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CHP QA

Principles and Procedures

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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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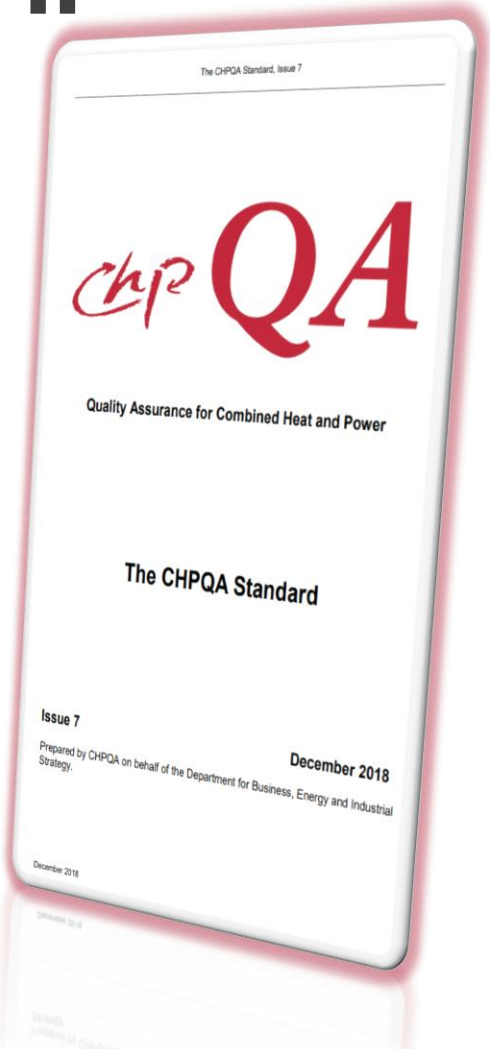
Definition of GQCHP

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 2018



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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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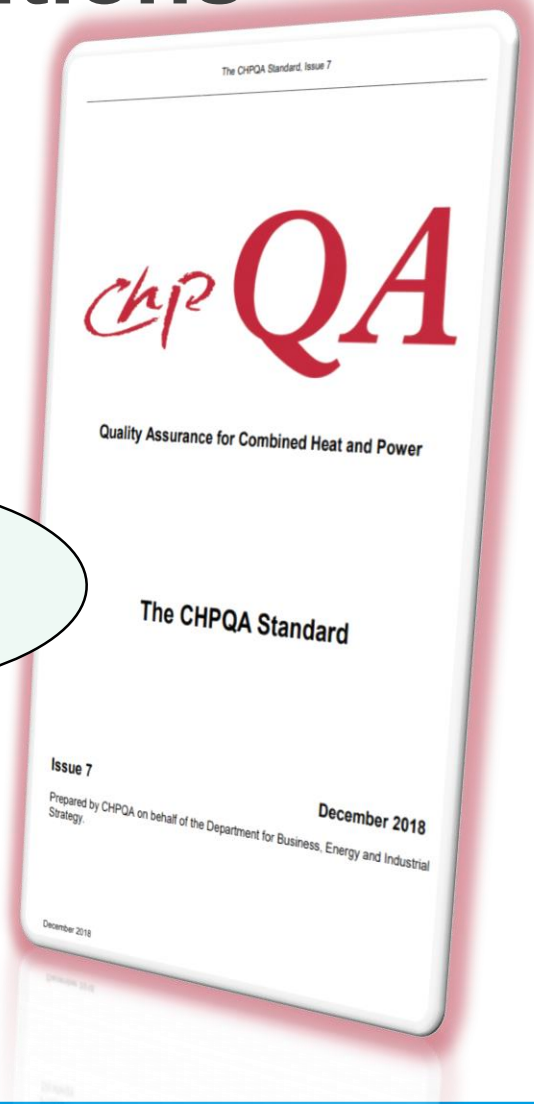
CHPQA X and Y Definitions

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

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

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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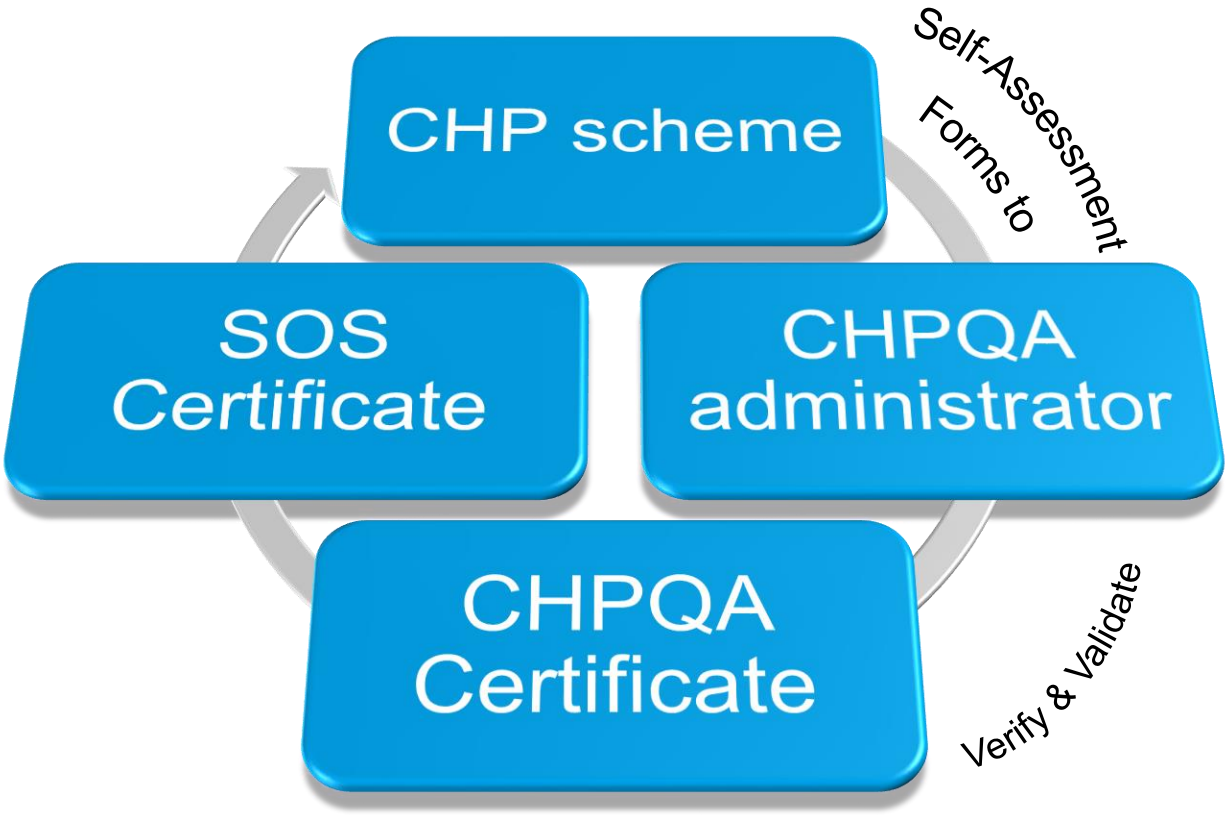
Self Assessment & Certification



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Roles & Responsibilities

- CHPQA Administrator
  - Managed by Ricardo Energy & Environment

- 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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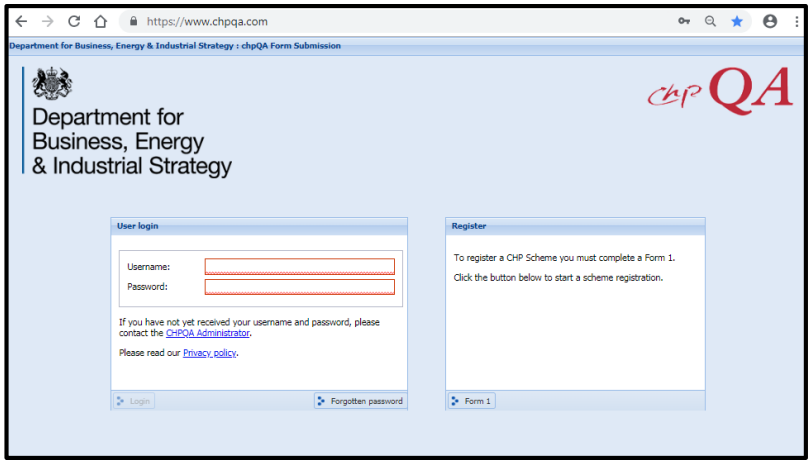
CHPQA Submission



- 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

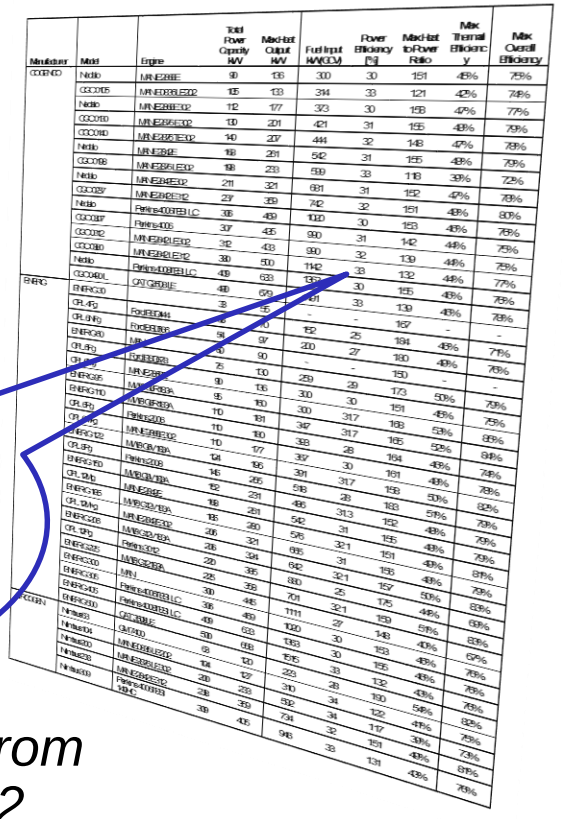
Simple small CHP schemes can use the CHPQA Unit List to determine:

- 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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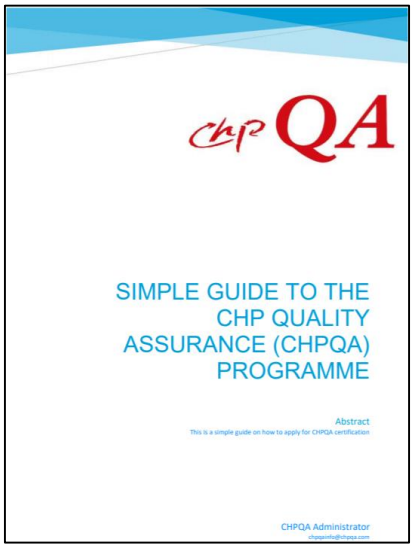
GNs Simplifications

- Four new “Simple Guide to” guides are in development, covering:
  - CHPQA Eligibility
  - CHPQA Monitoring
  - CHPQA Uncertainty
  - Good Quality CHP and the Quality Index (QI)
- One live simplified guidance: Simple Guide to the CHP Quality Assurance (CHPQA) Programme
- We welcome further suggestions for simplifications of the guidance.



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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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 1st year of operation
- Audit Actions should be closed before the Middle of December.

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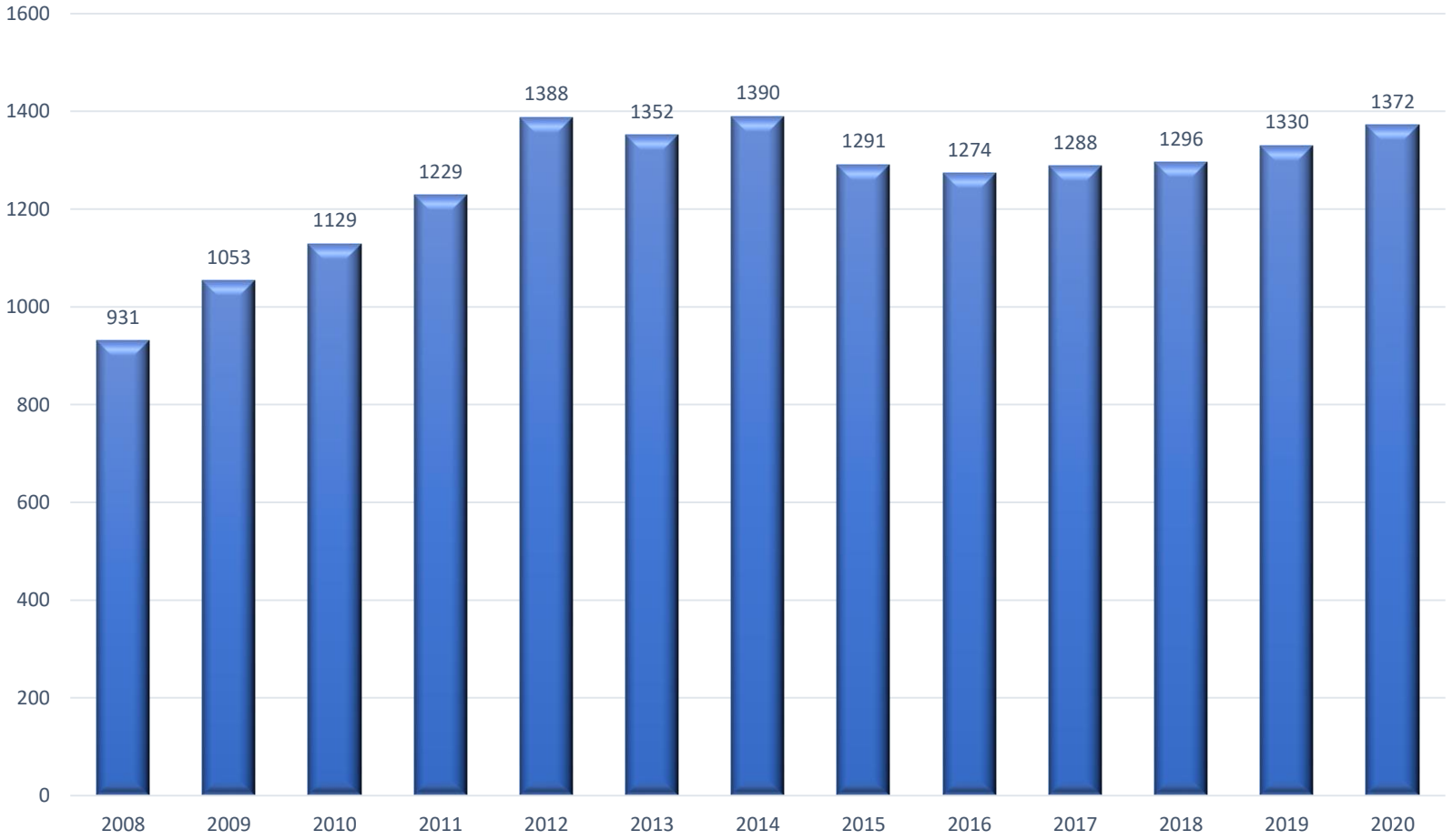
Certification Number of Schemes



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Where do you go from here?

- All CHPQA Certificates issued in 2020 will expire on 31st of December 2020
- **New self-assessments should be submitted to the CHPQA Administrator before end of March 2021.**
- **Based on 2020 actual data:**
  - Fuel used
  - Electricity generated
  - Heat utilised (actual)

- **If all is in order, new certificates (based on 2020 data) will be issued before the end of June 2021.**

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