Glossary

Absorption Chiller – A cooling device that uses heat rather than electrically driven vapour-compression to produce cooling. In CHP contexts, it is a recognised means of turning useful heat into a cooling output.

Adjustment Factor – A correction applied where the uncertainty of a metered or calculated energy input or output exceeds CHPQA "best practice" limits. In practice, this increases qualifying inputs or reduces qualifying outputs for assessment purposes. It includes individual adjustment factors and aggregated factors such as FOI, FOP and FOH.

Administrator – The body contracted by the government to have responsibility for the management of the CHPQA programme.

Alternative Fuels – Fuels other than Conventional Fuels. They are grouped into different categories for the purposes of assigning X and Y coefficients used in the calculation of the Quality Index (QI).

Annual Operation (AO) – The standard CHPQA reporting year running from 1 January to 31 December. For a new scheme, the first AO runs from the conclusion of the period of Initial Operation (IO).

Audit – A selective or periodic compliance review by the Administrator, which may be site or desk based, to confirm that the Standard and Guidance Notes have been correctly interpreted and that submitted data and calculations can be substantiated by records held by the Scheme.

Auxiliary boiler / Back-up boiler – Boiler equipment that may sit within the CHP scheme boundary to provide top-up, standby or back-up heat. Including this equipment within the boundary can affect power efficiency and QI.

Bias – A systematic error in a measured or calculated value. Unlike ordinary uncertainty, bias should be identified and corrected where possible.

Business Rates Exemption – A fiscal benefit linked to CHPQA and Secretary of State certification under which certain qualifying CHP plant and machinery may be exempt from business rates.

Calorific Value (CV) – The energy content of a fuel. CHPQA uses Gross Calorific Value (GCV) as the primary basis for fuel input and efficiency calculations.

Carbon Price Support (CPS) – A UK tax levied on fossil-fuel used to generate electricity when the electricity generation installation is of capacity >2 MWe. CHPQA certification can confer CPS exemption on some of the fuel consumed by CHP.

Certification – The issuing by the Administrator of a certificate that a Scheme meets the criteria for Good Quality for all or part of its energy inputs, outputs and capacity, based on Validation of Self-Assessment submitted by a Responsible Person

CfD (Contracts for Difference) – A support mechanism for low-carbon electricity generation. CfD contracts may be entered into by CHP schemes fuelled by biomass or waste. CfD pays the difference between a strike price and a market reference price. Within CHPQA, Guidance Note 44 sets out the X and Y values that will be used for calculating scheme QI, which in turn determines the quantity of electricity which qualifies for CfD payments.

CHP (Combined Heat and Power) – The simultaneous generation of heat and power in a single process. Power may be electricity or mechanical power, and heat outputs may include steam, hot water or hot air for process heating, space heating or absorption chilling.

CHPQA (Combined Heat and Power Quality Assurance) Programme – The UK government quality-assurance programme for assessing, certifying and monitoring CHP schemes so that benefits and regulatory treatment reflect actual energy efficiency and environmental performance. Under the Programme, Responsible Persons apply for Registration and Self-Assessment of CHP Schemes. The Administrator provides Certification of the Scheme in accordance with the criteria for Good Quality CHP. The Administrator oversees the processes of Registration, Validation, Certification and Audit on behalf of the Department for Energy Security and Net Zero.

CHPQA Certificate – The certificate confirming CHPQA certified status for a given scheme on a given assessment basis. It is used to support eligibility for associated benefits and support mechanisms.

CHPQA Guidance Notes (GNs) – The technical and procedural guidance documents that explain how the CHPQA Standard is to be interpreted and applied in practice.

CHP Scheme (Scheme) – The equipment, operating systems and monitoring systems for the total system defined to be within the Scheme boundary, being that to which CHPQA applies. This can be at any stage of development from design to actual operation. It will include one or more prime movers (e.g. gas turbine or reciprocating engine) driving electrical generator(s) or mechanical equipment (e.g. air compressor, pumps, etc.) and some means of recovering heat, which would otherwise be released to the environment, for useful purposes.

A Scheme can consist of a number of prime movers connected in series or in parallel. A gas turbine or a reciprocating engine operated in combined cycle mode, where the heat generated is used to produce steam that feeds into a steam turbine, would be an example

of connection in series. An example of parallel connection is a number of gas turbines with suitable heat recovery steam generators connected to a common steam system.

A Scheme boundary may be defined to include associated auxiliary or back-up boilers or generators.

CHPQA Standard – The core document setting out CHPQA definitions, criteria, thresholds and QI formulae for Good Quality CHP certification. According to the date of first certification of a CHPQA Scheme, different issues of the Standard apply. These Standards are published by the Department for Energy Security and Net Zero.

CHPQA Unit List –This list details the performance of a number of CHP prime mover units, based on manufacturers' specifications, which may be utilised during Self-Assessment of Schemes where the following criteria are met:

- Scheme CHP Total Power Capacity (CHP_{TPC}) ≤500 kWe,
- Scheme has no in-built facility to dump heat (no heat rejection),
- Scheme only includes a single reciprocating engine prime mover,
- Scheme has one main heat output system e.g. a single system recovering heat from the engine cooling systems, or/as well as exhaust gases in the case of a reciprocating engine.

The information in the Unit List may be used during Self-Assessment to calculate the gas consumption and/or heat output of CHP Schemes meeting the above criteria.

For each unit, the list displays: Manufacturer; Model; Engine Type; Total Power Capacity (equivalent to instantaneous power output) and Qualifying Heat Capacity (equivalent to instantaneous heat output).

CHP Qualifying Fuel Input (CHP_{QFI}) – The registered annual fuel input to a CHP Scheme qualifying as input to Good Quality CHP (MWh), based on GCV. Most Schemes will meet the Threshold Power Efficiency Criterion for Good Quality CHP in Annual Operation and therefore CHP_{QFI} is the total annual fuel input (CHP_{TFI}). For a Scheme that does not achieve the Threshold Power Efficiency Criterion for Good Quality CHP, CHP_{QFI} is that portion of the annual fuel input to a Scheme that would have achieved the Power Efficiency Criterion, based on the actual annual power generation (CHP_{TPO}).

CHP Qualifying Heat Capacity (CHP_{QHC}) – The registered maximum heat supply capacity of a CHP Scheme (MW_{th}). It is the maximum rate of heat supply demonstrably utilised to displace heat that would otherwise be supplied from other energy sources.

CHP Qualifying Heat Output (CHP_{QHO}) – The registered amount of useful heat supplied annually from a CHP Scheme (MWh_{th}). It is the heat output that is demonstrably utilised to displace heat that would otherwise be supplied from other sources.

Note: CHP_{QHO} excludes any heat rejected to the environment without any beneficial use. Examples include, inter.alia, heat lost from chimneys or exhausts and heat rejected in equipment such as condensers and radiators.

CHP Qualifying Multiplier (CHPQM) – Relevant for GN44 certificates, CHPQM is the ratio of QPO (as determined using GN44 criteria) to TPO for a Scheme. It is used to determine the proportion of a CHP's electrical output that qualifies for support under the RO and CfD mechanisms.

CHP Qualifying Power Capacity (CHP_{QPC}) – The registered power generation capacity of a CHP Scheme (MWe) that qualifies as Good Quality CHP. It is used for monitoring and statistical purposes regarding the installed capacity of Good Quality CHP in the UK. Where a Scheme meets the relevant Threshold QI Criterion for Good Quality CHP Capacity, CHP_{QPC} equals the total power capacity (CHP_{TPC}). For a Scheme that does not achieve the Threshold QI Criterion for Good Quality CHP, CHP_{QPC} is that portion of the total generation capacity that would achieve the Threshold QI Criterion, under the conditions of Maximum Heat Output under Normal Operating Conditions.

CHP Qualifying Power Output (CHP_{QPO}) – The registered annual power generation from a CHP Scheme (MWh_e) that either fully or partially qualifies as Good Quality CHP. For Schemes that meet the relevant Threshold QI Criterion for Good Quality CHP, CHP_{QPO} equals the total power output (CHP_{TPO}). For a Scheme that does not achieve the Threshold QI Criterion for Good Quality CHP, CHP_{QPO} is that portion of the annual power output from a Scheme that would have achieved the Threshold QI Criterion, based on the qualifying heat supplied (CHP_{QHO}).

CHP Scheme Boundary – The defined perimeter of the CHP scheme for CHPQA purposes. It determines which plant, fuel inputs and energy outputs are included in the assessment.

CHP Total Fuel Input (CHP_{TFI}) – The total registered annual fuel input to a CHP Scheme (MWh), based on GCV. This includes any fuel used for pilot burners or other 'parasitic' uses and fuels of all types whether Conventional or Alternative. In cases where steam is imported from outside of the Scheme boundary and used as an energy input to a prime mover such as a steam turbine, a fuel equivalent for this steam must be calculated and included in the $CHP_{TFI.}$

CHP Total Power Capacity (CHP_{TPC}) – The registered maximum power generation capacity of the CHP Scheme (MW_e), at the reference conditions defined in the CHPQA Guidance Notes. It defines the size of the Scheme for the purpose of selecting the appropriate Quality Index formula. Where there is more than one electrical generator in a Scheme, CHP_{TPC} shall include the total electrical capacity of all generators that can run together, i.e. the actual maximum generation capacity. Where a Scheme includes

mechanical power output, this shall be converted to an equivalent electrical power output and included in CHP_{TPC}.

CHP Total Power Output (CHP_{TPO}) – The total annual power generation from a CHP Scheme (MWh_e), as measured at the generator terminals, plus the electrical equivalent of any qualifying mechanical power supplied by the Scheme.

Climate Change Levy (CCL) – A UK tax on energy use. CHPQA certification, together with a valid Secretary of State exemption certificate, may enable exemption from CCL on all or part of the fuel inputs and electricity outputs of a qualifying CHP Scheme.

Community Heating (CH) – The centralised provision of heat to a number of residential, institutional, commercial, industrial or other sector buildings, premises, sites and users typically for the purpose of providing hot water, space heating or cooling and can include the provision of process steam. CH Schemes may also provide heat users with associated electricity. Community Heating includes both of what are frequently referred to as district heating and communal heating.

Complex Scheme – A CHP scheme that must use the complex submission journey, generally because it is >2 MWe in capacity, includes boilers, uses non-conventional fuel, or is not a simple single reciprocating engine scheme.

Conventional Fuels – Fuels described as taxable commodities under the Finance Act, 2000, Schedule 6, or oil as defined in the Hydrocarbon Oil Duties Act, 1979. Examples of such fuels are natural gas, LPG, coal, coke and fuel oils. They are distinguished from Alternative Fuels in the CHPQA Standard, see also Alternative Fuels.

Correction Factor (Fc) – A factor used to correct values for energy inputs and outputs where there is recognised bias in the measurement.

DESNZ – Department for Energy Security and Net Zero, the government department responsible for CHPQA and custodian of the Standard.

Design Certificate (previously F3(s)/F3 certificate) – A CHPQA certificate based on technical design data for a proposed, new or upgraded scheme, rather than actual operational data.

Design Submission – The self-assessment package for a new or upgraded scheme at design stage, including scheme details, projected performance and monitoring arrangements.

Economic Sector – The classification used in CHPQA submissions to describe the activity served by the CHP scheme, such as health, education, manufacturing or mixed community heating.

Equipment Tag / Meter Tag – The alphanumeric identifier used on CHPQA line diagrams and within submissions to identify plant items and meters.

Excess Uncertainty (Ux) – The amount by which the estimated uncertainty of a meter exceeds CHPQA best-practice limits of uncertainty. It is used to derive adjustment factors which in turn either increase the fuel inputs or decrease the energy outputs for the Scheme during assessment of CHP_{QFI} or QI.

Exported Heat / Exported Power – Heat or electricity supplied to external customers or off-site users. CHPQA requires relevant exports to be declared and, in the case of heat, evidenced for certification purposes.

F_{OI} / F_{OP} / F_{OH} - CHPQA uncertainty adjustment factors. F_{OI}, F_{OP} and F_{OH} are overall weighted factors applying to the total fuel input, total power output and total heat output, respectively, of the scheme when calculating the Scheme's power and heat efficiencies which are subsequently used in the calculation of the Scheme QI. They must be expressed to four decimal places.

GCV (Gross Calorific Value) – The total energy available from that fuel (solid, liquid or gas) when it is completely burnt. It is expressed as heat per unit weight or volume of fuel. 'Gross' signifies that the water formed or liberated during combustion is condensed to the liquid phase. The GCV of a solid or liquid fuel is determined at constant volume and the GCV of a gaseous fuel is determined at constant pressure. It is sometimes known as Higher Heating Value (HHV).

GN44 (Guidance Note 44) – The CHPQA Guidance Note dealing specifically with the use of CHPQA for Renewables Obligation (RO) and Contracts for Difference (CfD) Schemes. It contains separate X and Y coefficient sets from the main CHPQA Standard.

Good Quality CHP (GQ_{CHP}) – A CHP scheme, or qualifying part of a scheme, that meets the CHPQA thresholds for power efficiency and Quality Index and is therefore eligible for associated benefits.

Grandfathering Arrangements – Provisions allowing certain existing schemes to continue under earlier X and Y coefficients rather than being reassessed under newer ones.

Heat efficiency (η_{Heat}) – The ratio of qualifying heat output to total fuel input over the relevant period. It forms one component of the Quality Index formula.

Heat Load Duration Curve – A graph showing how many hours over a year the scheme operates at or above particular heat outputs. It is used to determine $CHPQA_{MaxHeat}$.

Heat Rejection Facility – Equipment allowing excess heat to be dumped or rejected rather than used. Its presence affects monitoring requirements and scheme treatment.

Heating Season (HS) – For Residential Community Heating schemes, a seven-month period selected by the Responsible Person and used in certain special CHPQA calculations.

Initial Operation (IO) – The period that commences when the Scheme in question has begun operating as CHP, generating electricity and at the same time supplying heat to one or more users. For the purpose of Climate Change Levy exemption, and the use of a QI Threshold of 95, a CHP Scheme serving an individual user or site ends Initial Operation after the first complete Annual Operation (after the first full calendar year. For a CHP Scheme serving Community Heating, Initial Operation ends after the first two complete AOs.

Investor Safeguard – A GN44/CfD concept allowing the design-certificate value of CHPQM to continue to be used for a defined period of time if a qualifying heat customer is lost. This concession is subject to detailed conditions.

MaxHeat (Maximum Heat Output under Normal Operating Conditions, $CHP_{MaxHeat}$) – The maximum heat output that is maintained or exceeded for the relevant minimum cumulative period during the year. It is used in the calculation of CHP_{QPC}.

Mechanical Power – Shaft power produced by the scheme and used directly for a mechanical load such as a pump or compressor. For CHPQA purposes it is converted to electrical equivalent using a multiplying factor of 1.05.

Meter Tag – The identifier used for metering equipment in scheme diagrams and submissions.

Minor Streams – Small input or output streams for which simplified monitoring and uncertainty treatment may be allowed, subject to limits and default adjustment factors.

Monitoring – The measurement of those energy inputs and outputs for a Scheme relevant to the Self-Assessment, together with the provision of maintenance of records and calibration of metering equipment. A Scheme includes the monitoring systems required for compliance with the CHPQA Standard.

NCV (Net Calorific Value) – The lower heating value (LHV) of a fuel, excluding latent heat from the condensation of water which is formed or liberated during combustion. It appears in some policy comparisons, although CHPQA calculations are always based on GCV.

Normal Operating Conditions (NOC) – The stable operating conditions used for determining MaxHeat and assessing CHP_{QPC}.

Operating or Operational - A CHP Scheme is deemed operating or operational when it is generating power and supplying useful heat to one or more heat users for at least one month during the first year of operation.

Operational Certificate (previously F4(s)/F4 certificate) – A CHPQA certificate based on actual operational data, identifying which portions of the scheme's inputs, outputs and capacity qualify as Good Quality CHP.

Operational Submission – The annual self-assessment submission based on actual scheme performance over the reporting period.

Overall Uncertainty (Uo) – The combined uncertainty associated with a metered or calculated value after all relevant measurement and computational uncertainties are taken into account.

Pass-out / partially condensing steam turbine – A turbine that extracts steam for heat use, creating a direct trade-off between heat extraction and electrical output. CHPQA uses the Z ratio to represent the ratio of heat gained to power lost in such a turbine.

Power Efficiency (η_{Power}) – The ratio of total power output to total fuel input over the relevant period. Under CHPQA, a power efficiency threshold of 20% is used to determine whether all of the fuel inputs can be deemed Good Quality or whether qualifying fuel inputs need to be scaled back.

Prime Mover – The primary engine, turbine, fuel cell or similar device that generates electrical or mechanical power in the CHP scheme.

Primary Energy Saving (PES) – A measure comparing CHP with separate generation of heat and power. It is expressed as a percentage. CHPQA X and Y values are set to ensure that qualifying schemes deliver PES values above certain thresholds.

Qualifying Group – A term used in the export power guidance, associated with electricity licensing and exemption arrangements, to classify certain sales relationships.

Quality Index (QI) – One of two key parameters for assessing a Scheme (the other being Power Efficiency). QI is an indicator of the energy efficiency and environmental performance of a Scheme, relative to the generation of the same amounts of heat and power by separate, alternative means.

Recovered Heat (as equivalent fuel input) – Certain imported or recovered heat inputs, especially steam generated from process waste heat, may be treated as equivalent Alternative Fuel inputs if they meet CHPQA admissibility rules.

Registration – The process of recording the Responsible Person and scheme details with the CHPQA Administrator so the scheme can be assessed and certified.

Residential Community Heating (RCH) – The centralised supply of heat, predominantly for Residential Users for space heating and domestic hot water. Residential Use is defined by the Finance Act 2000 and the term Residential User is defined in the CHPQA Guidance Notes. For a Community Heating Scheme to qualify as RCH, the Responsible Person must demonstrate that it meets at least one of the following criteria:

- The proportion of CHP Qualifying Heat Output (CHP_{QHO}) in Annual Operation provided for Residential Use is >60%.
- The proportion of CHP Qualifying Heat Output (CHP_{QHO}) during the Heating Season provided for Residential Use is >70%.
- The proportion of CHP Qualifying Heat Output (CHP_{QHO}) at MaxHeat provided for Residential Use is >60%.
- Residential Users out-number institutional, commercial and industrial customers by at least 50:1 and the proportion of CHP_{QHO} in Annual Operation supplied for Residential Use is ≥10%.

In the case of proposed, new Schemes, Schemes in Initial Operation and Schemes that are developing as defined in the CHPQA Guidance Notes, the proportion of CHP_{QHC} for Residential Use is >60%.

Responsible Person (RP) – The person registered with the Administrator as responsible for operation of the scheme and for CHPQA submissions and compliance.

Renewables Obligation (RO) – A support scheme under which electricity suppliers have to present a certain number of Renewables Obligation Certificates (ROCs) for each MWh of electricity supplied, or pay a buy-out. CHPQA certification grants, for some renewable schemes, an enhanced number of ROCs based on QPO.

Renewables Obligation Certificate (ROC) – A tradable certificate issued for eligible renewable electricity generation. In CHP contexts, the QPO and proportion of TFI that is renewable determine the number of ROCs issued to a qualifying CHP scheme.

Safeguard Provision – A GN44 mechanism, closed to new entrants, allowing a scheme, which meets certain policy criteria of heat efficiency, PES and overall efficiency, but not the QI criterion using the applicable X and Y values stated in GN44, to be effectively treated as if the QI criterion had been met. It ensures that if all aspects of primary policy intent are met by the scheme, the scheme will benefit as intended irrespective of the results of the QI calculation.

Scheme Line Diagram / Energy Flow Diagram – The schematic representation of the CHP scheme showing the scheme boundary, plant, metering and energy flows. Required as part of both design and operational submissions.

Secretary of State (CHP) Exemption Certificate – The legal certificate used for CCL and related fiscal reliefs. CHPQA certification supports application for this certificate but does not replace it.

Self-Assessment – The evaluation by the Responsible Person of the quality of a CHP Scheme, including calculation of key parameters, using the appropriate guidance for Self-Assessment as issued by the Administrator.

Simple Scheme – A smaller, simpler CHP configuration, ≤2 MWe and based on a single conventional fuel and a single reciprocating engine, eligible for simplified CHPQA submission routes.

Specific Enthalpy – The heat content per unit mass of steam or another fluid, used in CHPQA calculations for steam and heat outputs. The values are readily available from Steam Tables.

Threshold criteria for Good Quality CHP – The set of CHPQA rules that determine whether fuel input, power output and capacity qualify as Good Quality CHP, based principally on power efficiency and Quality Index.

The following criteria apply:

For.Fuel.Inputs.under.Annual.and.Initial.Operation¿

A.Scheme.that.qualifies.as.Good.Quality.CHP.for.its.entire.annual.energy.inputs.is.one. where.the.Power.Efficiency.equals.or.exceeds.86↘ ¡

For.Power.Outputs.under.Annual.Operation¿

A.Scheme.that.qualifies.as.Good.Quality.CHP.for.its.entire.annual.energy.outputs.is.one. where.the.Quality.Index.equals.or.exceeds.766¡. Normally?the.Threshold.QI.Criterion.is. based.on.Annual.Operation?but.it.can.be.based.on.other.periods?for.example.on.the. Heating.Season.in.the.case.of.RCH.Schemes¡

For.Power.Outputs.under.Initial.Operation¿

A.Scheme.that.qualifies.as.Good.Quality.CHP.for.its.entire.annual.energy.outputs.is.one. where.the.Quality.Index.equals.or.exceeds.51¡. Normally?the.Threshold.QI.Criterion.is. based.on.Annual.Operation?but.it.can.be.based.on.other.periods?for.example.on.the. Heating.Season.in.the.case.of.RCH.Schemes¡

For.Power.Generation.Capacity.under.Annual.Operation¿

The.Threshold.Criterion.for.existing.Good.Quality.CHP.Capacity.is.that.the.CHP.Scheme. achieves. a. QI. of. at. least. 766. at. its. Maximum. Heat. Output. under. Normal. Operating. Conditions¡

For.Proposed.New.Power.Generation.Capacity¿

Threshold.Criteria.for.proposed.new.Good.Quality.CHP.Scheme.Capacity?.at.design?.specification?tendering.and.approvals.stages?are

QI.≥76❶(at.Maxheat).and.Power.Efficiency.≥86↘ ?.both.under.Annual.Operation

Uncertainty – The error band within which the true value of a measured or calculated quantity is expected to lie. CHPQA uses uncertainty rigorously and uncertainty in excess of what is deemed best practice reduces effective efficiencies and QI.

Useful Heat – The heat from a CHP Scheme delivered to satisfy an economically justifiable demand for heat or cooling. Evidence of this demand should be available (e.g. a business case, contract or memorandum of understanding). It is not sufficient for a Scheme to be simply "CHP ready" without clear plans to supply heat.

Heat used for drying incoming biomass or waste fuel to a CHP plant may be classified as a useful CHP heat output, but only if it can be demonstrated that such a use of heat is an economically justifiable precursor to the combustion of the fuel within the CHP plant.

Applicants wishing to claim such a use of heat as a CHP heat output will be expected to provide an economic justification and calculations in support of their claim. For example, it must be demonstrated that the drying of the fuel independent of the CHP plant could be justified economically as an alternative to using CHP heat,taking account of the required capital expenditure, operating and maintenance costs and the resulting benefit (including the capital cost of the alternative boilers and the cost of the displaced fuel that would otherwise be used for the drying). A simple 'payback' analysis should be included:

$$\text{Simple payback} = \frac{\text{Capex of alternative boilers}}{(\text{Theoretical benefit from improved efficiency} - \text{Cost of fuel})}$$

Where: 'Cost of fuel' is the theoretical cost of the alternative boilers' fuel.

A statement of the Company's investment criteria should also be included that sets out what is considered to be an acceptable payback period.

Validation – The confirmation by the Administrator of the assessment method, assumptions made and consistency of the information provided in a Self- Assessment. Validation, unlike Audit, is the routine confirmation that a Self- Assessment has been carried out properly. It includes verification that the Scheme definition and calculations are correctly applied.

Weighted Adjustment Factor – The aggregated correction factor derived by weighting individual uncertainty adjustment factors according to the relative contribution of each stream to total input or output.

X coefficient – The power coefficient in the QI formula. It reflects the alternative, separate, state of the art power generation efficiency for the applicable fuel type, scheme size and date of Scheme commissioning.

Y coefficient – The heat coefficient in the QI formula. It reflects the alternative, separate, state of the art heat generation efficiency for the applicable fuel type, scheme size and date of Scheme commissioning.

Z ratio – The ratio of heat extracted from a pass-out condensing steam turbine to the resulting reduction in power output.