Department of Energy & Climate Change

Government response to the consultation on reviewing the qualification criteria for renewable Combined Heat and Power schemes

Response to the December 2012 consultation and the January 2013 supplementary questions

July 2013

Introduction

Combined Heat & Power (CHP) is an efficient energy conversion process where both heat and electrical power are supplied from a single process. This delivers energy and CO_2 emissions savings compared to separate generation of heat and power from the same fuel. In the UK CHP schemes are eligible for a number of incentives depending on their fuel type, size and the energy savings they deliver. In order to qualify for these incentives CHP schemes must be certified to the CHP Quality Assurance (CHPQA) programme.

Electrical output from biomass, bioliquid, biogas and waste fuelled CHP schemes is eligible for Renewable Obligation Certificates (ROCs) under the Renewables Obligation. With the exception of most types of biogas, such schemes accredited before 31st March 2015 can be eligible for a higher level of support (a CHP ROC band) under the Renewables Obligation compared to power-only plant using the same fuels. This additional support is provided in acknowledgement of the additional capital costs of CHP plant and the additional energy and CO_2 savings they deliver. To qualify as eligible for this support, schemes must be certified by CHPQA. The relevant certification requirements are specified in CHPQA Guidance Note 44.

DECC consulted on amendments to Guidance Note 44, and consequential amendments to other CHPQA documents, from 21st December to 8th March. The consultation proposed tightening the Guidance Note 44 requirements to reflect improvements in the efficiency of renewable CHP schemes since Guidance Note 44 was first developed.

Forty seven consultation responses were received. This document sets out the Government response to the issues raised and the revisions being made to Guidance Note 44 and other CHPQA documents.

Contents

Executive Summary

The Quality Index formulae in CHPQA Guidance Note 44 for renewable CHP, used for the purposes of obtaining a CHPQA ROC Eligible certificate, will be replaced with the following.

	Proposed Quality Index Formulae						
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 =	251 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 =	245 x	η_{power}	+	120	x	η_{heat}
>1 to ≤25MWe	QI =	191 x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	176 x	η_{power}	+	120	x	η_{heat}
Category D (e.g. Tallow, Used Cooking Oil)							
≤1MWe	QI =	245 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}	+	130	x	η_{heat}
>1 to ≤10MWe	QI =	370 x	η_{power}	+	130	x	η_{heat}
>10 to ≤25MWe	QI =	370 x	η_{power}	+	130	x	η_{heat}
>25MWe	QI =	350 x	η_{power}	+	130	x	η_{heat}
Category F (e.g. Logs, Energy crops, Agricultural residues etc)							
≤1MWe	QI =	348 x	η_{power}	+	130	x	η_{heat}
>1 to ≤10MWe	QI =	348 x	η_{power}	+	130	x	η_{heat}
>10 to ≤25MWe	QI =	348 x	η_{power}	+	130	x	η_{heat}
>25MWe	QI =	338 x	η_{power}	+	130	x	η_{heat}
Category G (e.g. Contaminated waste wood)							
≤1MWe	QI =	352 x	η_{power}	+	120	x	η_{heat}
>1 to ≤10MWe	QI =	338 x	η_{power}	+	120	x	η_{heat}
>10 to ≤25MWe	QI =	338 x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	318 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 =	293 x	η_{power}	+	120	x	η_{heat}
>10 to ≤25MWe	QI =	286 x	η_{power}	+	120	x	η_{heat}
>25MWe	QI =	279 x	η_{power}	+	120	x	η_{heat}

The CHPQA Standard specifies different Quality Index formulae for the purposes of determining eligibility for benefits other than ROCs. These formulae are more stringent than those currently used for determining eligibility for ROCs. However in some cases the above revised formulae are now more stringent than those in Issue 3 of the CHPQA Standard (this is the case for <25MW schemes only). In these cases the above formulae will also be used to replace those currently in the Standard.

The following changes will also be implemented in Guidance Note 44;

- A safeguard provision to ensure that all renewable CHP schemes meeting specified minimum heat efficiency, overall efficiency and primary energy saving criteria are guaranteed a Quality Index of 100.

- Grandfathering of the current Guidance Note 44 Quality Index formula for CHP schemes which are able to demonstrate that they reached financial close, or committed to waste contracts, prior to 26th July 2012.

- Grandfathering of the new Guidance Note 44 Quality Index formulae for new schemes. The Quality Index of each scheme will continue to be assessed annually (using the new grandfathered formulae) based on their performance in year.

- Revisions to the fuel type categorisation of renewable CHP schemes. Each category will specify a default list of fuels included. Developers may however submit evidence to the CHPQA administrator in support of an alternative categorisation. This evidence must demonstrate that another category is applicable based on the maximum potential prime mover efficiency and physical state of the fuel (solid, liquid, gaseous).

- Lowering the required Quality Index for schemes which supply heat primarily through a District Heat Network to a Quality Index of 95 for the first 5 years of operation, to support the evolution of such networks.

The revised arrangements will be applied by the CHPQA programme from 1st January 2014.

Main document

1. Quality Index Formulae

Introduction

1.1 Section 5 of the consultation document set out revised Quality Index (QI) formulae for Guidance Note 44, derived using assumptions set out in section 4 of the consultation document. The QI formulae were derived with the objective of satisfying the following three criteria;

i. The minimum primary energy saving requirement of 10% (0% for schemes <1MW electrical capacity).

ii. A new requirement for a minimum heat efficiency of 10%.

iii. An overall efficiency of at least 35% for schemes >25MW electrical capacity.

1.2 For each fuel category, detailed assumptions on the limiting case assumptions e.g. maximum electrical efficiencies of prime mover technology and maximum overall efficiency at minimum electrical efficiency, were used to derive the X and Y coefficients for the proposed QI formulae by iteration in order to satisfy the above three criteria.

$$QI = X\eta_{electrical} + Y\eta_{heat}$$

where $\eta_{electrical}$ = electrical efficiency
η_{heat} = heat efficiency

1.3 Consultees were asked whether they agreed with the proposed X and Y coefficients and to provide data in support of their comments.

Main Messages

1.4 A number of consultees disagreed with the three performance criteria used in deriving the QI formulae. Most of these felt that the 10% heat efficiency was too demanding and that a 5% requirement should be used instead. In particular they noted that even industrial heat loads were seasonal and that an annual average efficiency of 10% implied a higher peak efficiency. A smaller number of consultees felt that these criteria were insufficiently demanding and in particular that a higher overall efficiency requirement should be specified.

1.5 A large number of consultees challenged specific assumptions on maximum potential efficiencies for particular fuel categories. In particular many felt that the maximum efficiency assumed for waste wood fuelled schemes was not reflective of economically viable technology. Several respondents felt that reciprocating engine efficiencies were also overstated especially in the case of biogas and syngas fuelled engines. Similarly several respondents were of the view that efficiencies for waste fuelled plant were also overstated. A few responses felt that the efficiency assumptions for wood fuels were also too high. Some responses suggested that some of the maximum efficiencies used

might be based on a net rather than gross calorific value basis, which would account for them being overstated.

1.6 Several consultees commented that performance of schemes would naturally deteriorate over time and for this reason it was important that efficiency assumptions should reflect average lifetime performance of plant in normal operation, rather than "as new" performance.

1.7 Individual responses also raised a number of interesting points. These included a comment that the "slope" of the proposed formulae was steeper than current formulae, resulting in a more rapid fall-off of support for partially qualified schemes. One response suggested that the 1-25MW band used in many fuel categories was too coarse. A couple of responses proposed alternative approaches to determining qualification rather than using QI formulae based on heat and power efficiency.

Post Consultation Decisions

1.8 Additional support available for CHP is predicated on the additional benefits it delivers over and above power-only projects. The energy and CO_2 savings delivered by CHP relative to separate generation of heat and power from the same fuel increase as the Heat:Power Ratio increases. Reducing the heat efficiency criterion to 5% would therefore reduce the energy and CO_2 savings relative to the proposed 10% criterion. This would limit the benefits of the revised criteria in improving value for money.

1.9 It is true that the 10% heat efficiency criterion applies as an annual average and therefore, accounting for seasonal variation, the peak heat efficiency has to be greater than 10% to meet this criterion. However, more than two thirds of solid and liquid renewable fuel CHP schemes already certified to CHPQA meet this criterion, despite the existing arrangements not providing a strong incentive to maximise heat load. Consequently we are of the view that an annual heat efficiency of 10% is a reasonable minimum requirement for new plant to fully qualify as Good Quality CHP.

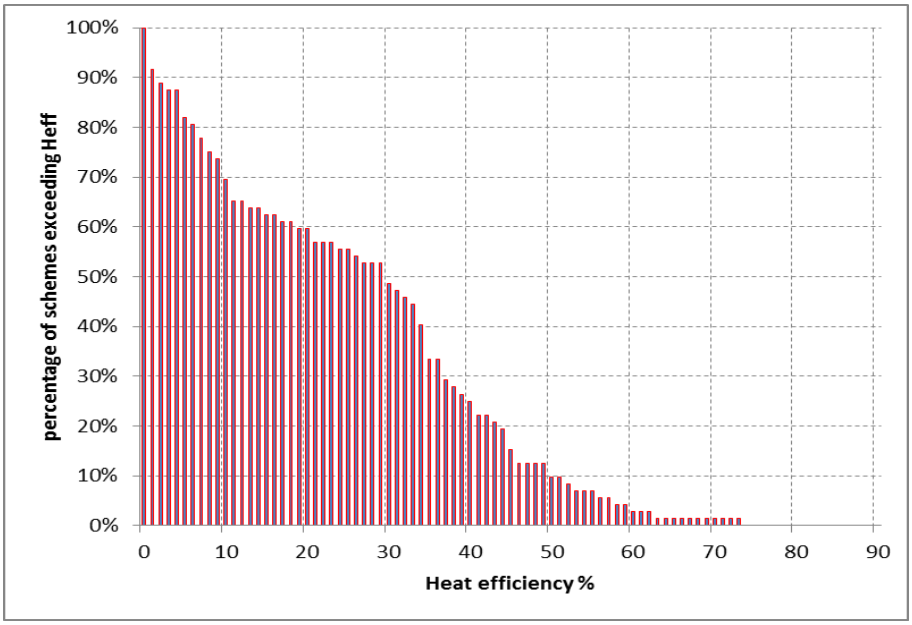

Figure 1. proportion of renewable CHP schemes exceeding specified heat efficiencies

1.10 We recognise that the 35% overall efficiency requirement on its own is not demanding for CHP. However, this criterion applies in addition to the heat efficiency and primary energy saving criteria. In practice it is these latter two criteria which drive the value of the QI coefficients, rather than the overall efficiency criterion.

1.11 One stakeholder proposed a much higher overall efficiency criterion (70%), noting that Article 13(6) of the Renewable Energy Directive referred to a 70% minimum efficiency for renewable industrial heat installations. Whilst such efficiencies are achievable by CHP this would be extremely demanding as a minimum requirement for full qualification as Good Quality CHP. It is important to note that CHP produces two outputs which are physically (as well as economically) of different value. Electricity is harder to generate than heat, but has a much higher utility. Electricity can be readily and efficiently converted into heat, motion or other forms of energy. Heat on the other hand is relatively easy to generate, but cannot readily or efficiently be converted into other forms of energy (electricity, motion etc). A CHP scheme operating at 70% overall efficiency is therefore producing higher utility (and harder to generate) output than an industrial boiler operating at the same efficiency.

1.12 It is also important to note that the required temperature of heat demand is another factor limiting the achievable overall efficiency of CHP. A CHP scheme effectively foregoes some electrical output in order to supply heat at a useful temperature. For each unit of electrical output foregone CHP can supply a greater number of units of heat. This is how CHP saves energy compared to separate generation of heat and power. The number of units of heat supplied per unit of electricity foregone is referred to as a "z-ratio". The value of the z-ratio depends on both the type of steam turbine and the pressure and temperature at which steam is extracted to supply heat. For high temperature heat supply the z-ratio is much lower than for low temperature heat.

1.13 Consequently high overall efficiencies are more achievable for relatively low temperature heat demand e.g. hot water at temperatures in the 70-90°C range for space and water heating in a building. For higher temperature heat demands e.g. steam for industrial processes, higher overall efficiencies are harder to meet. The majority of UK CHP schemes do supply industrial heat loads. These heat loads are difficult to decarbonise, with fewer technical options being available (e.g. heat pumps are not capable of supplying high temperature heat). We do not wish to discourage industries from adopting renewable CHP by setting too demanding an overall efficiency requirement. We would also note that the proposed move to replace the additional ROC support on electrical output from CHP with an RHI tariff payable on heat output will help encourage CHP with greater heat and overall efficiencies than the minimum requirements for CHPQA. RHI proposals on a specific tariff for biomass CHP and introduction of support for bioliquid CHP were consulted on in September 2012 and a Government response is pending.

1.14 **For these reasons we have decided that the three policy criteria (10% heat efficiency, 10% primary energy saving[1] and 35% overall efficiency) will be used as the basis for the revised QI formulae.**

[1] 0% for schemes <1 MW electrical capacity

1.15 The assumptions used in deriving specific QI formulae are intended to reflect the efficiencies (on a Gross Calorific Value basis) of the best available, economically viable technology in the marketplace. Consultees have noted that, in a number of cases, the assumptions do not reflect this. In particular it appears that the assumed efficiencies for waste wood, biogas, syngas and waste fuelled schemes were too high.

1.16 Bearing the above in mind **we have reviewed the underlying assumptions to take account of the following factors in revising and finalising the revised QI formulae for Guidance Note 44;**

i. Assumed maximum efficiencies are based only on technologies which have been demonstrated to be economically viable in the UK. Certain technologies included in the assumptions used to derive the consultation proposals for QI coefficients have been excluded from the assumptions used to finalise the QI coefficients e.g. fluidised bed waste wood schemes with reheat. This is on the basis that there are not currently any plants using these technologies in operation or active projects certified to CHPQA based on design data.

ii. Assumed maximum efficiencies are based on figures quoted on (or corrected to) a Gross Calorific Value basis.

iii. Assumed maximum efficiencies reflect the maximum achievable on the fuel in question e.g. on biogas rather than natural gas.

iv. Additional data provided by consultees and published by prime mover manufacturers has been considered.

1.17 Some responses noted that efficiency assumptions should account for deterioration in normal operation. However data from the CHPQA database shows no evidence of significant in service deterioration. Consequently no allowance for deterioration has been included in the revised efficiency assumptions.

1.18 The revised limiting case assumptions are set out in Table 1 below and the resulting QI formulae which will be implemented in Guidance Note 44 are set out in Table 2.

Fuel Category	Electrical Capacity (MW)	Prime Mover Technology	Minimum Electrical Efficiency (% GCV)	Maximum Electrical Efficiency (% GCV)	Maximum Total Efficiency (% GCV)	Risk
A e.g. AD gas, sewage gas, landfill gas	**≤1MW**	Reciprocating engine	-	36.9%	-	Fully qualifying without 10% Heat efficiency
		Gas turbine	20%	-	80%	Fully qualifying without 10% Primary Energy Saving
	>1MW	Reciprocating engine	-	39%	-	Fully qualifying without 10% Heat efficiency
		Gas turbine	20%	-	80%	Fully qualifying without 10% PES
B e.g. Syngas	**≤1MW**	Reciprocating engine	-	32%	-	Fully qualifying without 10% Heat efficiency
		Gas turbine	20%	-	80%	Fully qualifying without 10% Primary Energy Saving
	>1MW	Reciprocating engine	-	34%	-	Fully qualifying without 10% Heat efficiency
		Gas turbine	20%	-	80%	Fully qualifying without 10% PES
C e.g. Fatty Acid Methyl Ester, Pyrolysis oil	**≤1MW**	Reciprocating engine	-	38.9%	-	Fully qualifying without 10% Heat efficiency
		Gas turbine	20%	-	85%	Fully qualifying without 10% PES
	>1MW	Reciprocating engine	-	38.9%	-	Fully qualifying without 10% Heat efficiency
		Gas turbine	20%	-	85%	Fully qualifying without 10% PES

Fuel Type	Electrical Capacity (MW)	Prime Mover Technology	Minimum Electrical Efficiency (% GCV)	Maximum Electrical Efficiency (% GCV)	Maximum Total Efficiency (% GCV)	Risk
D e.g. Tallow, Used Cooking Oil	**≤1MW**	Reciprocating engine	-	38.9%	-	Fully qualifying without 10% Heat efficiency
		Gas turbine	20%	-	80%	Fully qualifying without 10% PES
	>1MW	Reciprocating engine	-	38.9%	-	Fully qualifying without 10% Heat efficiency
		Gas turbine	20%	-	80%	Fully qualifying without 10% PES
E e.g. Municipal Waste, sewage sludge, paper sludge etc	**≤1MW**	Biomass Air Turbines or Steam Turbines	-	23%	-	Fully qualifying without 10% Heat efficiency
		Organic Rankine Cycle or Steam Turbine	10%	-	80%	Fully qualifying without 10% PES
	>1MW to ≤25MW	Condensing Steam Turbine	-	25%	-	Fully qualifying without 10% Heat efficiency
		Back Pressure Steam Turbine	10%	-	80%	Fully qualifying without 10% PES
	>25MW	Condensing Steam Turbine	-	27%	-	Fully qualifying without 10% Heat efficiency
		Back Pressure Steam Turbine	10%	-	80%	Fully qualifying without 10% PES
F e.g. Logs, energy crops, agricultural residues etc	**≤1MW**	Biomass Air Turbines or Steam Turbines	-	25%	-	Fully qualifying without 10% Heat efficiency
		Organic Rankine Cycle or Steam engines	10%	-	80%	Fully qualifying without 10% PES
	>1MW to ≤25MW	Condensing Steam Turbine	-	27%	-	Fully qualifying without 10% Heat efficiency
		Back Pressure Steam Turbine	10%	-	80%	Fully qualifying without 10% PES
	>25MW	Condensing Steam Turbine	-	28%	-	Fully qualifying without 10% Heat efficiency
		Back Pressure Steam Turbine	10%	-	80%	Fully qualifying without 10% PES
G e.g. Contaminated waste wood	**≤1MW**	Biomass Air Turbines	-	25%	-	Fully qualifying without 10% Heat efficiency
		Organic Rankine Cycle or Steam engines	10%	-	80%	Fully qualifying without 10% PES
	>1MW to ≤25MW	Condensing Steam Turbines	-	28.2%	-	Fully qualifying without 10% Heat efficiency
		Back Pressure Steam Turbines	10%	-	80%	Fully qualifying without 10% PES
	>25MW	Condensing Steam Turbines	-	29.4%	-	Fully qualifying without 10% Heat efficiency
		Back Pressure Steam Turbines	10%	-	80%	Fully qualifying without 10% PES
H e.g. Wood pellets, straw, clean waste wood etc	**≤1MW**	Biomass Air Turbines	-	25%	-	Fully qualifying without 10% Heat efficiency
		Organic Rankine Cycle or Steam engines	10%	-	85%	Fully qualifying without 10% PES
	>1MW to ≤25MW	Condensing Steam Turbines	-	31%	-	Fully qualifying without 10% Heat efficiency
		Back Pressure Steam Turbines	10%	-	85%	Fully qualifying without 10% PES
	>25MW	Condensing Steam Turbines	-	33%	-	Fully qualifying without 10% Heat efficiency
		Back Pressure Steam Turbines	10%	-	85%	Fully qualifying without 10% PES

Table 1. Quality Index Revision – Finalised Limiting Case Input Assumptions

	Current QI Formulae	New QI Formulae
Category A (e.g. AD gas, sewage gas, landfill gas)		
≤1MWe	QI = 285 x η_{power} + 120 x η_{heat}	QI = 238 x η_{power} + 120 x η_{heat}
>1 to ≤25MWe	QI = 251 x η_{power} + 120 x η_{heat}	QI = 225 x η_{power} + 120 x η_{heat}
>25MWe	QI = 193 x η_{power} + 120 x η_{heat}	QI = 193 x η_{power} + 120 x η_{heat}
Category B (e.g. synthesis gas)		
≤1MWe	QI = 285 x η_{power} + 120 x η_{heat}	QI = 275 x η_{power} + 120 x η_{heat}
>1 to ≤25MWe	QI = 251 x η_{power} + 120 x η_{heat}	QI = 251 x η_{power} + 120 x η_{heat}
>25MWe	QI = 193 x η_{power} + 120 x η_{heat}	QI = 193 x η_{power} + 120 x η_{heat}
Category C (e.g. Fatty Acid Methyl Ester, Pyrolysis oil etc)		
≤1MWe	QI = 275 x η_{power} + 120 x η_{heat}	QI = 245 x η_{power} + 120 x η_{heat}
>1 to ≤25MWe	QI = 191 x η_{power} + 120 x η_{heat}	QI = 191 x η_{power} + 120 x η_{heat}
>25MWe	QI = 176 x η_{power} + 120 x η_{heat}	QI = 176 x η_{power} + 120 x η_{heat}
Category D (e.g. Tallow, Used Cooking Oil)		
≤1MWe	QI = 275 x η_{power} + 120 x η_{heat}	QI = 245 x η_{power} + 120 x η_{heat}
>1 to ≤25MWe	QI = 260 x η_{power} + 120 x η_{heat}	QI = 226 x η_{power} + 120 x η_{heat}
>25MWe	QI = 176 x η_{power} + 120 x η_{heat}	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} + 140 x η_{heat}	QI = 370 x η_{power} + 130 x η_{heat}
>1 to ≤10MWe	QI = 370 x η_{power} + 140 x η_{heat}	QI = 370 x η_{power} + 130 x η_{heat}
>10 to ≤25MWe	QI = 370 x η_{power} + 140 x η_{heat}	QI = 370 x η_{power} + 130 x η_{heat}
>25MWe	QI = 364 x η_{power} + 140 x η_{heat}	QI = 350 x η_{power} + 130 x η_{heat}
Category F (e.g. Logs, Energy crops, Agricultural residues etc)		
≤1MWe	QI = 370 x η_{power} + 130 x η_{heat}	QI = 348 x η_{power} + 130 x η_{heat}
>1 to ≤10MWe	QI = 370 x η_{power} + 130 x η_{heat}	QI = 348 x η_{power} + 130 x η_{heat}
>10 to ≤25MWe	QI = 370 x η_{power} + 130 x η_{heat}	QI = 348 x η_{power} + 130 x η_{heat}
>25MWe	QI = 338 x η_{power} + 130 x η_{heat}	QI = 338 x η_{power} + 130 x η_{heat}
Category G (e.g. Contaminated waste wood)		
≤1MWe	QI = 370 x η_{power} + 140 x η_{heat}	QI = 352 x η_{power} + 120 x η_{heat}
>1 to ≤10MWe	QI = 370 x η_{power} + 140 x η_{heat}	QI = 338 x η_{power} + 120 x η_{heat}
>10 to ≤25MWe	QI = 370 x η_{power} + 140 x η_{heat}	QI = 338 x η_{power} + 120 x η_{heat}
>25MWe	QI = 364 x η_{power} + 140 x η_{heat}	QI = 318 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}	QI = 329 x η_{power} + 120 x η_{heat}
>1 to ≤10MWe	QI = 315 x η_{power} + 120 x η_{heat}	QI = 293 x η_{power} + 120 x η_{heat}
>10 to ≤25MWe	QI = 315 x η_{power} + 120 x η_{heat}	QI = 286 x η_{power} + 120 x η_{heat}
>25MWe	QI = 315 x η_{power} + 120 x η_{heat}	QI = 279 x η_{power} + 120 x η_{heat}

Table 2. Current & final revised QI Formulae

1.19 Although a couple of responses suggested alternative approaches to the introduction of QI formulae with revised coefficients, there was not a widespread request for this. Discussions with the representative body for CHP operators suggests that the industry is in general supportive of the QI formulae and associated scaleback mechanism approach. We have not therefore pursued a completely new approach.

1.20 One response suggested a minimum heat efficiency threshold for the exemption from the cap on dedicated biomass. A separate Government response to the recent consultation on a notification process for the new build dedicated biomass cap will be published shortly.

1.21 Although one response suggested that the revised formulae increase the “slope” of QI and hence result in a more rapid fall off in eligibility for support, in actual fact reduction in the values of the coefficients reduces the slope of QI. There are however issues associated with rapid fall off in eligibility for support and the safeguard provision. These are discussed below.

2. Safeguard Provision

Introduction

2.1 Section 5 of the consultation document noted that the QI formulae approach is an established methodology, well understood by industry and incorporating the scaleback mechanism for partially qualified schemes. It also noted, however, that QI formulae cannot perfectly ensure that schemes which meet all three policy criteria fully qualify as Good Quality CHP.

2.2 To address this the consultation proposed a “safeguard” provision in which any scheme which met all three policy criteria (minimum primary energy saving, minimum heat efficiency and minimum overall efficiency) would be awarded a QI of 100 regardless of the result of the QI formulae.

Main Messages

2.3 A large number of consultation responses supported the proposed safeguard provision. A smaller number of consultees felt that the safeguard would not be necessary provided that the QI formulae were correct. A small number of consultees disagreed with the safeguard provision on the grounds that they favoured more demanding policy criteria as discussed in section 1 above.

2.4 Several stakeholders noted that, whilst welcome, the introduction of the safeguard provision introduced something of a cliff-edge in the qualification criteria. For example, if a scheme achieved a QI of 100 by virtue of the safeguard provision and subsequently suffered a small reduction in performance, such that one or more criteria were just missed, it would revert to being assessed on the QI formulae. Since the scheme qualified via the safeguard provision the QI formulae will produce a (possibly significantly) lower QI and Qualifying Power Output (QPO). This is illustrated in Figures

2 and 3 (showing QPO as a proportion of Total Power Output (TPO)) below in the case of varying heat efficiency. This contrasts with the linear reduction in QI where the formulae alone are used with no safeguard provision.

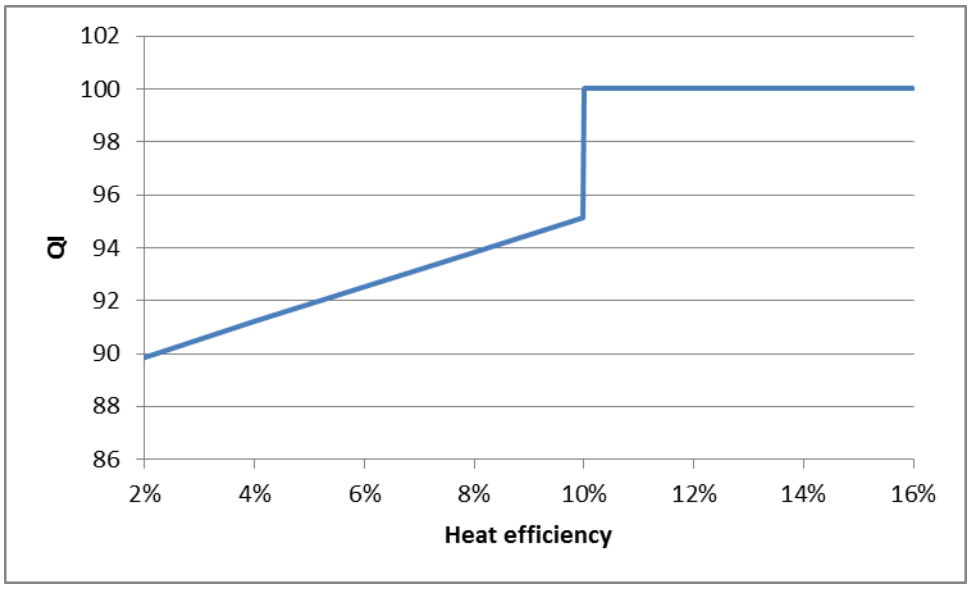

Figure.2 Illustration of potential discontinuity in QI introduced by safeguard provision

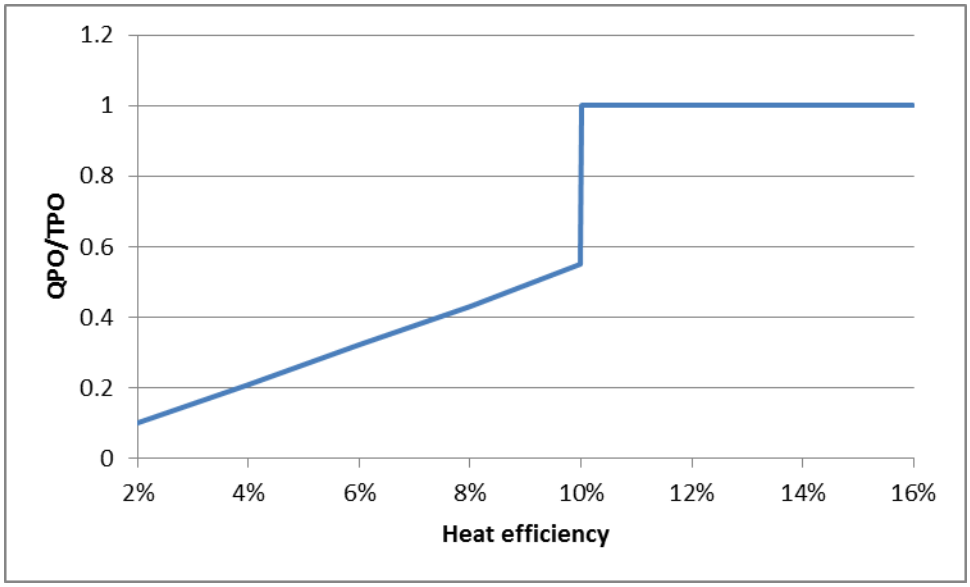

Figure.3 Illustration of potential discontinuity in QPO introduced by safeguard provision

2.5 A few consultees noted that the procedures for calculating primary energy saving should be explicitly set out in the CHPQA Guidance Notes. One response noted that the safeguard should be included in the CHPQA Standard itself and be applied for the purposes of determining ECA eligibility also.

Post Consultation Decisions

2.6 QI is calculated using only heat efficiency and power efficiency as input variables. The three policy criteria used to derive QI (10% heat efficiency, 10% primary energy saving and 35% overall efficiency) are also influenced by other factors e.g. the reference efficiencies used for calculating primary energy saving vary with the age of the plant and voltage of the network to which the scheme is connected (to adjust for transmission

losses avoided). Consequently, regardless of the accuracy of QI coefficient setting, QI formulae alone cannot perfectly ensure that all schemes which meet the three policy criteria fully qualify as Good Quality CHP. For this reason **we will proceed with implementing the safeguard provision in CHPQA Guidance Note 44**.

2.7 We acknowledge that the safeguard provision as proposed in the consultation does introduce something of a cliff-edge into QI and hence to the extent to which a scheme qualifies as Good Quality. **We will therefore implement a specific scale back procedure for new schemes which need to use the safeguard provisions to fully qualify.** This procedure will be based on determination of the operating point at which a scheme would just meet all three policy criteria and recalculation of the X coefficient in order to give a QI of 100 at this point. Scaleback of Qualifying Power Output will then be conducted using the normal CHPQA rules. The recalculation of the X coefficient will be a once-only event based on a scheme's design data. An example of this procedure is shown below.

e.g. >25 MWe waste wood fuelled CHP, fully exporting, >200kV transmission grid connected, commissioned after 2005.

$\eta_{power\ (Fully\ Condensing\ Design)} = 28\%$

$\eta_{power\ (CHP)} = 26\%$

$\eta_{heat} = 10\%$

z ratio[2] = 5

Guidance Note 44 QI formula

$QI = 318\ \eta_{power} + 120\ \eta_{heat}$

$= 318 \times 0.26 + 120 \times 0.1$

$= 94.68$

Determine operating point at which is just compliant with safeguard criteria

$\eta_{power} = 26\%$

$\eta_{heat} = 10\%$

$PES = 16.8\%$

Recalculate X to satisfy QI =100

$100 = X\ \eta_{power} + 120\ \eta_{heat}$

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

[2] As defined in Guidance Note 28 procedures.

X = (100-120 x 0.1) / 0.26

X = 338.46

Revised X value is now used to calculate QI and QPO for this scheme at all operating conditions for its lifetime as illustrated in Figures 4 and 5 below.

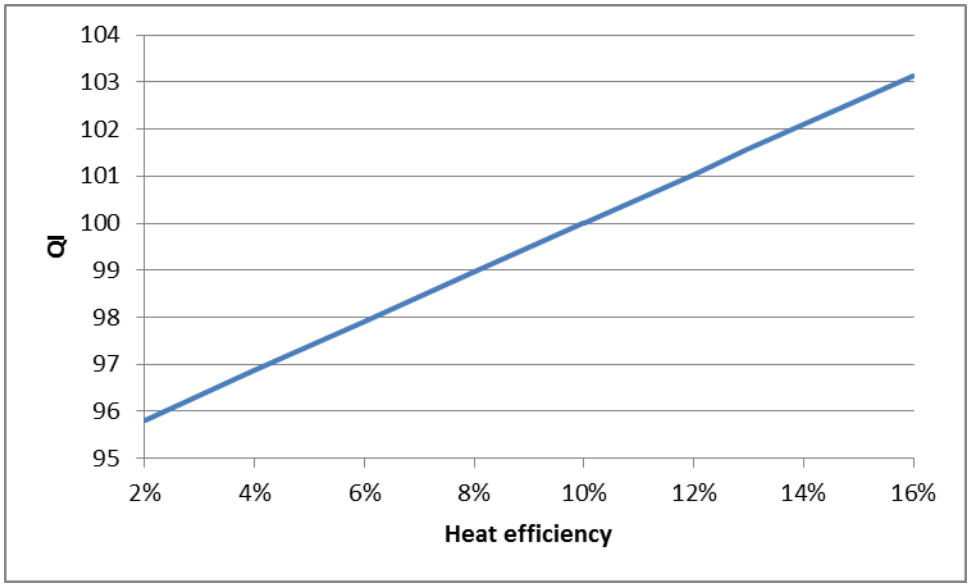

Figure.4 Illustration of QI under scaleback provision for safeguarded schemes

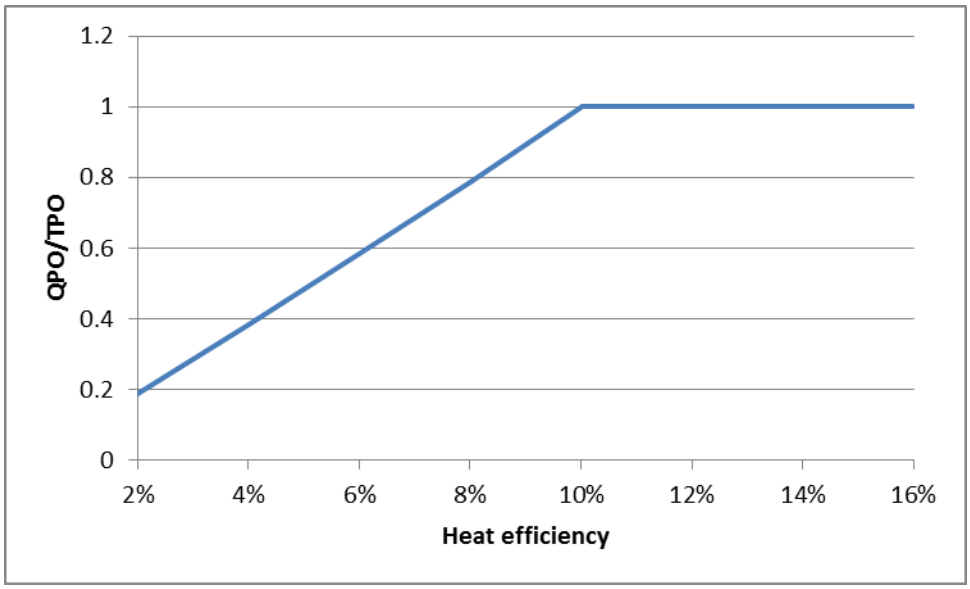

Figure.5 Illustration of QPO under scaleback provision for safeguarded schemes

2.8 As requested by consultees the Primary Energy Saving calculation methodology will be included in Guidance Notes either by reference to Directive 2012/27/EU and Decision 2011/877/EU (with clarification of which reference efficiencies are applicable to each fuel category) or using copy-out.

2.9 The safeguard provision will not be included in the CHPQA Standard. The requirements in the Standard are separate to those in Guidance Note 44 and, in many cases, based on a higher overall performance requirement.

3 Fuel categories

Introduction

3.1 For the purpose of applying QI formulae CHP schemes are grouped by fuel types. The intent is that fuels which can be used in the same prime movers, with the same electrical efficiencies, are grouped together. The consultation proposed 7 fuel categories and listed the fuels proposed to be included in each category. To avoid potentially misleading fuel category names it was proposed to rename the fuel categories using alphabetical characters. The proposed categorisation was as follows.

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

Table 3. Consultation fuel categorisation

Main Messages

3.2 Consultation responses on this issue were evenly split between those who broadly supported the proposed categorisation, but with re-categorisation for some specific

fuels, and those who felt that categorisation should be based on objective physical characteristics of the fuel (including in particular moisture content). Some consultees noted that certain fuels were missing from the list, e.g. hydrogenated vegetable oil and certain liquid wastes, and that certain fuels e.g. wood chips should be split depending on moisture content.

3.3 A small number of responses favoured no change to existing fuel categorisation or a move to categories used in the Renewables Obligation or by Ofgem for assessing sustainability.

Post Consultation Decisions

3.4 As indicated in the consultation, the purpose of the categorisation is to group fuels according to the maximum efficiency of the most efficient prime mover technology in which they can be used. This objective is fundamentally different from that of categorisation for assessing fuel sustainability under the Renewables Obligation.

3.5 The proposed fuel categories aimed to clarify and improve upon the existing fuel categorisation by grouping fuels in terms of the maximum efficiency of their prime mover technology. However, clearly any list of fuels can never be fully comprehensive and clarity over how additional fuels will be categorised is desirable. Categorisation of fuels by their properties potentially introduces a burdensome need to routinely analyse fuel properties and some risk of manipulation of fuel properties to achieve more favourable categorisation. In addition fuel properties do not, in practice, link directly with the fundamental assumptions used to derive the QI formulae in each category. For these reasons we do not propose to categorise QI formulae by fuel parameters.

3.6 **Categorisation by fuel lists will therefore be retained, with the revisions to the lists and categories set out in Table 4 below. However,** in order to provide a process to accommodate new fuels within the categories and to enable developers to seek alternative categorisation in respect of a scheme using one of the fuels listed, where there is evidence to support this **developers will be able to submit evidence to justify an alternative categorisation based on demonstrating that the criteria in columns 3 & 4 of Table 4 are met.** It is expected that required evidence on maximum possible prime mover efficiency would take the form of data from prime mover manufacturers for prime movers using the fuel in question. All efficiencies are quoted on a Gross Calorific Value, gross power output basis.

3.7 A new category B has been introduced appropriate for the performance of engines running on syngas, which several consultees noted had lower efficiencies than engines running on biogas. As noted by one consultee Hydrogenated Vegetable Oil was an inadvertent omission from the list of liquid biofuels in category C, it has now been added for completeness.

Fuel Category	Default Fuel list	Criteria	
A	Gas produced by anaerobic digestion of biological material, Sewage gas, Landfill gas	Most Efficient Prime Mover Efficiency is no higher than:	36.9% (≤1 MWe) 39% (>1 MWe)
		Fuel State:	Gaseous at Normal Temperature & Pressure
B	Synthesis gas from gasification of biological material	Most Efficient Prime Mover Efficiency is no higher than:	32% (≤1 MWe) 34% (>1 MWe)
		Fuel State:	Gaseous at Normal Temperature & Pressure
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 Biomethanol, Bioethanol, Biobutanol, Bio Methyl Tertiary Butyl Ether, Bio Ethyl Tertiary Butyl Ether	Most Efficient Prime Mover Efficiency is no higher than:	38.9%
		Fuel State:	Liquid at Normal Temperature & Pressure
D	Tallow, Used cooking oil	Most Efficient Prime Mover Efficiency is no higher than:	38.9%
		Fuel State:	Liquid at Normal Temperature & Pressure
E	The biological fraction of; Municipal solid waste, Industrial waste, Clinical waste, Refuse derived fuel, Solid recovered fuel, Poultry litter, Sewage sludge, Paper sludge	Most Efficient Prime Mover Efficiency is no higher than:	23% (≤1 MWe) 25% (>1 to ≤25 MWe) 27% (>25 MWe)
		Fuel State:	Solid at Normal Temperature & Pressure
F	Logs, Roundwood, Energy crops, Agricultural residues, Prunings, Milling residues, Arboricultural & Forestry residues, Distillers grain	Most Efficient Prime Mover Efficiency is no higher than:	25% (≤1 MWe) 27% (>1 to ≤25 MWe) 28% (>25 MWe)
		Fuel State:	Solid at Normal Temperature & Pressure
G	Contaminated waste wood (grades B-D of PAS 111)	Most Efficient Prime Mover Efficiency is no higher than:	25% (≤1 MWe) 28.2% (>1 to ≤25 MWe) 29.4% (>25 MWe)

		Fuel State:	Solid at Normal Temperature & Pressure
H	Wood pellets, Dry wood chips, Straw, Bagasse, Nut shells, Husks and Cobs, Visibly clean waste wood (grade A of PAS 111)	Most Efficient Prime Mover Efficiency is no higher than:	25% (≤1 MWe) 31 % (>1 to ≤25 MWe) 33% (>25 MWe)
		Fuel State:	Solid at Normal Temperature & Pressure

Table 4. Revised fuel categorisation

4 Heat Networks

Introduction

4.1 Section 9 of the consultation document set out the proposals on District Heat Networks. Both DECC publications *The Future of Heating: A strategic framework for low carbon heat in the UK* and its successor *The Future of Heating: Meeting the challenge*, identified heat networks as having a key role to play in decarbonising heating in buildings in areas of dense heat demand. Those publications recognised that it is often the case that heat networks start out quite small and then expand over time.

4.2 The current CHPQA arrangements provide for a reduced QI threshold of 95 for an initial one year in general, but two years in respect of district heating. This is to provide time for any teething problems with the CHP to be ironed out, and time for the district heat network loads to be built up.

4.3 In acknowledgement of the need for heat loads on a network to be built up over time, the consultation proposed that a reduced QI threshold of 95 apply for a period of five years for schemes that supply heat primarily through a district heating network serving commercial, public and/or residential buildings.

Main messages

4.4 The majority of responses were in agreement with the proposed approach, but some requested a 10 year period instead of 5 years. This was to account for the anticipated time that consultees expected it would take to establish a sufficiently sized and reliable district heating network.

4.5 An alternative option proposed by some consultees was that an initial threshold of 90 should apply, increasing on an incremental basis of 1 or 2 points per annum.

4.6 There were several requests that the definition of 'district heating network' should be clarified in the Guidance Notes e.g. in Guidance Note 30. There was also a request that the treatment of "max heat"[3] conditions for the purposes of assessing compliance with the threshold be clarified.

[3] As defined on p.8 of *The CHPQA Standard Issue 3*

Post Consultation Decisions

4.7 **We are implementing flexibility for new renewable CHP supplying heat networks, for their first 5 years of operation for the purposes of Guidance Note 44.** We are not minded to provide flexibility for 10 years as requested by some consultees, as this is typically half the working lifetime of a CHP scheme. We have seen no convincing evidence to support the need for such a long period and, by virtue of providing relatively low temperature heat, CHP supplying heat networks should suffer fewer penalties to their electrical generation efficiency and hence be able to achieve higher QI than CHP supplying higher temperature industrial heat loads. Neither do we wish to discourage developers from pursuing a more incremental approach where CHP capacity on a network is expanded as the heat demand grows, as this will deliver higher efficiencies during the network development.

4.8 We are implementing the proposed flexibility of a **QI threshold of 95 for an initial period of operation. The full power output of new schemes meeting this threshold will qualify under Guidance Note 44, and the power output of schemes which do not fully qualify will be scaled-back against a threshold of 95. The initial period will comprise the initial year in which the scheme commences operation plus the following full 5 calendar years**. We are not minded to start at a QI threshold of 90 as proposed by some consultees as, in some cases, this is achievable with no heat supply. Schemes will be assessed against the 95 threshold based on QI calculated from their heat efficiency in long-term operation and not “max heat” conditions. In the case of new schemes which connect to a Heat Network after the calendar year in which they are initially commissioned the period for which the 95 QI threshold applies shall include the year of connection to the network plus the following full 5 calendar years.

4.9 We will include a definition of ‘Heating/Cooling Network’ in the updated Guidance Note 44. In view of the importance of renewable CHP as an option for decarbonising industrial heat and the benefits of industrial clustering we will include networks supplying both industrial and commercial heat, as well as residential networks within this definition.

5 Grandfathering the new QI formulae

Introduction

5.1 Further to the publication of the Bioenergy Strategy, the Government is keen to promote renewable CHP capacity. Providing a suitable environment for investment in renewable CHP requires policy to provide for investor confidence going forward. For this reason section 7 of the consultation document proposed grandfathering the revised CHP Quality Index formulae.

5.2 When the current Guidance Note 44 QI formulae were set in 2008, there was only limited experience of the performance of renewable CHP schemes. Now that there is a better understanding of the technology used and the operation of renewable CHP schemes, we have been able to propose revisions to the QI formulae to ensure that the required primary energy savings criteria are met and that only schemes with a significant heat load fully quality for Government support for renewable CHP.

5.3 Therefore, the consultation proposed that, once a scheme has been certified in accordance with the revised QI formulae, the same QI formulae should be applied for the remaining lifetime of support for the plant. This is subject to any change that may be necessitated by EU legislation. This only grandfathers the formulae used, the actual QI of a scheme will continue to be assessed annually based on actual performance each year.

Main messages

5.4 The majority of consultees agreed with the proposals to grandfather the revised QI formulae going forward, once the scheme has been certified in accordance with those formulae.

5.5 Many of the responses disagreed with the proposed lack of grandfathering of the current QI formulae, preferring the 'alternative approach' outlined in question 6 or a modification of it. This is discussed in more detail in section 6 below. A few consultees queried how the proposed lack of grandfathering would impact on Enhanced Capital Allowances (ECAs) and whether schemes which had already claimed ECAs might have to repay them. Two responses sought clarification of exactly when the grandfathering of the formulae would apply – whether that would be at the point of certification to CHPQA or at the point of financial close.

5.6 Another suggestion was that instead of grandfathering the QI formulae, the underlying criteria could be grandfathered instead, for example grandfathering the criterion of achieving a 10% primary energy saving.

5.7 One consultee sought assurance that any future revisions to the QI formulae would only be implemented following a sufficient lead time, they suggested four years. They argued that this was necessary to prevent undermining the investment case of plant that had already reached financial close or were already under construction.

5.8 Two responses were wholly unsupportive of any grandfathering on the grounds that they felt that the criteria were insufficiently demanding.

Post Consultation Decisions

5.9 **In response to the variety of points raised by consultees, the Government confirms it will grandfather the revised Guidance Note 44 QI formulae**. We did not propose to grandfather the existing QI formulae. Our decisions on this, and arrangements for projects reaching financial close on or before 25th July 2012 are set out in section 6 below.

5.10 **Grandfathering of the revised Guidance Note 44 QI formulae will be based on the date that the scheme achieves CHPQA certification.** By linking grandfathering of the new QI formulae to the date of CHPQA certification, it should not be necessary to guarantee a minimum lead time for any future changes to QI formulae.

5.11 We will also grandfather the safeguard provision and the new fuel categorisation in the revised Guidance Note 44.

5.12 Grandfathering is subject to any changes that may be required by EU law or by the European Commission (for example, updates to the harmonised efficiency reference values).

5.13 Certain CHP schemes qualify for first-year allowances for energy saving technologies, commonly referred to as Enhanced Capital Allowances. To claim Enhanced Capital Allowances CHP schemes are required to have obtained a Certificate of Energy Efficiency from DECC. These certificates are issued based on Guidance Note 42 which references the CHPQA Standard and the formulae contained therein (rather than those in Guidance Note 44). Guidance Note 42 will be updated to align with the revised requirements at the earliest opportunity.

5.14 Any changes made to the CHPQA Standard and Guidance Note 42 as a result of this Government response will have no implications for Certificates of Energy Efficiency that have already been issued based on the previous criteria. Any changes impacting on eligibility for Enhanced Capital Allowances will only take effect after their announcement. Schemes which have already claimed Enhanced Capital Allowances would not therefore have to repay the value of an Enhanced Capital Allowance due to a change in the CHPQA standard. However, where CHP schemes do hold a Certificate of Energy Efficiency issued under the current issue of the CHPQA Standard, operators do have to ensure that those schemes continue to comply with the rules in force at the time the certificate was issued to avoid the certificate being withdrawn (e.g. due to a change in the design of the scheme relative to the design which was certified).

6 Grandfathering current QI Formulae

Introduction

6.1 Chapter 7 of the initial Consultation document explained that the CHPQA certification criteria are not currently grandfathered. As addressed in section 5 above, the Consultation document proposed that the revised criteria should be grandfathered, but that the existing criteria should not be grandfathered. Under those proposals, once a scheme had been certified in accordance with the revised QI formulae, the same QI formulae would have been applied for the remaining lifetime of Renewables Obligation support for the plant (subject to any changes required by the EU).

6.2 The Government first proposed to grandfather the CHP ROC uplift in the Renewables Obligation Banding Review consultation, published on 20th October 2011. The RO Banding Review Consultation did not say that this proposal included grandfathering of the current CHPQA certification criteria. However, we understand that some developers may have assumed that the current CHPQA certification criteria were included in the proposed grandfathering.

6.3 The Government response to the Renewables Obligation Banding Review consultation (published on 25th July 2012) set out the decision to extend grandfathering policy to include the CHP uplift as from 1st April 2013. It also explained that the decision to grandfather the uplift did not include grandfathering the existing CHPQA qualification criteria.

6.4 The Supplementary questions to the CHPQA consultation, published on 21st January 2013 sought views from stakeholders on an 'alternative approach' to grandfathering the existing CHPQA criteria. The alternative approach involved grandfathering the current QI formulae for schemes that reached financial close during the period from the commencement of the RO Banding Review consultation to the date of the Government response (i.e 20th October 2011 to 25th July 2012).

Main messages

6.5 The majority of responses supported the alternative approach on grandfathering. Some of these wanted the criteria to be grandfathered in the case of major refits to existing plant also.

6.6 Several consultees argued that plant reaching financial close in some or all periods prior to 20th October 2011 had a legitimate expectation that the QI formulae would be grandfathered. They therefore proposed expansion of the time window to cover the period from December 2008 to March 2010, in one case, and all projects reaching financial close before 25th July 2012, in another case.

6.7 Some consultees enquired as to how these proposals will affect Scotland and noted that differing past decisions and consultation timelines for the Renewables Obligation (Scotland) Banding Review suggested that a different time window should be considered for grandfathering stations in Scotland.

6.8 Similar to some of the responses received for question 3, some consultees were concerned that any future revisions to QI formulae should only be implemented after a sufficient lead time, perhaps somewhere in the region of four years.

6.9 A small number of responses were unsupportive of the alternative approach, generally on the grounds that they felt the existing certification criteria were insufficiently demanding and did not drive efficient use of biomass. One response pointed out that affected projects should have carried out better due diligence work, and as such should not benefit from special provisions being made for them when they failed to mitigate project development risks.

Post Consultation Decisions

6.10 DECC is keen to ensure a stable environment for investment in renewable energy projects and promote investor confidence. Consultation responses indicated strong support for grandfathering of existing CHPQA criteria for some or all projects that reached financial close prior to 25th July 2012 as a means of Government affirming its commitment to providing policy stability for investors. **We are therefore grandfathering the existing Guidance Note 44 QI formulae and Guidance Note 14 fuel categories for all schemes that were in operation, or that can demonstrate they reached financial close, prior to 26th July 2012**. Section 7 below sets out the evidence requirements for grandfathering of the existing requirements.

6.11 The safeguard provision (section 2) and the relaxation in the requirements for district heat networks (section 4) will not apply to those schemes being grandfathered with the existing QI formulae.

7 Evidence Requirements for Grandfathering current QI Formulae

Introduction

7.1 Grandfathering of the existing QI formulae based on financial close will require the evidence to demonstrate financial close to be defined within Guidance Note 44.

7.2 The Supplementary Consultation questions proposed that this might be achieved by requiring the following information:

> 1) A letter from a company board, investment committee or project finance providers attesting to the fact that they have committed to finance the project subject to ordinary course conditions precedent, which have a reasonable expectation of being met. Such letter would have to be signed by Directors with due authority and state that the information provided is true and accurate in all material respects and that the commitment was made in the period from 20th October 2011 to 25th July 2012; and
>
> 2) Board minutes attesting to the fact that financial close occurred in the 20th October 2011 to 25th July 2012 period; and
>
> 3) Evidence of funds having been disbursed towards the project reaching commissioning (e.g. supply chain contracts, construction work contracts). A minimum threshold of financial expenditure might need to be defined to provide confidence that projects are indeed committed.

Main messages

7.3 The majority of responses supported the proposed evidence requirements. Some responses commented that item 2 (board minutes) would only be available in the case of schemes funded by project finance and projects funded on balance sheet should only be required to provide evidence as detailed in (1) and (3) above. Few responses proffered views on a suitable minimum threshold of expenditure, ranging from 10% of total capital cost to, perhaps, 50% but for off-balance sheet projects only.

7.4 A few consultees proposed alternative approaches to evidence of financial close including existence of a contract for the construction and commissioning of a scheme, construction having started, primary plant and equipment having been ordered and paid for and consideration of evidence requirements on a case-by-case basis depending on project sizes.

7.5 Several responses noted that the administrative burden of demonstrating financial close should be kept to a minimum.

7.6 One consultee noted, in respect of Energy from Waste projects, that tenders for waste contracts also bound developers into a commitment to deliver a project and that such tenders should also be considered as appropriate evidence for grandfathering. Another noted that financial close evidence requirements should be aligned as far as possible with those used for notifications under the proposed biomass cap.

Post Consultation Decisions

7.7 Proposals for evidence of financial close under the proposed notification process for the dedicated biomass cap are broadly in line with those proposed for CHPQA, but with the clarification that evidence of committed finance must cover 100% of the required finance for the project. Some stakeholders requested alignment of the two processes, however, it should be noted that they will not be identical, because they serve different purposes. In particular, with CHPQA grandfathering, there is no limit on the number of stations that may be grandfathered, provided they can demonstrate they meet the criteria. Bearing this, and the minimum thresholds for expenditure proposed by consultees, in mind **we confirm that the following evidence will be required for the purposes of grandfathering of the existing QI formulae**.

1) Letter(s) from a company board, investment committee, all project finance providers (or from person(s) with written delegated authority from the company board, investment committee or project finance providers), attesting to the fact that they have committed to finance the project subject to ordinary course conditions precedent, which have a reasonable expectation of being met. Such letter(s) would have to be signed by a director or other individual with due authority, and state that the information provided is true and accurate in all material respects and that the commitment was made in the period prior to 26th July 2012; and

2) A letter from the company board or investment committee confirming that the letters provided under 1) sum up to 100% of the total projected capital cost of the project; and

3) Board minutes attesting to the fact that financial close occurred in the period prior to 26th July 2012; and

4) Evidence of a minimum of 10% of the total projected capital cost of the project having been disbursed towards the project reaching commissioning (e.g. supply chain contracts, construction work contracts) by the date of publication of this document.

Waste fuelled schemes may alternatively submit the following evidence;

1) A copy of a binding tender for a waste contract, which includes a contractual obligation to supply heat, submitted prior to 26th July 2012; and

2) Confirmation from the waste authority that this tender was successful and that the waste contract has been awarded to the project; and

3) Evidence of a minimum of 10% of the total projected capital cost of the project having been disbursed towards the project reaching commissioning (e.g. supply chain contracts, construction work contracts) by the date of publication of this document.

8. Other Issues

Introduction

8.1 Consultees raised a range of other CHP issues not directly related to the consultation questions or, in some cases, the subject of the consultation. These are summarised briefly in the following paragraphs.

Main Messages

8.2 The issues were raised or proposals made by consultees were as follows;

i. A request that Government commit to no further changes to the CHPQA criteria until 2020 and provision of at least 4 years leadtime for any changes.

ii. A comment that it was important to retain the flexibility for the scheme operator to define the scheme boundary.

iii. Three consultees noted that incentives on electrical output (e.g. a ROC uplift) encouraged sub-optimal CHP.

iv. A proposed strategy to capture and distribute low grade heat from conventional thermal powerplant and install local CHP capacity for upgrading of this heat for distribution by local heat networks and for (electrical) peaking.

v. A comment that the RHI does not allow CHP schemes to return Scottish grants in order to qualify to claim the RHI tariff.

vi. Wording of Guidance Note 44 is not strictly correct regarding the maximum technical capability of renewable CHP.

Government Views

8.3 Government understands the importance of providing certainty for investors. However, we believe that this is best dealt with by means of grandfathering the revised Guidance Note 44 QI formulae from the point of CHPQA certification. Committing to no further revisions for a set period of time would prevent Government from being able to respond to any issues arising from changes in technology performance over time etc. This would present a risk in terms of ensuring value for consumers.

8.4 There are no proposals to amend arrangements for definition of CHP scheme boundaries.

8.5 The Government recognises that support via a ROC uplift, whilst being successful in bringing forward renewable CHP which is more efficient than dedicated power-only biomass plant, does not encourage optimal CHP from an energy efficiency and carbon saving perspective. This is why the Government has proposed to replace the ROC uplift for new schemes with an RHI tariff based on the heat output. Government consulted on proposals for specific RHI tariffs for CHP in September 2012 and a Government response is pending. This will directly incentivise the supply of useful heat from CHP and hence encourage plant with a higher overall efficiency and greater carbon savings.

The Government will publish its response on expansion of the non-domestic RHI scheme later this year. RHI eligibility in relation to grants received will be considered in developing RHI amending legislation.

8.6 The proposed strategy on capturing waste heat, localised CHP and heat networks goes well beyond the scope of the CHPQA programme. The Government's views on the role of heat networks and CHP in helping reduce the carbon intensity of heat are set out in *The Future of Heating: Meeting the challenge*[4] along with the results of energy systems modelling of least cost pathways to decarbonising heat.

8.7 We will clarify the text on maximum potential efficiency as part of the updating of Guidance Note 44.

[4] https://www.gov.uk/government/publications/the-future-of-heating-meeting-the-challenge

Annex

This Annex summarises the content of consultation responses. A number of confidential responses were received. These are not reported here but were considered in formulating the Government's response.

Consultation Question 1

Do you agree with the proposed coefficients in the revised Quality Index formulae for renewable CHP? Please provide evidence to support your response.

1. Few of the consultation responses supported the detailed values of the proposed coefficients in their entirety. Consultees provided comments covering a range of issues such as the appropriateness of the policy criteria (10% heat efficiency, 10% primary energy saving, 35% overall efficiency) used to derive the QI coefficients and, in particular, the accuracy of the assumptions used in deriving the QI coefficients for specific fuel categories.

   Policy criteria

2. Eight respondents commented that they supported the principle of tightening the criteria. One noted that they supported the proposed criteria used to derive the QI coefficients (10% heat efficiency, 10% primary energy saving and 35% overall efficiency), another indicated their support for the 10% heat efficiency criterion.

3. Twelve consultees felt that the 10% heat load criterion was too demanding in view of the fact that even industrial heat loads are not constant and a 10% average heat load therefore implies higher peak load. They proposed a 4-5% heat efficiency requirement as an alternative, with three respondents suggesting this could be phased in over time. Two suggested 10% be brought in no earlier than 2020. One argued that loss of electrical efficiency with increasing heat load made it "all but impossible" to comply with a 10% heat load (and still meet the 35% overall efficiency). Three respondents noted that existing plant had been designed to maximise electrical output and re-engineering plant to meet higher heat output would be difficult or impossible. One response noted that CHP project cases often have to be made based on operation in power-only mode, they felt there was a risk that the heat efficiency requirement could compromise electrical efficiency in power only mode and hence compromise the ability of projects to secure finance.

4. One consultee felt that the 35% overall efficiency criterion was insufficiently demanding in view of the fact that large dedicated biomass plant could achieve efficiencies of 37% (unclear if this is on a GCV basis). They argued that additional support for CHP was based on the premise that it was a more efficient way to use biomass and that the Renewable Energy Directive (2009/28/EC) requires Member States to promote renewable heating and cooling systems with efficiencies of at least 85% for residential and commercial applications and 70% for industrial applications. They proposed a minimum overall efficiency of 70% be used to derive QI coefficients for schemes both above and below 25MW. They noted that under the ROC uplift regime there was no incentive to over-achieve on the CHPQA criteria as this would reduce electrical output and hence ROC support. Another consultee also felt that the proposed formulae did not drive high

enough overall efficiencies. The consultee provided an example of an Energy from Waste plant which could fully qualify whilst supplying less than half its peak potential heat capacity.

5. One respondent felt that the 35% overall efficiency criterion for >25MW schemes should be dropped as they felt this could have a counter-productive influence on plant size.

Specific Formulae & Underlying Assumptions

6. One consultee supported the application of the proposed formulae for new plant generally, but did not support the use of lower coefficients for larger plant which they felt (in view of their higher electrical efficiency) should not be discouraged even where large scale heat contracts were not available.

7. Four response noted that the maximum efficiencies assumed in deriving QI coefficients should reflect average, real performance of plant over their lifetime rather the new plant performance. Another commented that these efficiency assumptions were in general optimistic and did not reflect performance attainable by economically sound plant.

8. Eight responses disagreed with the proposed coefficients for Category F ("Waste Wood"). They felt the proposals were based on unrealistically high assumptions for maximum electrical efficiency of such schemes using economically viable technology burning contaminated waste wood. One suggested that maximum GCV electrical efficiencies of 25.5% for schemes below 25MW (cf 30% used) and 26% for >25MW (cf 32% used) schemes were more realistic when considering economically viable technology. One consultee proposed that, for Waste Wood, a scheme by scheme approach be adopted to setting QI coefficients with the developer having to submit justified proposals for the coefficients to be used.

9. One respondent agreed with the proposed QI formulae for Categories E ("Agricultural Biomass) & G ("Wood fuels"). However, three other consultees disagreed with the proposed coefficients for Category G ("Wood"). This was on the grounds that they felt the proposals were based on unrealistically high assumptions for maximum electrical efficiency of such schemes.

10. Eight consultees commented that the proposed QI formulae for Category A (Biogas & Syngas) were particularly demanding. One noted that Syngas had the same QI coefficients as Natural Gas, but was not technically able to meet the same efficiencies. Six responses noted that the limiting assumption of 45% (GCV) efficient engines was unrealistically high. One of these provided data from their review of published engine efficiencies suggesting 37% for small (<4MW) and 39% for large (>4MW) engines would be more appropriate. Another noted that their 1MW scheme was achieving 35.2% electrical efficiency and that, under the proposed coefficients, they would need 26.1% heat efficiency to fully qualify. One response noted that the reductions in QI coefficients for these fuels appeared much more severe than those for Solid biomass, and that the justification for this was unclear.

11. Five responses noted that the electrical efficiencies for reciprocating engines assumed for Categories B and C (Liquid biofuels and Liquid waste categories) were too high. One suggested the efficiencies as quoted above based on their review of published efficiency data. Two further consultees also felt that the Category C were too demanding, but did

not comment on the assumptions used in their derivation. One of them noted that the QI coefficients for these fuels appeared much more severe than those for Solid biomass, and that the justification for this was unclear.

12. Five consultees felt that the QI coefficients for Category D (solid waste) were too demanding. One response emphasised that the proposed coefficients would discourage existing waste fuelled powerplant converting to CHP. Two consultees stated that although the assumed electrical efficiency of 28% for >25MW plant is quoted by some grate manufacturers this is on an NCV basis. They noted that the Cogeneration Directive reference efficiency was 25% NCV (~22.5% GCV). Another noted that for smaller plant an efficiency of 26% is quoted by manufacturers for 1-25MW plant, but on an NCV basis and were sceptical that larger plant would operate at higher efficiencies as, to their knowledge >25MW schemes are based on multiple smaller grates. A third suggested that 24% for schemes up to 25MW was a more realistic electrical efficiency assumption.

13. One response noted that the effect of schemes using forestry waste moving from the existing Biomass to Category E (Agricultural Biomass) negated the tightening of the formulae. They cited their ACT plant which under both existing and proposed criteria would fully qualify with a heat efficiency of around 3%.

Alternatives to Current QI Formulae Approach

14. Three consultees proposed moving to alternative approaches to determining QI rather than the current approach of a weighted sum of electrical and power efficiencies, with weighting factors derived to satisfy the policy criteria. One as an example suggested using the three policy criteria directly;

$$QI = \frac{PES}{10\%} \times \frac{\eta_{overall}}{35\%} \times \frac{\eta_{heat}}{10\%} \times 100$$

15. The second proposed retaining the existing QI coefficients and adding the 10% minimum heat criterion as a stand-alone requirement. The third proposed using primary energy saving alone, assessed against best available technology rather than EU reference efficiencies.

Other Issues

16. One consultee requested that the Government response clarify that the scaleback mechanism would continue to apply, They and one other consultee proposed that a 2% minimum heat efficiency requirement be introduced to prevent applications coming forward with nominal heat loads solely to escape the dedicated biomass cap.

17. One response argued that the QI formulae should differentiate between high and low temperature heat loads, noting that it was easier to deliver high heat efficiencies in the case of high temperature heat demand.

18. One association commented that their members felt that the “slope” of the proposed QI formulae was steeper than previously.

Consultation Question 2

Do you agree with the proposed safeguard provision? Please provide a justification for your answer.

19. Twenty consultees supported the proposed safeguard provision. Although two commented that it would be less necessary if the heat efficiency criterion was reduced to 5% and five of these noted that it had the disadvantage of creating a "cliff-edge" in the QI formulae and schemes which fully qualified due to the safeguard, but then experienced a small reduction in performance could experience a substantial loss in support as a result. Another response noted that this could occur due to the loss of heat customers on a network. One response proposed that a "glidepath" approach be adopted to address the cliff edge whereby, if a scheme fell below one of the criteria its eligibility for the ROC uplift was reduced linearly in proportion to the extent to which the criterion and a QI of 100 was missed. They did not set out in detail how this might work. Two responses requested that the safeguard provision provide some dispensation for initial operation (they proposed 7.5% heat efficiency for first two years). They also proposed that the response clarify that this provision be grandfathered alongside the QI formulae. Three further responses requested dispensation for initial operation, but specifically for district heating schemes and for periods of 5-10 years. They noted that District Heating schemes were unlikely to meet the safeguard criteria at the start of operation.

20. Eight responses felt that a safeguard provision would not be necessary provided that the QI formulae accurately reflected the latest performance of plant on the market. Three responses disagreed with the proposed safeguard on the grounds that they felt the policy criteria were not sufficiently demanding. A fourth also felt the criteria looked low, but did oppose the principle of the provision.

21. Two respondents commented that inclusion of a safeguard provision within the CHPQA standard (as well as Guidance Note 44) was desirable e.g. for the purposes of Enhanced Capital Allowance eligibility and preferential business rates. Two also requested that the Primary Energy Saving calculation methodology be set out in CHPQA Guidance Notes and indicate the relevant reference efficiencies for each fuel category and at which z ratio the lower heat reference values should be made. One consultee requested clarification on whether there would be any discrimination between schemes qualifying under the safeguard provision rather than the QI formulae.

Consultation Question 3

Do you agree with the proposed approach on grandfathering? Please provide a justification for your response and data in support of this or any alternative proposed approach.

22. Twenty-two respondents supported the grandfathering of the new criteria going forward, but opposed the lack of grandfathering of current formulae for existing schemes on the grounds that investment in existing schemes had been made on the basis of the current criteria and retrospective change would also damage investor confidence.

23. One respondent agreed, but only to the extent that an exception is created for those schemes that can demonstrate that they reached financial close during the period 20th October 2011 to 25th July 2012.

24. One consultee also thought it must be extended to projects financed after the RO banding consultation was issued.

25. One stakeholder supported the proposal for the eligible life of new renewable CHP projects that are fully accredited under the RO between 1 January 2014 and 31 March 2017 noting that a similar approach was proposed for biomass sustainability under the RO.

26. One response agreed with approach proposed for new schemes, but is concerned that under the proposed changes, almost half of existing solid biomass schemes will suffer reduced support. It submitted that DECC should consider grandfathering those schemes' existing support.

27. Two respondents want the X coefficient reductions to be reviewed and the safeguard provision to be grandfathered for the life of the plant.

28. Another respondent agreed but submitted that for existing plants it would be more appropriate to grandfather from the point of accreditation, such that X&Y values on which a project was financed are carried forward. They suggested that if grandfathering is introduced as outlined, existing CHP schemes should be given the opportunity to consider foregoing the CHP.

29. One participant proposed that a degradation formula be included, to allow for reducing plant performance with time.

30. One consultee agreed with the grandfathering philosophy but thought it should have been implemented at the start of the programme. They commented that 45% of solid biomass schemes experiencing reduced support under the propsoals was unacceptably high.

31. One respondent disagreed with any grandfathering on the grounds that they felt that these were insufficiently demanding. Another consultee thought that the current position of not grandfathering should be maintained to ensure that only the most efficient technologies receive CHPQA accreditation, and to incentivise investment in the most efficient systems. They thought that by grandfathering the criteria now, the flexibility to update the criteria is being removed, and will prevent future technological improvements being reflected in the scheme, and could see poor quality CHP systems being supported even as technology improves.

32. Four respondents disagreed with the proposal on the grounds that retroactive changes introduce uncertainty into the financing process.

33. One stakeholder thought that the grandfathering proposals set out in Section 7 of the consultation paper should only be applied to those projects that are constructed on the basis of an investment decision taken after the publication of this consultation. There should be a clear distinction between "new projects" and "existing projects" for these arrangements to be supported. This distinction should be based upon the date that an

investment decision is made. If the investment decision is made before 21 December 2012 (i.e. the start date of this consultation) then the project should be defined as an "existing project".

Consultation Question 4

Do you agree with the proposed fuel categorisation? Please provide data on the efficiency of schemes fuelled with particular fuel types in support of any alternative categorisation.

34. Responses included those that commented on the principles of the categorisation, those that covered the detail of which fuels were included in each category and responses which focussed on particular fuel categories.

35. Nine consultees agreed with the majority of the fuel categories. One of these felt that the liquid biofuel category did not capture the full range of liquid biofuels, in particular those from residues. Two felt that some liquid biofuels might require bespoke QI formulae. Three felt that syngas from gasification needed a separate category from biogas as syngas fuelled schemes were of inherently lower efficiency than biogas engines. One suggested Agricultural Biomass be split into Energy Crops and Agricultural residues and requested clarification from DECC on whether the inclusion of straw within the Wood fuel category was based on its moisture content. Another proposed that dried and undried wood chips be distinguished via a moisture content criterion. They also asked for clarification on the reasons for the classification of straw and bagasse alongside wood and the definition of milling residues. One consultee noted that Hydrogenated Vegetable Oil needed to be included in the Bioliquid category.

36. Eight consultees felt that fuel categorisation should reflect objective physical characteristics of the fuel such as calorific value, ash content and, in particular, moisture content (as efficiency is assessed on a GCV basis and thus affected by GCV). One proposed that fuel moisture content should have to be measured onsite, whilst another requested that any categorisation by fuel moisture content be based on moisture content of the annual fuel mix. Two responses emphasised the importance of defining the point at which fuel categorisation is assessed e.g. as the fuel crosses the scheme boundary.

37. Two consultees, despite proposing categorisation by fuel properties, felt that any change from the current CHPQA fuel categorisation would create confusion and uncertainty for investors. They also felt that the categorisation should be better aligned with fuel types within the Renewables Obligation.

38. One response commented that a Biomass Gasification unit and a Biomass Combustion unit should be subject to the same classification so as to encourage the use of the more efficient generating processes/technology.

39. One consultee felt that moving waste wood from "solid waste" to its own category was inappropriate, in particular as the proposed QI formula for waste wood did not reflect the performance limitations imposed by contamination. Another noted that distinguishing between wood and waste wood could be difficult in practice and the laxer criteria for waste wood provided a strong incentive to game the system. They proposed a number of

possible alternative approaches; i) three biomass categories differentiated only on moisture content; ii) categories differentiated by embedded energy in MWh/tonne or iii) metering heat input to the prime mover at boiler outlet.

40. Another consultee explicitly supported the introduction of a separate category for waste wood. However they noted that inclusion of PAS grade-A waste wood in Category G (wood fuels) might be problematic as such fuel involved intermediate combustion temperatures between virgin wood and Grade B-D waste wood.

41. One consultee disagreed with the proposed categorisation which they felt was illogical. They suggested that Category G should include only fuels which were obviously wood and wastes and residues should be separately treated.

42. One consultee proposed that a separate category be introduced for CHP using Solid Recovered Fuel.

43. One response noted that the Biogas & Syngas category covered four different gases with different maximum potential prime mover efficiencies. They felt that the QI coefficients should be set at a level which enabled all to fully comply.

Consultation Question 5

Do you agree with the proposed approach on District Heat Networks? Please provide a justification for your response and data in support of this or any alternative proposed approach.

44. Nine respondents agreed with the proposed approach on District Heat Networks. Three respondents requested clarification of the term within CHPQA Guidance Notes (which currently only refer to “residential community heating schemes”).

45. Four consultees thought that the QI threshold of 95 was too high if it is to apply for a five year period. They suggested that either the threshold is reduced or applies on an incremental basis of 1point p/a over the five year period culminating in a QI of 95 in year five, or a QI threshold of 90 or a staggered approach. Two other stakeholders suggested that the initial QI should be set to 90 and then rise by two points per year until the target QI is 100.

46. Five resposnes wanted a clearer definition of ‘District Heating Network’.

47. One consultee wanted the application of ‘max heat’ in respect of calculation of QI for District Heating to be clarified.

48. Two respondents thought that DECC should extend the period of the reduced QI threshold to seven or even ten years, while at the same time lowering that threshold to 90.

49. One consultee noted that allowing plant operators to switch from the ROC CHP uplift support to the RHI support would result in a much stronger incentive to develop a growing district heat network.

50. One response noted that heat network expansion might result in overcapacity. It is therefore likely that "wasted heat" will generate very low QI until the network is fully "loaded". They proposed a reduced QI of 50-60.

51. One respondent felt that there should be an option, providing a coherent causation is identified, that the Initial Operating Period be extended until such time as the initial proposed scheme is completed. They argued that the completion could well be outside the control of the generator and it would be unfortunate indeed that a slow running but perfectly sensible scheme was to be decommissioned as the QI fell beyond its reach. They proposed that the Initial Operating period be extended until such time as the contractual recognisable term "practical completion" is achieved. They felt that Identification of that moment should be achievable by modification of the originating F2 and F3 submissions. They also argued that over the extended life of a district heating scheme, anchor consumers can fall by the wayside, returning a scheme to a position worse than the Initial Operating Period condition. They felt that, if there is to be wide-scale deployment of district heat, that mechanisms should be put in place to avoid the needs of many being undermined by the failure of one.

52. One respondent felt that the proposed reduction should also be applied to existing plant that have been retrofitted whilst their network is developed.

53. One consultee did not support the approach, feeling that it could create a barrier to entry for more competitive, low carbon heating alternatives, that could potentially be deployed faster and deliver a thermodynamic performance comparable to an established and fully operational DHN.

Consultation Question 6

Do you agree with this alternative approach on grandfathering? Please provide a justification for your response or any alternative proposed approach, including, in particular, justification for any alternative proposed dates.

54. Twenty respondents supported the proposed approach.

55. Two respondents believe that the existing criteria should be grandfathered for all schemes that reached financial close prior to 25th July 2012 and not just those in the October 2011 – July 2012 period. They regarded this as important to avoid penalising schemes with genuine heat loads which were considered acceptable by the CHPQA criteria extant at the time of their design and which may be technically constrained from increasing their heat supply. They expressed the view that there had been little clarity on grandfathering policy in respect of CHPQA criteria prior to 25th July 2012. They noted the risks to investor certainty if existing criteria were not grandfathered along the lines they proposed and that the benefit in addressing existing schemes with negligible heat load was limited due to the small number of such schemes.

56. One consultee believed that the alternative grandfathering approach should also cover schemes that reached financial close on CHP retrofit decisions within these time windows.

57. One respondent sought that the alternative approach to grandfathering is extended to EfW projects that have achieved preliminary accreditation and which submitted final waste contract tenders to local authorities between October 2011 and September 2012. The protection afforded by such grandfathering should carry forward once projects have gone into construction, including where their completion will be after 2017 when the existing support regime is to be replaced. It was submitted that this is needed to accommodate the lengthy build and commissioning process for EfW projects of at least 36 months.

58. Seven stakeholders were under the assumption that the qualification criteria would be grandfathered when the ROC banding review consultation was underway.

59. One respondent felt that grandfathering should either apply to all plants that have been designed to meet the old criteria i.e. commissioned/ post 2009, or it should not apply to any plants at all.

60. One consultee felt that there should be a commitment to no further revisions of the QI formulae until 2020 at the earliest, and any future revisions of the QI formulae should only be implemented following sufficient lead time, for example four years, so as not to undermine the investment case of plants that have already reached financial close or are under construction.

61. Two respondents felt that no CHPQA criteria should be grandfathered, one of them providing the reason that projects should have carried out better due diligence and should have mitigated those project development risks.

Consultation Question 7

Do you agree that this would constitute an appropriate and workable requirement for evidence of financial close? Please provide a justification for your response or any alternative proposed approach.

62. Thirteen consultees felt that these requirements were sensible.

63. Two respondents felt that a letter from the Board, Investment Committee or Bank (in the case of project financing) confirming that financial close or a decision to commit funds would be sufficient evidence. Another consultee thought that evidence could also include copies of certified minutes of meetings or copies of contracts for the chosen technology.

64. One consultee thought that a minimum threshold should be defined, with different thresholds applying depending on the funding mechanism, that is, on or off balance sheet, suggesting a 10% threshold for on-balance sheet projects and a 50% threshold for off-balance sheet funding. Another consultee thought that an earlier commitment date should be required for on balance sheet funding (e.g. grid payments, consent and option/lease).

65. One stakeholder agreed with the 1st and 2nd conditions, but felt that Condition 3 should be replaced by the start of construction of the project within a certain period of time after financial close, for example 18 months

66. Three respondents recommended that projects that are financed without third party funding (on balance sheet) should have to provide the evidence described in (1) and (3) of s.5 of the Supplementary guidance. Sub-paragraph (2) may not be available to on-balance sheet projects. They thought that projects that are financed with third party should have to provide certified extracts from the facility agreement executed within the grandfathering window. They said that all grandfathered projects should be obliged to provide evidence that funds equivalent to: 1) at least 10% of total expected capital cost were invested in the project within the grandfathering window; and 2) at least 25% of total expected capital cost have been invested in the project to date.

67. One respondent felt it was important that DECC considers and aligns the outcomes of this current consultation on renewable CHP Schemes with the outcomes of the consultation on the design of the notification process for new dedicated biomass which is expected in March 2013.

68. Two consultees thought that the requirements were reasonable, but thought that the third requirement was unreasonable (the evidence of funds having been disbursed toward the project reaching commissioning).

69. One respondent felt that each plant should be considered on its individual merits - the documentation available will differ depending on how the investment programme was funded. The key indicator would be for the owner/operator of the facility to prove that significant expenditure in the plant had been made on the belief that the CHPQA certification criteria were grandfathered.

70. Two respondents did not think the additional proposal would be beneficial.

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