



# Principles and Procedures

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CHPQA

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# Talk Coverage

- Quick Review
  - Principles
  - Roles & Responsibilities
  - Certificates
  
- CHPQA Procedures



# Why CHPQA?

- It is a tool for measuring the Quality of CHP Schemes
- A rigorous system is needed to:
  - ❑ ensure that incentives are targeted fairly
  - ❑ Ensure that it only benefits schemes making significant environmental savings
- CHPQA provides the **methods** and **procedures** needed to assess and certify the quality of the full range of CHP Schemes

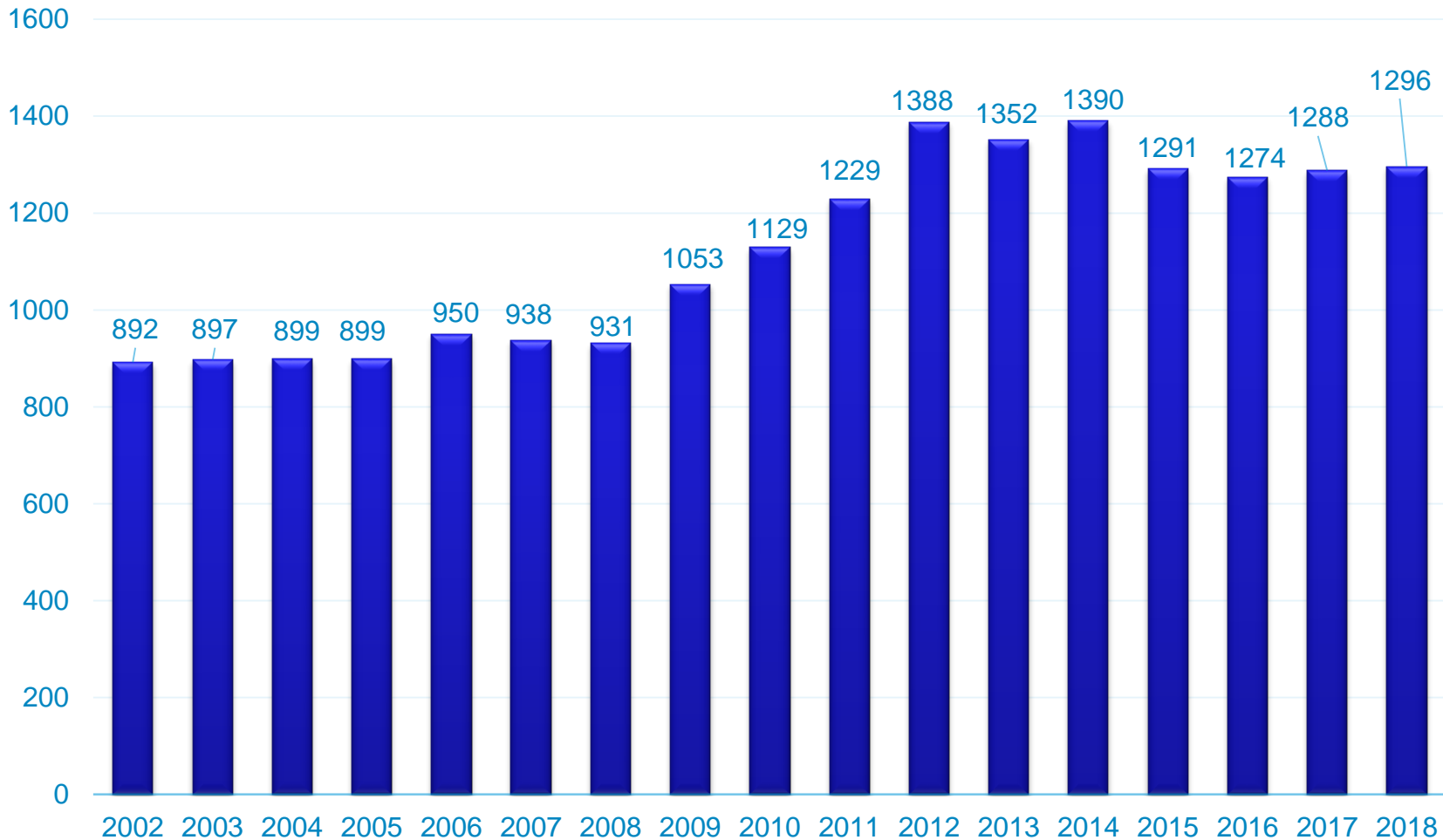


# Fiscal Measures and GQCHP

- CCL Exemption (on fuel input and electricity output where directly supplied)
- Business Rates Exemption (embedded schemes)
- Hydrocarbon Oil Duty Relief
- Enhanced Capital Allowance
- 1ROC/MWh of electricity from EfW CHP, 2 ROCs/MWh from dedicated biomass CHP (April 2009)
- CPS:-
  - Schemes > 2 MWe:- Exemption to fuel for heat
  - Schemes ≤ 2 MWe:- Full exemption from CPS
- CPS – exemption for supplies of fossil fuels to CHP where the fuel is used to generate Good Quality electricity used on site (from April 2015)
- Specific RHI tariff for biomass fuelled GQCHP
- CHP specific CfDs applicable to biomass and waste fuelled CHP, replaced RO for all new projects from 1/4/2017 (18 months later if eligible for RO 'grace' period).



# Number of Schemes





# Definition of GQCHP

Set out in the CHPQA Standard

➤ For Existing Schemes:

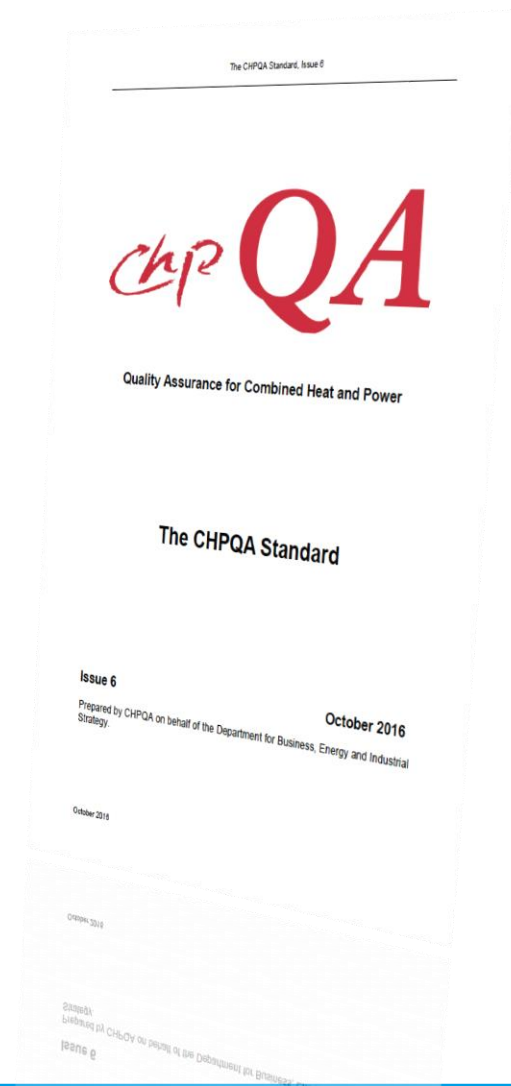
- ❑ Quality Index (QI)  $\geq 100$  and
- ❑ Power generation efficiency of  $\geq 20\%$

➤ For Upgraded & New Schemes:

- ❑ Quality Index (QI)  $\geq 105$  and
- ❑ Power generation efficiency of  $\geq 20\%$ .

**See Issue 6 - Published October 2016**

**See also CHPQA Guidance Note 44 Issue 6 with regard to CFD and ROC support**





# CHPQA QI Formulas

The general definition for QI is:

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

Where:

Power Efficiency

and

Heat Efficiency

$$\eta_{\text{Power}} = \frac{CHP_{TPO}}{CHP_{TFI}}$$

$$\eta_{\text{Heat}} = \frac{CHP_{QHO}}{CHP_{TFI}}$$

X and Y are parameters which depend on the type of fuel used and size of scheme ( $MW_e$ )



# CHPQA Power Efficiency

- Power efficiency -  $\eta_{\text{Power}}$
- Determined from  $\text{CHP}_{\text{TFI}}$ ,
  - ❑ The measured fuel input, in MWh
  - ❑ Includes all fuels consumed by Scheme
  - ❑ Covers full calendar year
  - ❑ Determined on a GCV (HHV) basis
- And from  $\text{CHP}_{\text{TPO}}$ ,
  - ❑ The measured power output, in MWh
  - ❑ Includes all power generated by Scheme
  - ❑ Covers full calendar year
  - ❑ Not to include load banks

$$\eta_{\text{Power}} = \frac{\text{CHP}_{\text{TPO}}}{\text{CHP}_{\text{TFI}}}$$







# CHPQA Heat Efficiency

- Heat efficiency –  $\eta_{Heat}$
- Determined from  $CHP_{TFI}$ ,
  - ❑ The measured fuel input, in MWh
  - ❑ Includes all fuels consumed by Scheme
  - ❑ Covers full calendar year
  - ❑ Determined on a GCV (HHV) basis
- And from  $CHP_{QHO}$ ,
  - ❑ The measured, useful heat output
  - ❑ Covers full calendar year

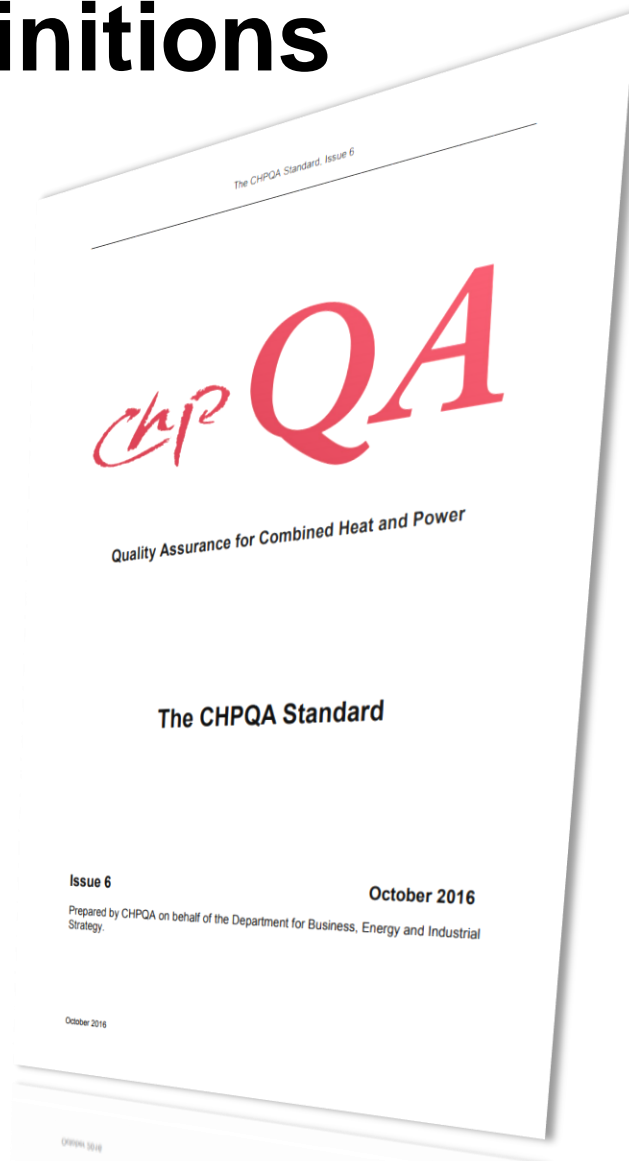
$$\eta_{Heat} = \frac{CHP_{QHO}}{CHP_{TFI}}$$





# CHPQA X and Y Definitions

- Given in the CHPQA Standard
- Depend on scheme specific fuel type and power capacity
- Full details this afternoon



Size of Scheme (CHP <sub>TPC</sub> )	QI Formula
<b>CONVENTIONAL FOSSIL FUELS SCHEMES</b>	
<b>Natural gas</b>	
≤1MWe	QI = 249 x $\eta_{power}$ + 113 x $\eta_{heat}$
>1 to ≤10MWe	QI = 195 x $\eta_{power}$ + 113 x $\eta_{heat}$
>10 to ≤25MWe	QI = 191 x $\eta_{power}$ + 113 x $\eta_{heat}$
>25 to ≤50MWe	QI = 186 x $\eta_{power}$ + 113 x $\eta_{heat}$
>50 to ≤100MWe	QI = 179 x $\eta_{power}$ + 113 x $\eta_{heat}$
>100 to ≤200MWe	QI = 176 x $\eta_{power}$ + 113 x $\eta_{heat}$
>200 to ≤500MWe	QI = 173 x $\eta_{power}$ + 113 x $\eta_{heat}$
>500MWe	QI = 172 x $\eta_{power}$ + 113 x $\eta_{heat}$
<b>Oil</b>	
≤1MWe	QI = 249 x $\eta_{power}$ + 115 x $\eta_{heat}$
>1 to ≤25MWe	QI = 191 x $\eta_{power}$ + 115 x $\eta_{heat}$
>25MWe	QI = 176 x $\eta_{power}$ + 115 x $\eta_{heat}$
<b>Coal</b>	
≤1MWe	QI = 249 x $\eta_{power}$ + 115 x $\eta_{heat}$
>1 to ≤25MWe	QI = 191 x $\eta_{power}$ + 115 x $\eta_{heat}$
>25MWe	QI = 176 x $\eta_{power}$ + 115 x $\eta_{heat}$

>25MWe	QI = 176 x $\eta_{power}$ + 115 x $\eta_{heat}$
>1 to ≤25MWe	QI = 191 x $\eta_{power}$ + 115 x $\eta_{heat}$



# Definition of 'Useful Heat'

- 'Useful Heat' is defined as the heat from a CHP scheme delivered to satisfy an **economically-justifiable** demand for heat or cooling
  - ❑ (Article 3 of the Cogeneration Directive, Article 2 of the EED);
- Demand which does not exceed the needs for heating or cooling, and which
- Otherwise would be met at market conditions by energy generation processes other than cogeneration.



## Examples of 'Useful Heat' loads

- CHP heat used for space heating, hot water and process heat
- CHP heat replacing an existing heat demand
- CHP heat used to meet legislative requirements

Do not require economic justification, only evidence of demand



- CHP heat used to meet unusual heat loads (e.g. woodchip / wood pellet drying, AD plant heat load)
  - ❑ requires economic justification





# Basis of Economic Analysis

- Should be undertaken for the alternative to CHP (i.e. assuming that CHP does not exist)
- Heat is only provided through a gas or an oil boiler
- Any fiscal benefits or revenue from CHP will thus be excluded from the cost-benefit analysis
- Analysis can be undertaken in a spreadsheet or in the form of a detailed report
- All assumptions must be fully stated and referenced (*for example size of market and corresponding size of heat demand need to be evidenced with suitable market study*)
- Calculations must be fully shown (calculation of costs, revenues, and payback period)

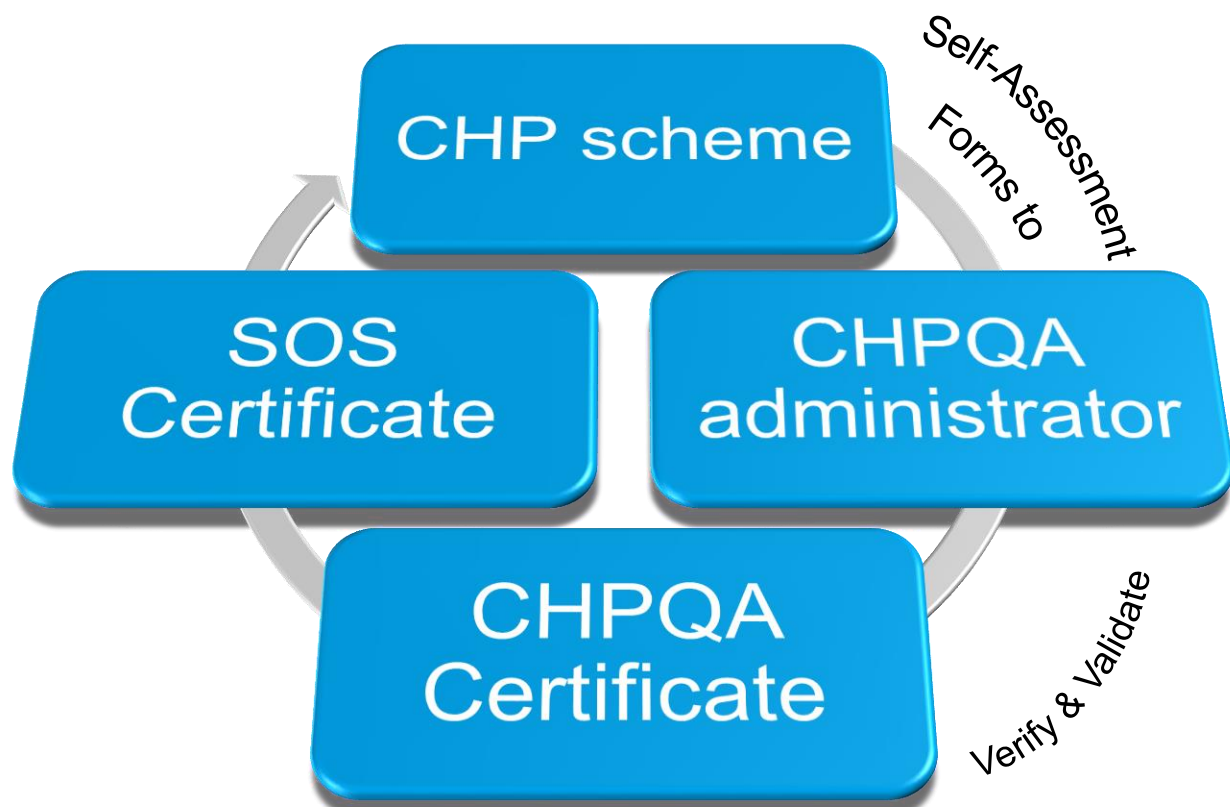


# Requirements for CHPQA Economic Justification

- Full description of the business case for the heat load
- A cost-benefit analysis involving:
  - ❑ the capital cost of the heat source (i.e. gas boiler)
  - ❑ the operating costs (e.g. cost of fuel to run the boiler)
  - ❑ the revenue/benefit achieved by utilising the heat
  - ❑ a statement of the Company's investment criteria stating what is considered an acceptable payback period.



# Self Assessment & Certification





# Roles & Responsibilities

➤ CHPQA Administrator

- ❑ Managed by Ricardo Energy & Environment



➤ Department for Business, Energy & Industrial Strategy (BEIS)

➤ Other Government Departments (HMRC, VOA)



HM Revenue  
& Customs

➤ Ofgem

- ❑ for RHI and ROCs



Valuation Office Agency

➤ Low Carbon Contracts Company

- ❑ for CfD contracts.







# CHPQA Guidance Notes

- Range of Guidance Notes available on the CHPQA web site
- Always refer to the web site to be sure of latest version
- Five broad areas
  - ❑ 0-9 Introduction & Forms
  - ❑ 10-16 Scheme Details & Thresholds
  - ❑ 17-29 CHPQA Analysis
  - ❑ 30-39 Treatment of Special Cases
  - ❑ 40-49 Uses for CHPQA



# CHPQA Guidance Notes

- Of particular interest;
  - ❑ 11 and 12 – Defining & Describing the Scheme
  - ❑ 13 – Scheme Monitoring
  - ❑ 14, 15 and 16 – Fuel, Power and Heat Metering
  - ❑ 17, 18 and 19 – Metering/Monitoring Uncertainty

Ideas?

- **Simplification of Guidance Note – Any suggestions!!!**



# CHPQA Submission

- A range of forms:
  - ❑ F1 (contact details);
  - ❑ F3 (design phase).
  - ❑ F2 (scheme description); and
  - ❑ F4 (scheme actual performance in previous calendar year).
- Simplified procedure and forms for small single reciprocating engine based schemes (<2MW<sub>e</sub>).
  - ❑ Only have to provide three figures per year.

The screenshot shows the CHPQA Form Submission website. The page title is "Department for Business, Energy & Industrial Strategy : CHPQA Form Submission". The page features the Department for Business, Energy & Industrial Strategy logo and the CHPQA logo. There are two main sections: "User login" and "Register". The "User login" section has fields for "Username:" and "Password:" and a "Login" button. Below these fields, there is a link for "Forgotten password". The "Register" section has a "Form 1" button and text stating: "To register a CHP Scheme you must complete a Form 1. Click the button below to start a scheme registration." There is also a link for "Privacy policy" in the "User login" section.

Further details on CHPQA forms submission in the next session...



# Simplification for <500kW<sub>e</sub> Schemes

Simple small CHP schemes can use the CHPQA Unit List to determine:

- Gas input (based on power efficiency) and
- Heat output (based on heat-to-power ratio)

Only CHP units meeting the following criteria:

- CHP Scheme with TPC <500kW<sub>e</sub>
- Only include a single prime mover
- Using Natural Gas fired engines
- No facility to dump heat

This list is always under review, so make sure you are using the latest

Manufacturer	Model	Engine	Total Power Output kW	Max Heat Output kW	Fuel Input kW/GJ	Power Efficiency %	Max Heat to Power Ratio	Max Thermal Efficiency	Max Overall Efficiency
COGAS	NR10	MAN ESBE	90	135	300	30	151	48%	75%
	CG10B	MAN ESBE202	105	135	344	33	121	42%	74%
	NR10	MAN ESBE10	112	177	323	30	149	40%	77%
	CG10D	MAN ESBE10	110	201	421	31	155	48%	75%
	NR10	MAN ESBE10	140	217	444	32	148	47%	76%
	CG10B	MAN ESBE10	140	231	542	31	155	48%	75%
	NR10	MAN ESBE10	211	324	559	33	118	39%	72%
	CG10D	MAN ESBE10	211	324	681	31	152	47%	75%
	NR10	PERMADIESEL	217	324	742	32	151	48%	80%
	CG10D	PERMADIESEL	307	435	1020	30	153	48%	79%
	CG10B	MAN ESBE10	312	435	930	31	142	46%	75%
	NR10	MAN ESBE10	330	510	1142	33	132	44%	72%
	CG10B	PERMADIESEL	430	630	1353	30	155	48%	79%
	CG10D	PERMADIESEL	430	630	1401	30	139	40%	76%
	PERMADIESEL	CG10B	PERMADIESEL	430	630	1401	30	139	40%
CG10D		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10B		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10D		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10B		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10D		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10B		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10D		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10B		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10D		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10B		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10D		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10B		PERMADIESEL	430	630	1401	30	139	40%	76%
CG10D		PERMADIESEL	430	630	1401	30	139	40%	76%

Make sure that the **engine spec** used from Unit List matches the details on your F2





# Certification Timetable

- CHPQA Certificates cover a **calendar year** and expire at the end of December
- SoS (CHP Exemption) certificates are **open-ended...**
- ...provided that a valid CHPQA certificate is obtained **no later than end of June every year**
- **To obtain an SoS certificate need to make sure you select the correct option**

**CHPQA**

Department for  
Business, Energy  
& Industrial Strategy

*Quality Certification for  
an existing CHP Scheme*

CHPQA Certificate No: F12345678

Scheme: The CHPQA Administrator  
The Gemini Building  
Forml Avenue  
Didcot OX11 0QR

CHPQA Scheme Reference No: 1234A

This is to Certify that the Self-Assessment of the above CHP Scheme undertaken by Responsible Person of Scheme performance during the calendar year: 2016 has been Validated under the Combined Heat and Power Quality Assurance programme and that:

1. The Total Power Capacity of this Scheme is:	1,020 MWe
and the <b>Qualifying Power Capacity</b> is:	1,020 MWe
2. The threshold Power Efficiency criterion for this Scheme is:	20 %
and the <b>Power Efficiency</b> of this Scheme is:	29.12 %
3. The Qualifying Heat Output from this Scheme is:	5,185 MWh
and the <b>Heat Efficiency</b> of this Scheme is:	39.73 %
4. The threshold Quality Index criterion for under <b>Initial Operation</b> is:	100
and the <b>Quality Index</b> of this Scheme is:	118.20
5. The Total Fuel Input to this Scheme is:	12,975 MWh
and the <b>Qualifying Fuel Input</b> is:	12,975 MWh
6. The Total Power Output from this Scheme is:	3,778 MWh
and the <b>Qualifying Power Output</b> is:	3,778 MWh
7. The fuel supply reference(s) (e.g. TRANSCOMPR gas meter reference nos. and/or other unique ID descriptors) for this Scheme are:	[12345678]

This certificate is a statement of Scheme performance over the period 01/03/2016 to 31/12/2016 and is valid until 31/12/2017.  
Approved by the CHPQA Administrator on behalf of BEIS. Date: 10 March 2017  
The CHPQA programme is carried out on behalf of the Department for Business, Energy and Industrial Strategy (BEIS), in consultation with the Scottish Executive, The National Assembly for Wales, and the Northern Ireland Department of Enterprise, Trade and Investment.  
For the purposes of the Climate Change Levy (General Assessment) Regulations 2003 only, the QPO limit shall be equal to the actual output of the station multiplied by the following ratio: the Qualifying Power Output entered in a item 6 above over the Total Power Output entered in a item 6 above.



# CHPQA Audits

- All Schemes are potentially subject to Audit
- Usually performed in autumn of each year (Aug to Dec)
- Look to audit approximately 75 Schemes a year, and larger Schemes every three years
- Selected during validation
- Audit Actions should be closed before the next data submission



# Where do you go from here?

- All CHPQA Certificates issued in 2018 will expire on 31<sup>st</sup> of December 2018
- **New self-assessments should be submitted to the CHPQA Administrator before end of March 2019**
- **Based on 2018 actual data:**
  - Fuel used
  - Electricity generated
  - Heat utilised (actual)
- **If all is in order new certificate (based on 2018 data) will be issued before the end of June 2019**







# Some Clarifications

## Initial Operation Conditions

- Only apply to CCL related incentives
- QI Threshold during IO is 95
- Initial calendar year of operation
- Scheme commences operation in June 2017
- IO period ends 31 December 2018

## Normal Operation Conditions

- Starts when IO ends



# CHPQA Contact Details

CHPQA Administrator

The Gemini Building

Fermi Avenue

Harwell

Didcot

OX11 0QR

E-mail: [chpqainfo@chpqa.com](mailto:chpqainfo@chpqa.com)

Tel: 01235 75 3004

Web:

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