.02	47.39	0.9500
Aviation Turbine Fuel	43.93	46.24	0.9500
Burning Oil	43.90	46.21	0.9500
Coal (domestic)	28.65	30.16	0.9500
Coal (electricity generation)	25.00	26.31	0.9500
Coal (electricity generation - home imports only)	23.96	25.22	0.9500
Coal (industrial)	25.68	27.03	0.9500
Coking Coal	30.24	31.83	0.9500
Diesel	42.91	45.65	0.9400
Fuel Oil	40.70	43.30	0.9400
Gas Oil	42.57	45.29	0.9400
LPG	45.96	49.35	0.9313
Naphtha	45.39	47.78	0.9500
Natural Gas	47.89	53.21	0.9000
Petrol	44.78	47.14	0.9500
Biodiesel (ME)	37.20	38.70	0.9612
Biodiesel (BtL or HVO)	44.00	46.32	0.9499
Bioethanol	26.80	29.70	0.9024
BioETBE	36.30	39.62	0.9162
Biogas	30.00	33.30	0.9009
Biomethane	49.00	54.39	0.9009
CNG	47.89	53.21	0.9000
Grasses/Straw	14.50	15.26	0.9499
LNG	47.89	53.21	0.9000
Wood Chips	14.00	14.74	0.9499
Wood Logs	14.70	15.48	0.9499
Wood Pellets	17.00	17.90	0.9499
Methane (CH_4)	50.00	55.50	0.9009
Carbon Dioxide (CO_2)	0.00	0.00	0.0000

Table A1.2: Conversion assumptions between NCV and GCV for the CHPQA fuel categories

CHPQA Category	Representative fuel	NCV/GCV
Natural gas	Natural Gas	0.9000
Oil	Gas Oil	0.9400
Coal	Coal (industrial)	0.9500
Fuel Cells	Natural Gas	0.9000
A	Biogas	0.9009
B		
C, D and K	Biodiesel (BtL or HVO)	0.9499
E, F, G and H	Wood Chips	0.9499
I	Methane (CH_4)	0.9009
J	Naphtha	0.9500

[25] Based on Government conversion factors for company reporting. (2015 values)