Department for Business, Energy & Industrial Strategy

CHP QA

Principles and Procedures

Pete Edwards

November 2022

Department for Business, Energy & Industrial Strategy

CHPQA

Session Coverage

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

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CHP QA

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

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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.

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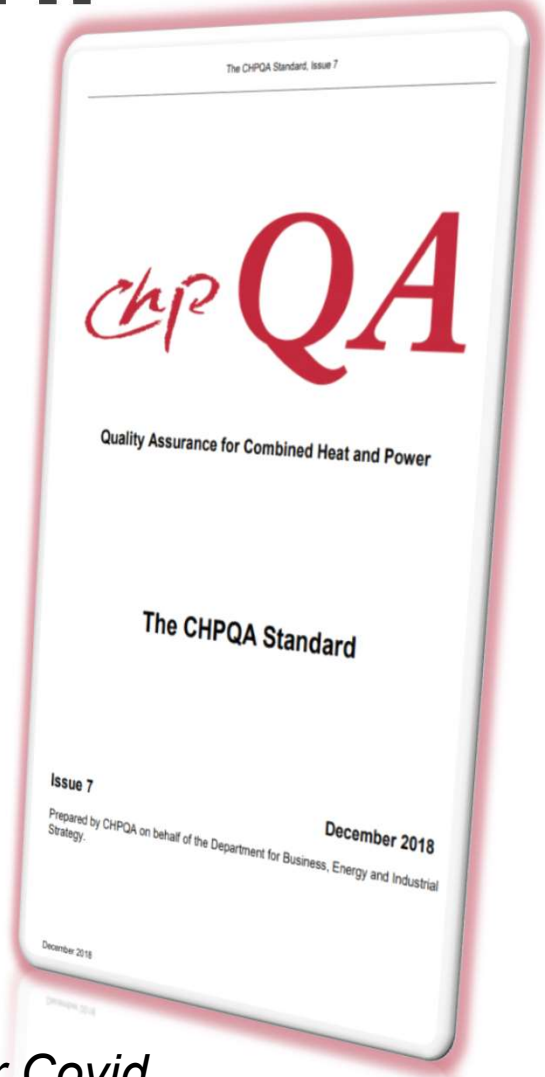
Definition of GQCHP

Set out in the CHPQA Standard



- For Existing Schemes:
  - Quality Index (QI) ≥100 and
  - Power generation efficiency of ≥ 20%
- For Upgraded & New Schemes:
  - Quality Index (QI) ≥105 and
  - Power generation efficiency of ≥ 20%.

See Issue 7 - Published December 20

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 This has not superseded Issue 7.

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CHPQA QI Formulas

The general definition for QI is:

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

Where:

Power Efficiency and Heat Efficiency

$$\eta_{Power} = \frac{CHP_{TPO}}{CHP_{TFI}} \qquad \eta_{Heat} = \frac{CHP_{QHO}}{CHP_{TFI}}$$

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

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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

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

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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

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

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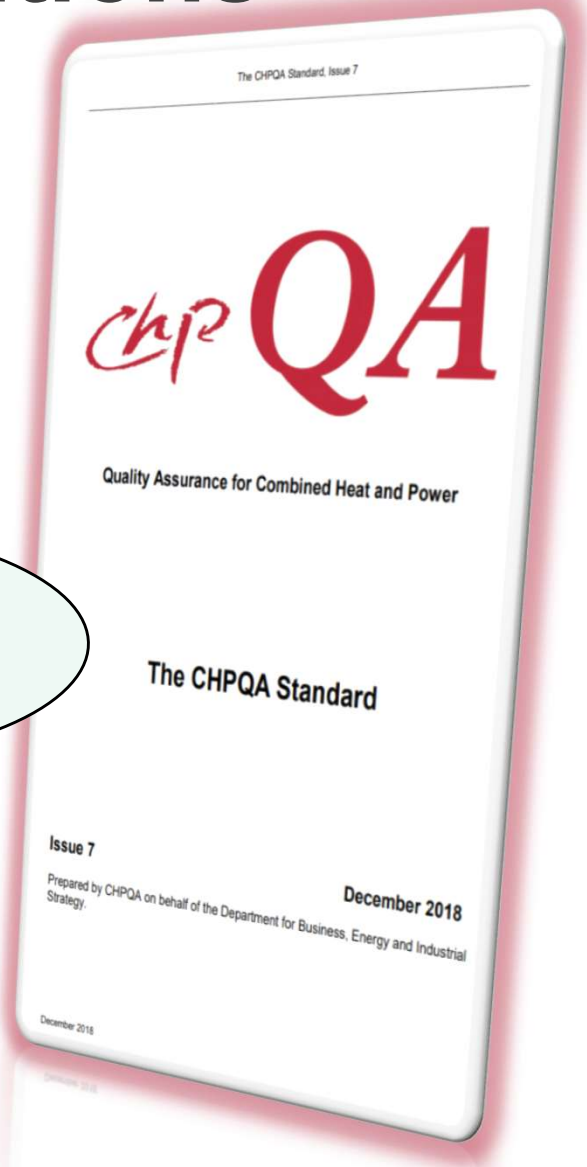
CHPQA X and Y Definitions

- 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	
≤1MW$_e$	QI = 249 x η_{power} + 113 x η_{heat}
>1 to ≤10MW$_e$	QI = 195 x η_{power} + 113 x η_{heat}
>10 to ≤25MW$_e$	QI = 191 x η_{power} + 113 x η_{heat}
>25 to ≤50MW$_e$	QI = 186 x η_{power} + 113 x η_{heat}
>50 to ≤100MW$_e$	QI = 179 x η_{power} + 113 x η_{heat}
>100 to ≤200MW$_e$	QI = 176 x η_{power} + 113 x η_{heat}
>200 to ≤500MW$_e$	QI = 173 x η_{power} + 113 x η_{heat}
>500MW$_e$	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)



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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.

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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

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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).

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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

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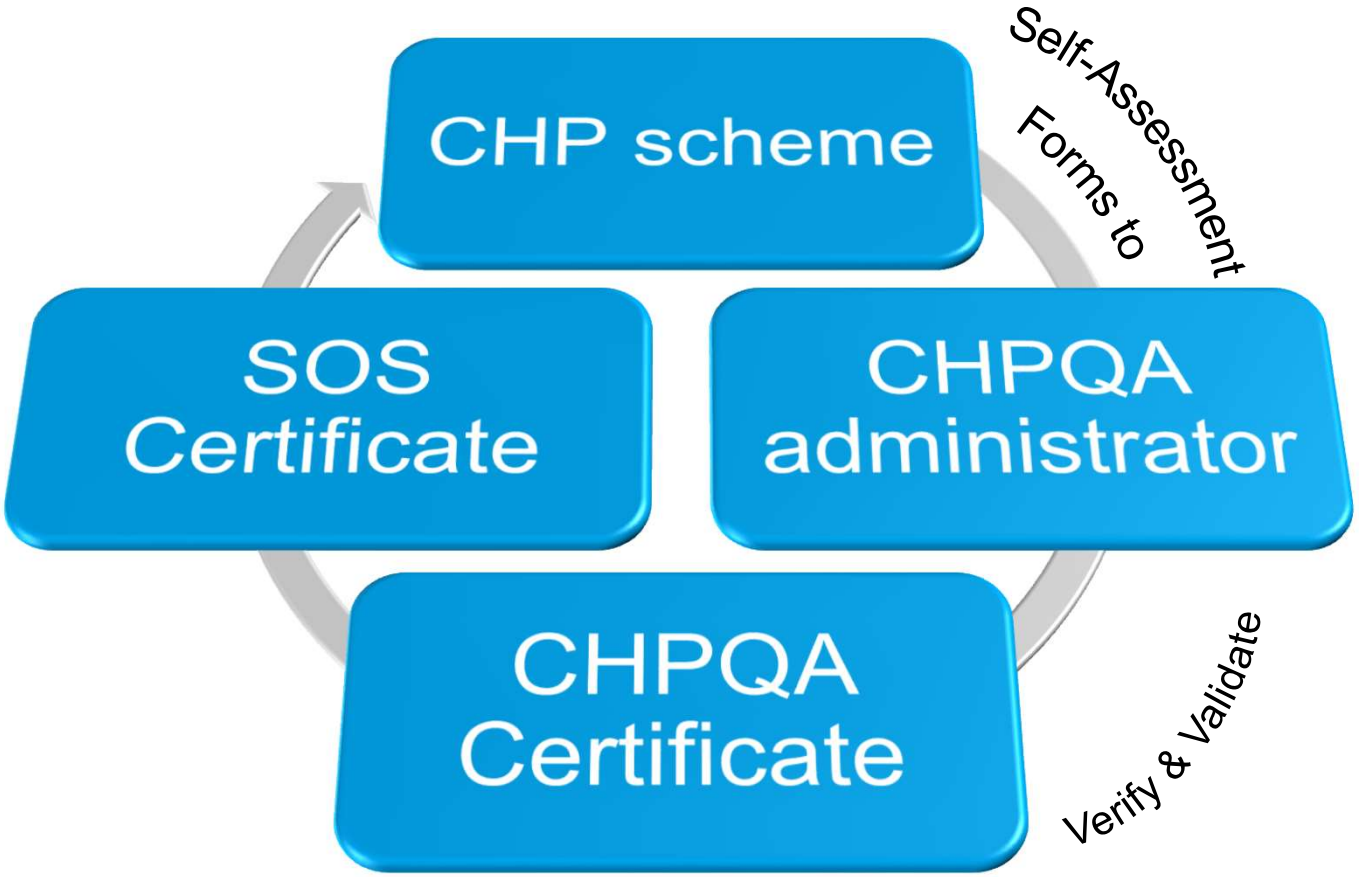
Self Assessment & Certification



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Roles & Responsibilities

- CHPQA Administrator
  - Managed by Ricardo Energy & Environment

RICARDO

- Department for Business, Energy & Industrial Strategy (BEIS)
- Other Government Departments (HMRC, VOA)

HM Revenue & Customs

Valuation Office Agency

- Ofgem
  - for RHI and ROCs

ofgem

- Low Carbon Contracts Company
  - for CfD contracts.

LOW CARBON CONTRACTS COMPANY

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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.

Further details on CHPQA forms submission in the next session…

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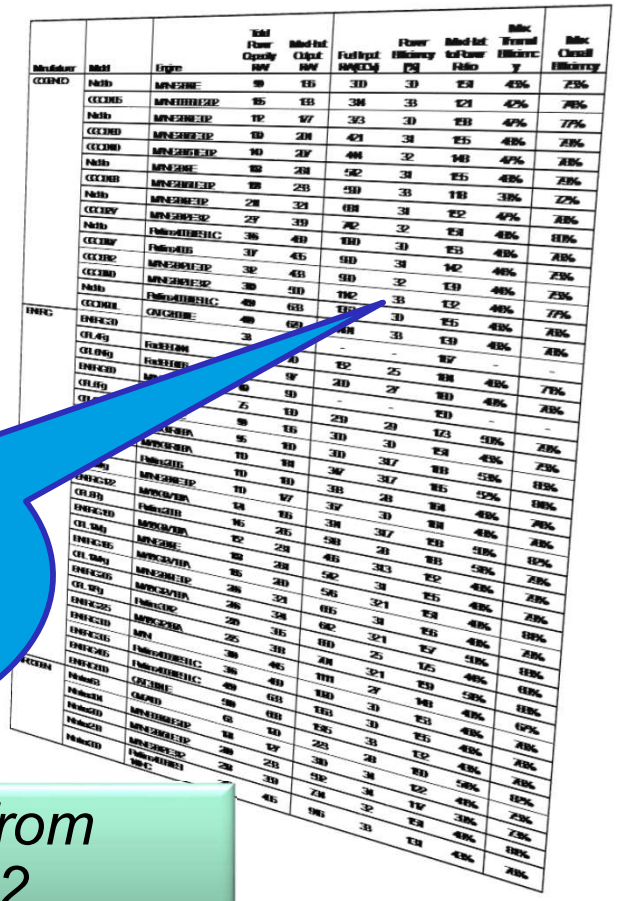
Simplification for <500kWe Schemes

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

- Only need to provide **<u>one figure per year</u>** … 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.

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

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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

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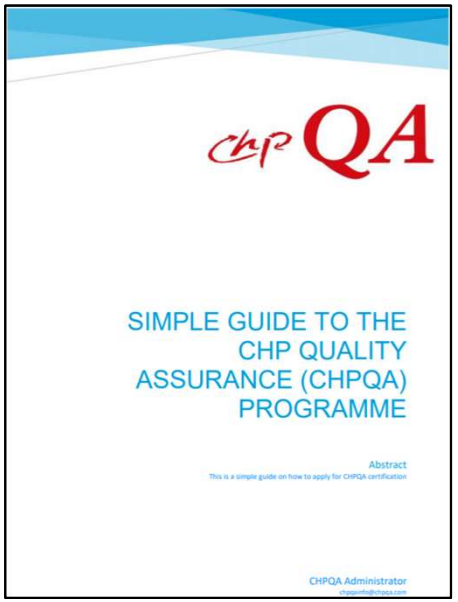
GNs Simplifications

- 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!!!

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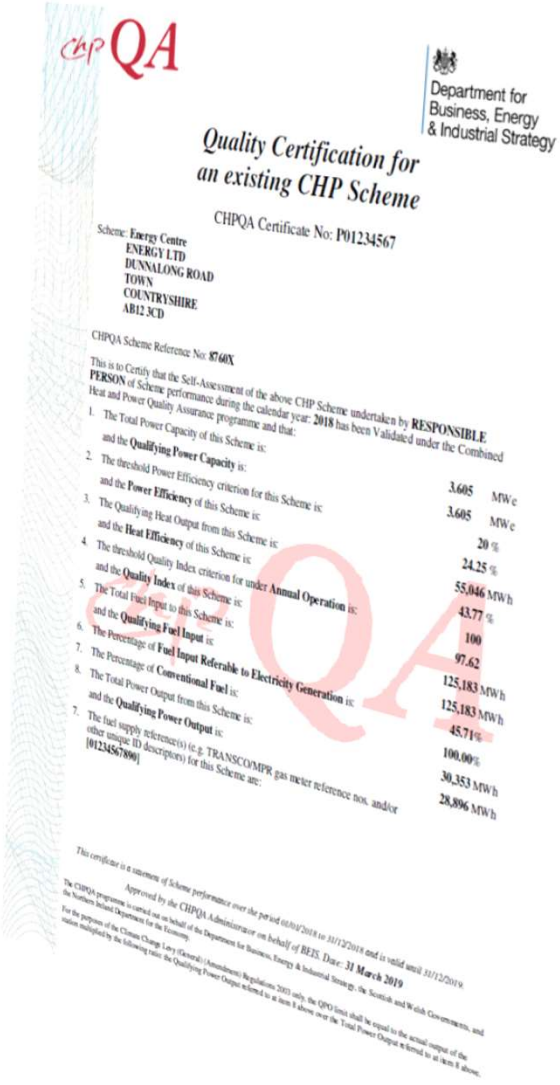
Certification Timetable

- 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*



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Quality Certification for an existing CHP Scheme

CHPQA Certificate No: P01234567

Scheme: **Energy Centre**
ENERGY LTD
DUNNALONG ROAD
TOWN
COUNTRYSHIRE
AB12 3CD

CHPQA Scheme Reference No: **8760X**

This is to Certify that the Self-Assessment of the above CHP Scheme undertaken by **RESPONSIBLE PERSON** of Scheme performance during the calendar year: **2018** has been Validated under the Combined Heat and Power Quality Assurance programme and that:

1. The Total Power Capacity of this Scheme is: **3.605** MWe
   and the **Qualifying Power Capacity** is: **3.605** MWe
2. The threshold Power Efficiency criterion for this Scheme is: **20** %
   and the **Power Efficiency** of this Scheme is: **24.25** %
3. The Qualifying Heat Output from this Scheme is: **55,046** MWh
   and the **Heat Efficiency** of this Scheme is: **43.77** %
4. The threshold Quality Index criterion for under **Annual Operation** is: **100**
   and the **Quality Index** of this Scheme is: **97.62**
5. The Total Fuel Input to this Scheme is: **125,183** MWh
6. The Percentage of **Fuel Input Referable to Electricity Generation** is: **125,183** MWh
   and the **Qualifying Fuel Input** is: **45.71**%
7. The Total Power Output from this Scheme is: **100.00**%
   and the **Qualifying Power Output** is: **30,353** MWh
8. The fuel supply reference(s) (e.g. TRANSCO/MPR gas meter reference nos. and/or other unique ID descriptors) for this Scheme are: **28,896** MWh
   [01234567890]

This certificate is a statement of Scheme performance over the period 01/01/2018 to 31/12/2018 and is valid until 31/12/2019.

Approved by the CHPQA Administrator on behalf of BEIS. Date: **31 March 2019**

The CHPQA programme is carried out on behalf of the Department for Business, Energy & Industrial Strategy, the Scottish and Welsh Governments, and the Northern Ireland Department for the Economy.

For the purposes of the Climate Change Levy (Amendment) Regulations 2003 only, the QPO listed shall be equal to the actual output of the station multiplied by the following ratio: the Qualifying Power Output referred to at item 8 above over the Total Power Output referred to at item 8 above.

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CHPQA Audits

- All Schemes are potentially subject to Audit
- Usually performed in autumn of each year (Aug to Dec)
- Usually audit approximately 75 Schemes per year,
- Large Schemes (>2MWe) likely to be audited every three years
- Some Schemes selected during validation
- Try to audit new Schemes during first year of operation
- Audit Actions should be closed by December.

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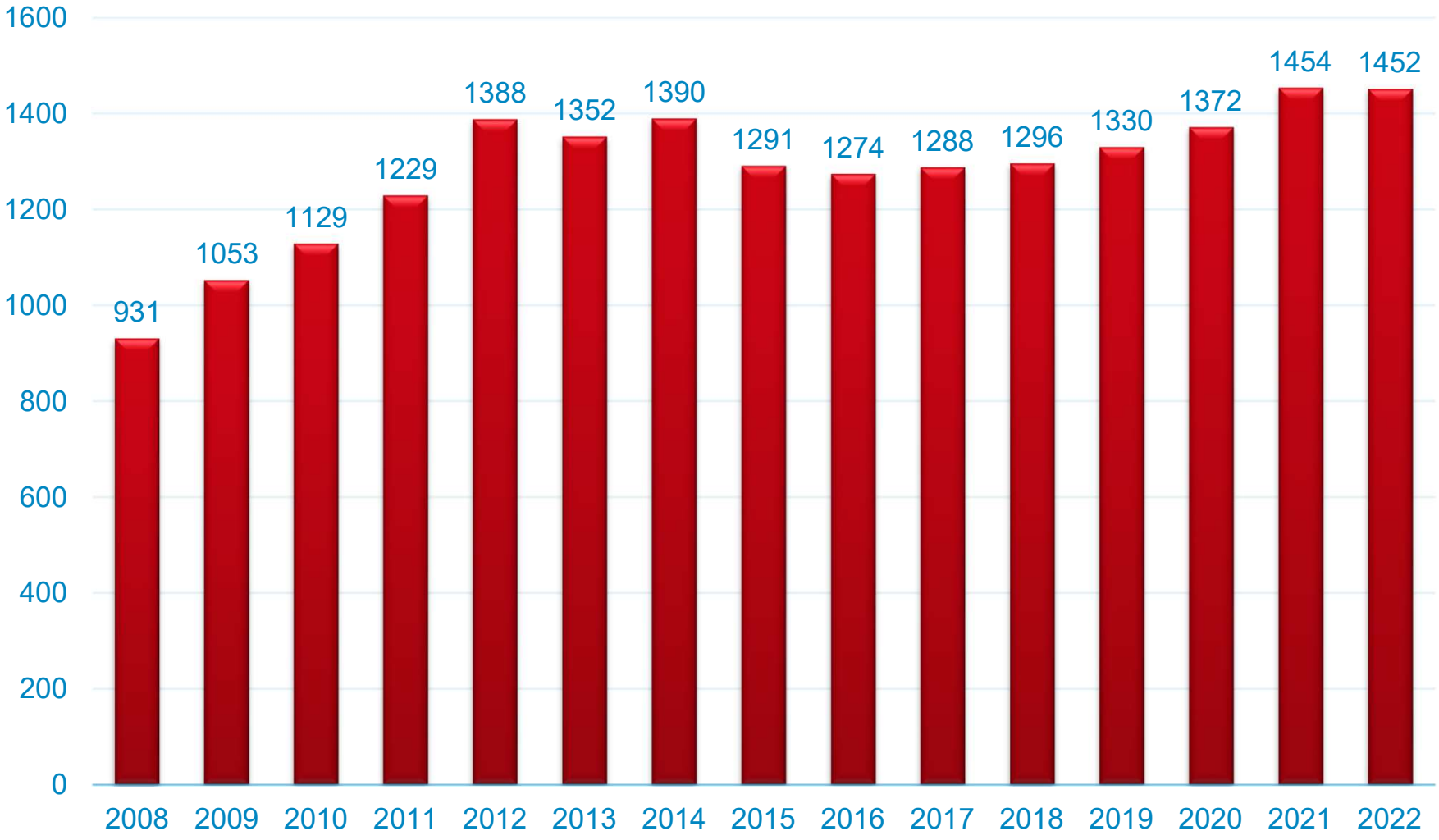
Certification Number of Schemes



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Where do you go from here?

- All CHPQA Certificates issued in 2022 expire on 31 December 2022
- **New self-assessments should be submitted to the CHPQA Administrator before end of March 2023.**
- **Based on 2022 actual data:**
  - Fuel used
  - Electricity generated
  - Heat utilised (actual)

- **If all is in order, new certificates (based on 2022 data) will be issued before the end of June 2023.**

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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

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Thank you

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CHPQA Contact Details

CHPQA Administrator

The Gemini Building
Fermi Avenue
Harwell
Didcot
OX11 0QR

E-mail: **chpqainfo@chpqa.com**

Tel: 01235 75 3004

Web:

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