



Principles and Procedures

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Session 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 (ECA)~~ – scheme now closed
- 1ROC/MWh of electricity from EfW CHP, 2ROCs/MWh from dedicated biomass CHP (scheme closed to new entrants in 2017)
- CPS:-
 - Schemes >2MWe:- Exemption to fuel for heat
 - Schemes ≤2MWe:- 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.



Definition of GQCHP

Set out in the CHPQA Standard

➤ For Existing Schemes:

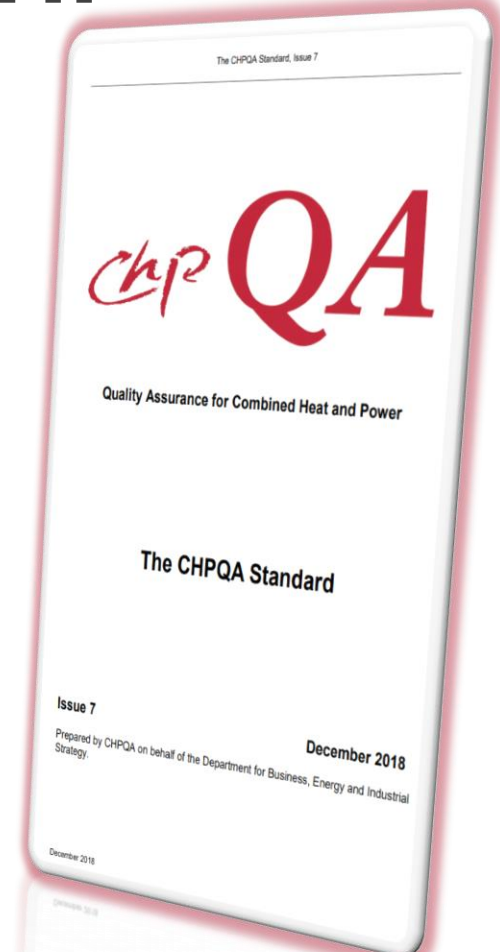
- ❑ Quality Index (QI) ≥ 100 and
- ❑ Power generation efficiency of $\geq 20\%$

➤ For Upgraded & New Schemes:

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

See Issue 7 - Published December 2018

Issue 8 (published March 2021) was released to allow for Covid easement to 2020 performance. This has not superseded Issue 7.





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 - η_{Power}
- 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_{TPO} ,
 - ❑ The measured power output, in MWh
 - ❑ Includes all power generated by Scheme
 - ❑ Covers full calendar year
 - ❑ Not to include load banks

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





CHPQA Heat Efficiency

- Heat efficiency – η_{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

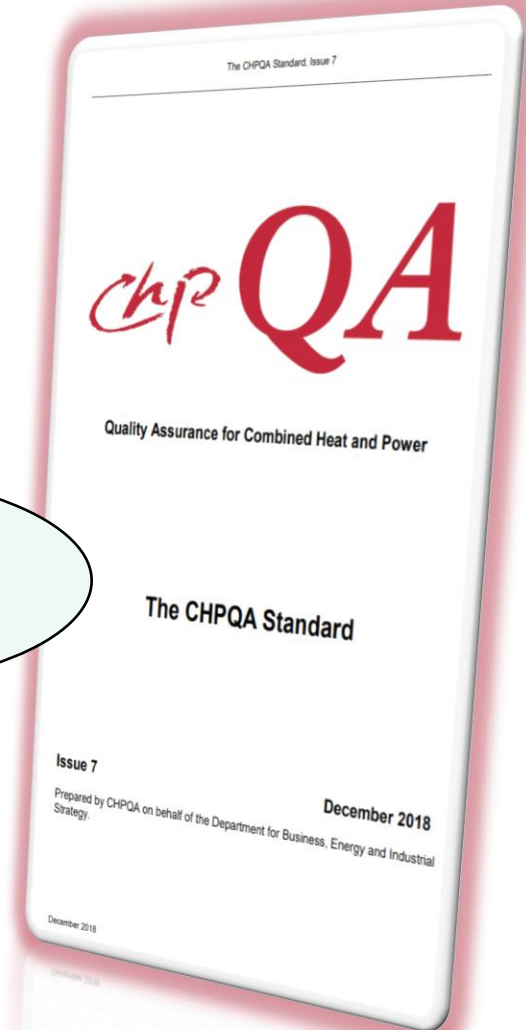
$$\eta_{Heat} = \frac{CHP_{QHO}}{CHP_{TFI}}$$





CHPQA X and Y Definitions

- Given in the CHPQA Standard
- Depend on scheme specific fuel type and power capacity
- Full details in Module 2



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

Deliver:
 1- overall η of 70%
 2- PES 10% for >1 MWe
 3- heat 10% (Useful)

| | |
|-----------------|---|
| >500MWe | QI = 172 x η _{power} + 113 x η _{heat} |
| >100 to ≤200MWe | QI = 176 x η _{power} + 113 x η _{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



Does not require economic justification, only evidence of demand

- CHP heat used to meet unusual heat loads (e.g. drying woodchip/sawdust, grass, SRF etc, 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).
- Assume Heat is provided from Gas or Oil fired boilers.
- Any fiscal benefits or revenue from CHP should 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.
- Calculations must be fully shown (calculation of costs, revenues, and payback period).



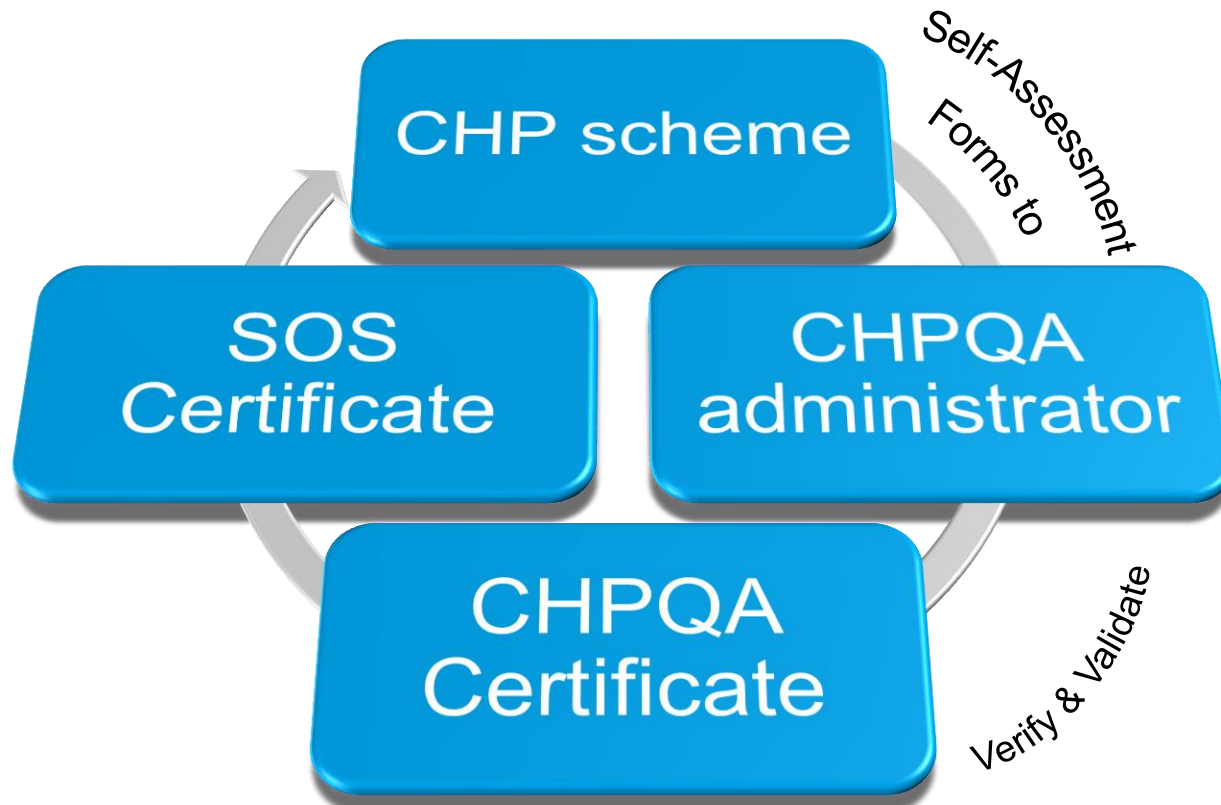
Requirements for CHPQA Economic Justification

- 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 (i.e. increase in the value of sold products)
 - ❑ a statement of the Company's investment criteria stating what is considered an acceptable payback period

**See Guidance Note 50: Quantifying and
Justifying Useful Heat Outputs**



Self Assessment & Certification





Roles & Responsibilities

➤ CHPQA Administrator

❑ Managed by Ricardo Energy & Environment



➤ Department for Energy Security & Net Zero (DESNZ)

➤ Other Government Departments (HMRC, VOA)



HM Revenue
& Customs

➤ Ofgem

❑ for RHI and ROCs



Valuation Office Agency



➤ Low Carbon Contracts Company

❑ for CfD contracts.



LOW CARBON
CONTRACTS COMPANY



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_e).
 - ❑ 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 the login fields, there is a link to "Forgotten password" and a note: "If you have not yet received your username and password, please contact the [CHPQA Administrator](#). Please read our [Privacy policy](#)." The "Register" section has a "Form 1" button and text: "To register a CHP Scheme you must complete a Form 1. Click the button below to start a scheme registration."

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



Simplification for <500kWe Schemes

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

- Only need to provide **one figure per year** ... total electricity generation
- Gas input (based on design power efficiency) and
- Heat output (based on design heat-to-power ratio)

Only CHP units meeting the following criteria:

- CHP Scheme with TPC <500kWe
- 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 Capacity kW | Rated Net Output kW | Fuel Input kW/GJ | Power Efficiency % | Rated Net Heat Flow kW | HEC | Total Efficiency % |
|--------------|-----------|--------|-------------------------|---------------------|------------------|--------------------|------------------------|-----|--------------------|
| CCOBS | MN2500E2P | 90 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 95 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 100 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 105 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 110 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 115 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 120 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 125 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 130 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 135 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 140 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 145 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 150 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 155 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 160 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 165 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 170 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 175 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 180 | 935 | 300 | 30 | 42% | 40% | 70% | |
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| CCOBS | MN2500E2P | 190 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 195 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 200 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 205 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 210 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 215 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 220 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 225 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 230 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 235 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 240 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 245 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 250 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 255 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 260 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 265 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 270 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 275 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 280 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 285 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 290 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 295 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 300 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 305 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 310 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 315 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 320 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 325 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 330 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 335 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 340 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 345 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 350 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 355 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 360 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 365 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 370 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 375 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 380 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 385 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 390 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 395 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 400 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 405 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 410 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 415 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 420 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 425 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 430 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 435 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 440 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 445 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 450 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 455 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 460 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 465 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 470 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 475 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 480 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 485 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 490 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 495 | 935 | 300 | 30 | 42% | 40% | 70% | |
| CCOBS | MN2500E2P | 500 | 935 | 300 | 30 | 42% | 40% | 70% | |

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



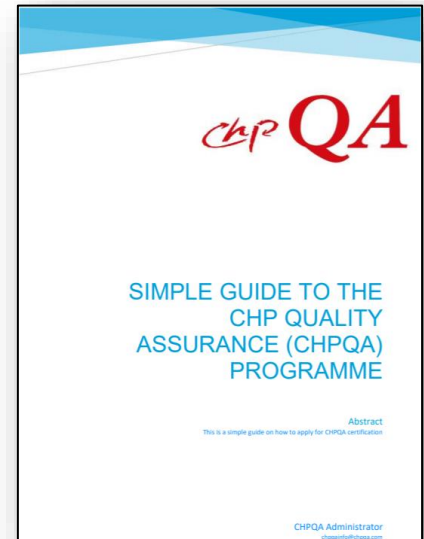
CHPQA Guidance Notes

- Range of Guidance Notes available on the CHPQA web site
- Always refer to the web site to be sure of latest version
- Electronic forms linked to the relevant GNs
- 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



GNs Simplifications

- There are four “Simple Guide to”, covering:
 - CHPQA Eligibility
 - CHPQA Monitoring
 - CHPQA Uncertainty
 - Good Quality CHP and the Quality Index (QI)
- Simple Guide to the CHP Quality Assurance (CHPQA) Programme – covers the administrative process of applying to CHPQA.
- We welcome further suggestions for simplifications of the guidance.



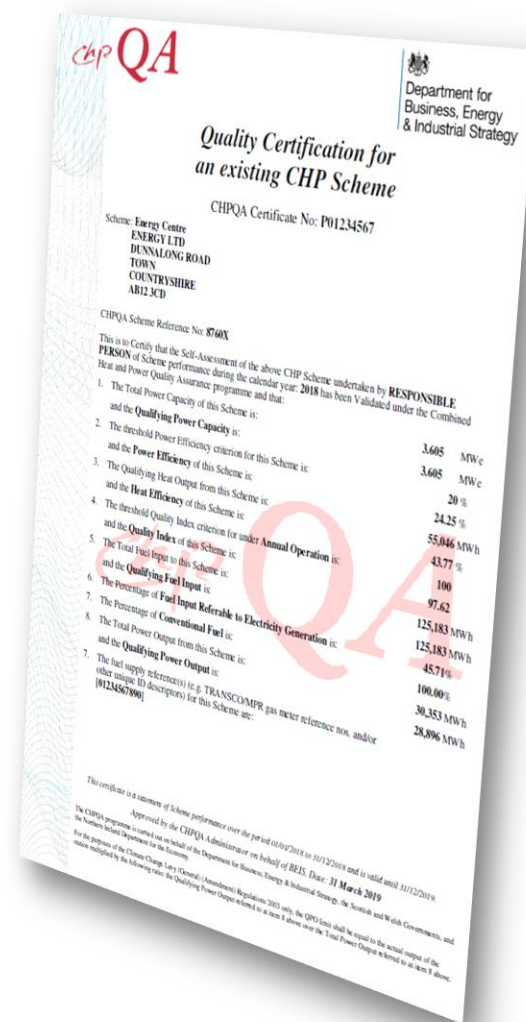
Ideas?

Simplification of Guidance Note – Any suggestions!!!



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 in your submission**





Some Clarifications

Initial Operation Conditions

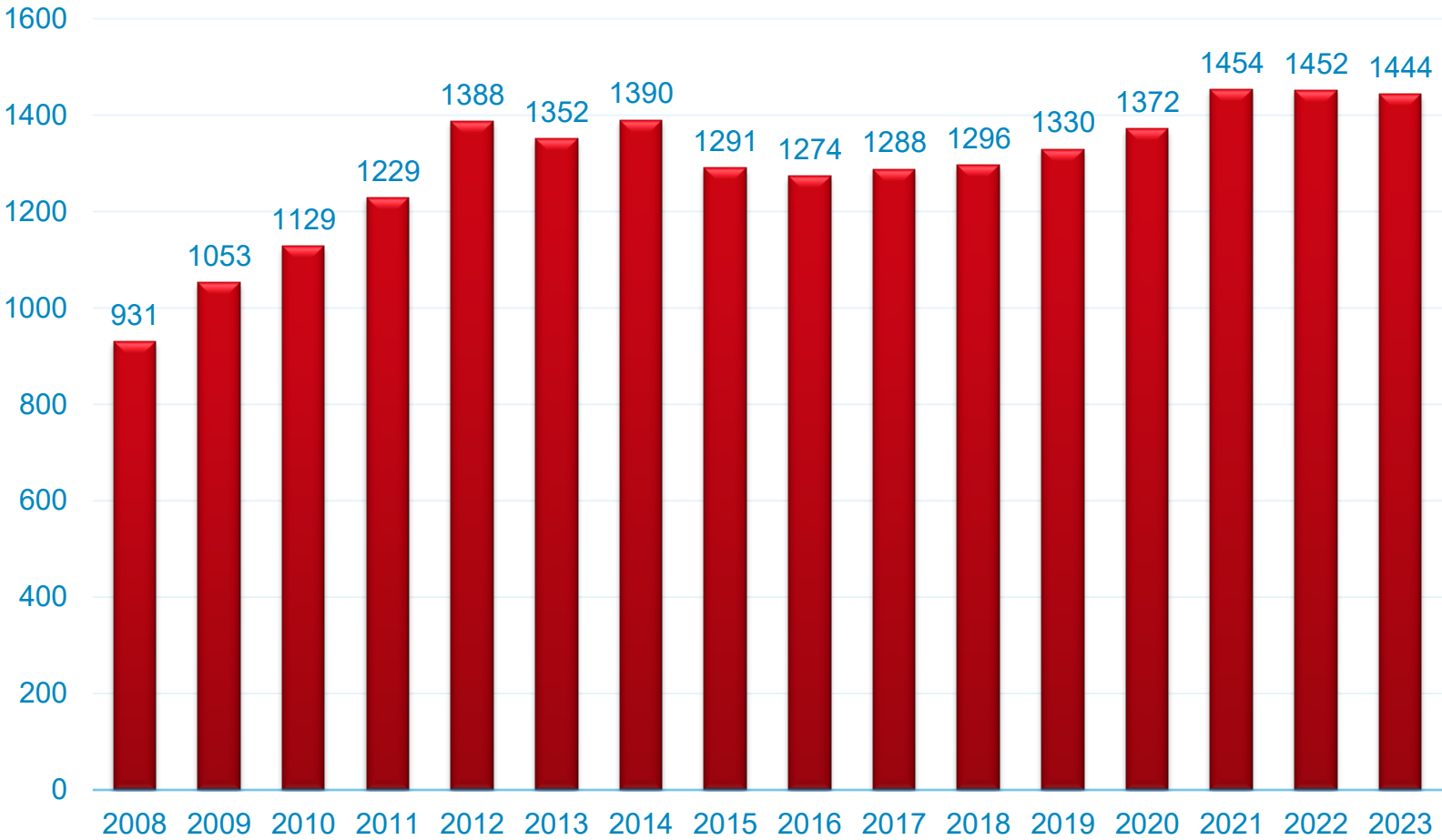
- Only apply to CCL related incentives
- QI Threshold during IO is 95
- Initial calendar year of operation
- Example...Scheme commences operation in June 2018, IO period ends 31 December 2019

Normal Operation Conditions

- Starts when IO ends



Certification Number of Schemes





Where do you go from here?

- All CHPQA Certificates issued in 2023 expire on 31 December 2023
- **New self-assessments should be submitted to the CHPQA Administrator before end of March 2024.**
- **Based on 2023 actual data:**
 - Fuel used
 - Electricity generated
 - Heat utilised (actual)
- **If all is in order, new certificates (based on 2023 data) will be issued before the end of June 2024.**





CHPQA Audits

- All Schemes are potentially subject to Audit



Department for
Energy Security
& Net Zero

chip QA

Thank you



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