



Overview and Interactions of Fiscal Benefits for GQCHP

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CHPQA

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Talk Coverage

- ECA: Clarification only
- CCL: 'Main' and 'CPS' rates
- CfD, RHI and RO (introduction)



CHP Enhanced Capital Allowance (ECA)



CHP Enhanced Capital Allowance (ECA) Eligibility

➤ When to apply:

- Application to the CHPQA programme should be made once certain detailed information is available for the Self-Assessment, **when final design details are available**
- Claimants will **not need to have the Certificate before buying equipment** but will need it by the time their tax return is submitted for the year in which expenditure is incurred.

➤ How to apply:

- Completing F3 form and make sure you tick the correct box for requesting an Energy Efficiency certificate.



CHP Qualifying Equipment for ECA

- All equipment within the CHP Scheme boundary.
- Details are given in the CHP Technology list

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/583663/CHPQA_ECA_Note.pdf

- For EfW CHP some additional equipment outside the CHP boundary can also qualify – only if using SRF
- the maximum portion of Qualifying Expenditure eligible for ECA is based $\frac{CHP_{qpc}}{CHP_{tpc}}$

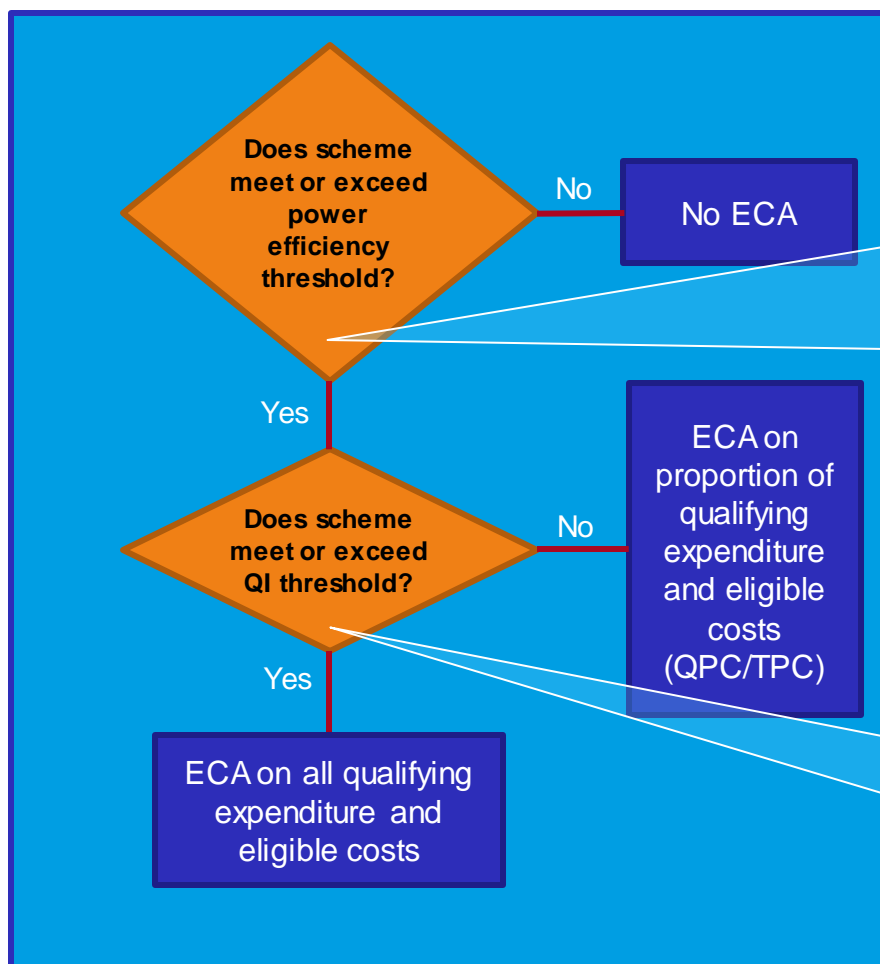


CHP Enhanced Capital Allowance (ECA) Eligibility

- CHP scheme operators need to demonstrate that they comply with the following eligibility criteria:
 - *Main intended business to provide heat and power for clearly identified users on site or to known third parties, and not to generate power for sale to or via unspecified third parties.*
 - *Not available for companies whose core business is electricity production.*



Calculation of ECA value to a CHP Scheme



Power Efficiency Threshold

- 20% for conventional fuels
- 10% for wholly biomass or solid/liquid waste
- Between 20% and 10% for partly biomass or solid/liquid waste (dependent on fuel mix)

Quality Index (QI) Threshold

- ≥ 105 under MaxHeat conditions



ECA: Non-compliance

Certificate will be revoked:

- If the original design has changed after certification and a new EE certificate has not been obtained from CHPQA, or
- If no heat customer(s) present at time of commissioning (i.e. not operating as CHP)

If certificate is revoked, applicant will have to contact HMRC to return any claimed benefits



CHP Enhanced Capital Allowance (ECA) Eligibility

Number of schemes received EE Certificate

These schemes
shouldn't claim
ECA if claiming
RHI.

Fuel Type	2015	2016	2017	2018
Conventional	117	62	33	27
Renewable	19	13	5	4
Grand Total	136	75	38	31



Climate Change Levy (CCL)

- The main rates of CCL are charged on energy supplied to an end user
- Carbon Price Support (CPS) rates are paid by consumers. When a deemed taxable self-supply of fossil fuels is made for use in electricity generation.



CCL: 'Main' and 'CPS' rates

- Main Rate of CCL was introduced in 2001
- GQCHP is exempt from the main rates of CCL on fuel and on electricity used on site or directly supplied
- To stabilise price signals to investors in low carbon technologies the Government introduced the Carbon Price Support (CPS) in 2013,
- CPS applied to fuel for electricity generation only.
- GQCHP certified by CHPQA is exempt from CPS rates on the fuel that is referable to the Scheme's Qualifying Heat Output (QHO).
- Effective from 1 April 2015, the exemption was extended to fuel referable to Qualifying Power Output (QPO) used on-site or supplied under exemption from a supplier licence.



Main rates of CCL

Taxable commodity	Rate from 1 April 2016	Rate from 1 April 2017	Rate from 1 April 2018	Rate from 1 April 2019
Electricity (£/KWh)	0.00559	0.00568	0.00583	0.00847
Natural gas (£/KWh)	0.00195	0.00198	0.00203	0.00339
LPG (£/kg)	0.01251	0.01272	0.01304	0.02175
Any other taxable commodity (£/kg)	0.01526	0.01551	0.01591	0.02653

45%
increase

67%
increase

- The new rates of CCL will apply from 1 April 2019
- Increased by 67% for N. Gas and 45% for Electricity
- This is a result of ending CRC



CPS Rates of CCL

Equivalent
to £0.0095
/KWh of
electricity

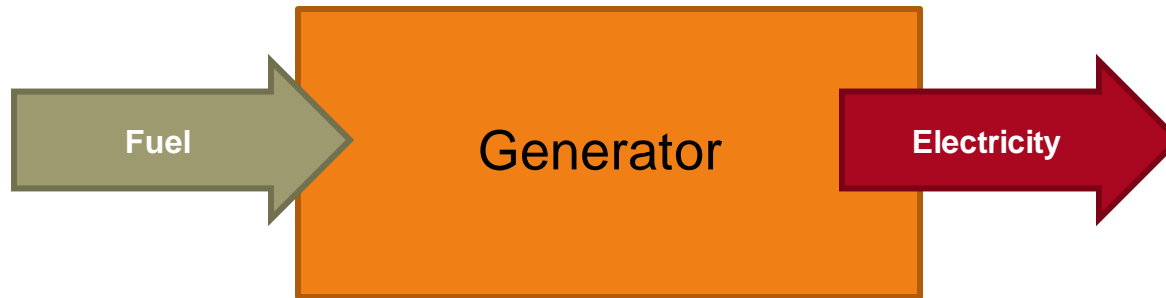
Capped
until 2020

Commodity	Units	1 April 2015-31 March 2016	1 April 2016-31 March 2019
Natural Gas	£/kWh	0.00334	0.00331
LPG	£/kg	0.05307	0.05280
Coal	£/GJ	1.56860	1.54790
Fuel Oil	£/litre	0.05730	0.05711
Gas Oil	£/litre	0.04990	0.04916

➤ The CPS rates do not apply in Northern Ireland



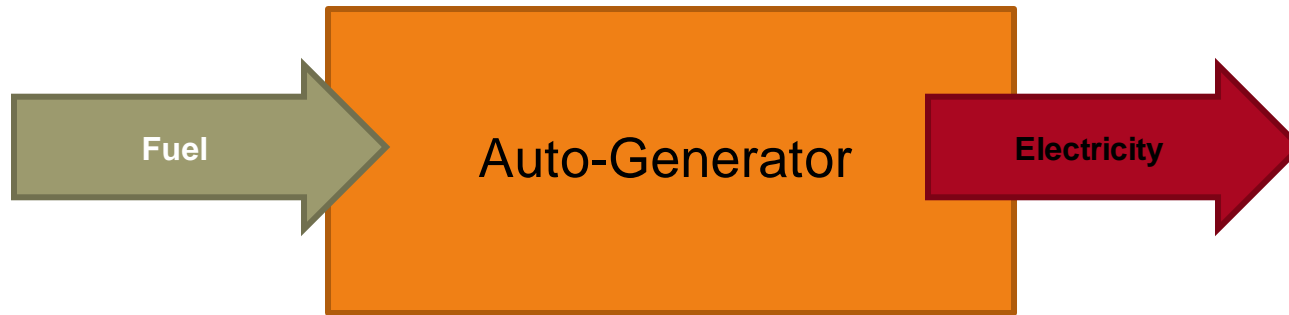
Power Stations



- Fuel input subject to CPS rates
- No CCL on Fuel input but all Electricity output is subject to CCL (CCL paid by consumers)
- CPS paid by Generators on all conventional fuels used for generating electricity.



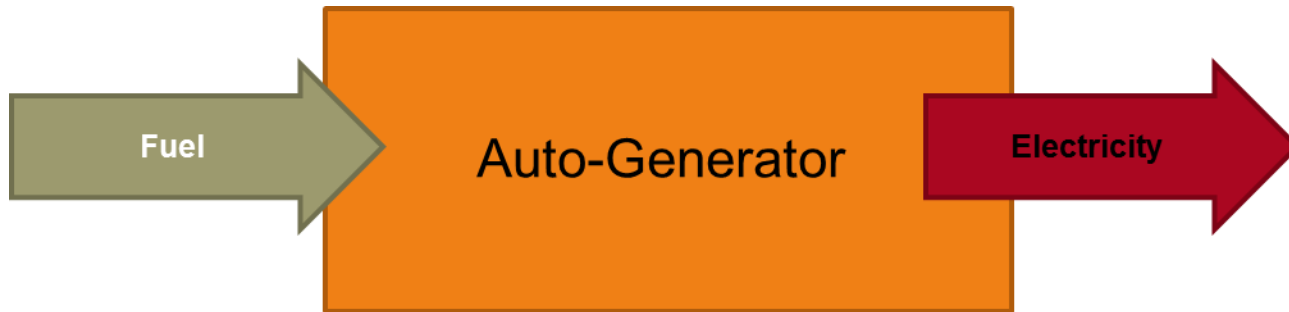
Auto-generators $< 2\text{MW}_e$



- Exempt from CPS
- fuel input subject to 100% CCL,
- electricity consumed on site exempt from CCL



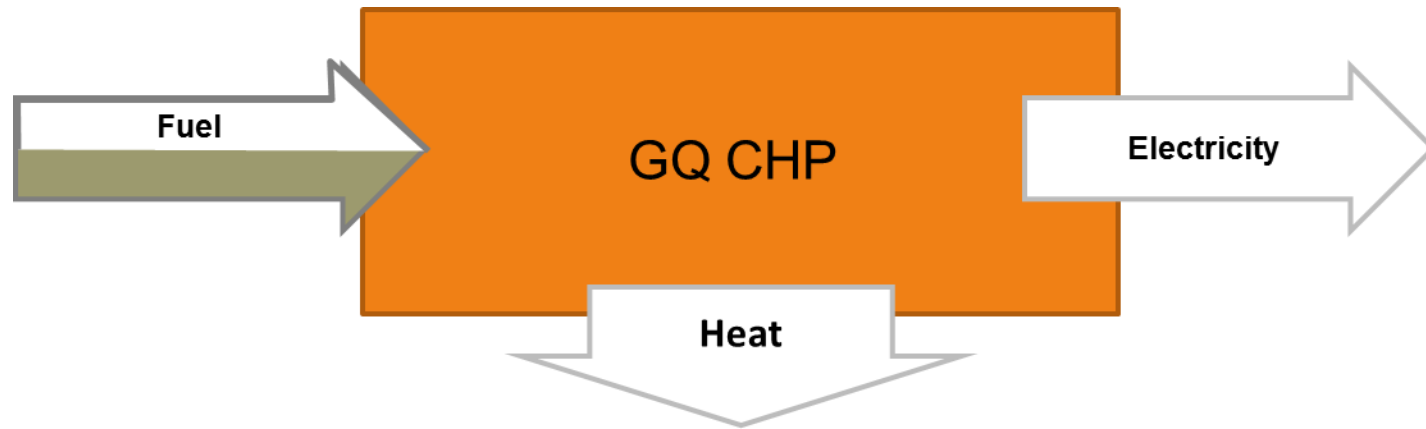
Auto-generators $\geq 2\text{MW}_e$



- No CCL on fuel input
- Fuel input subject to 100% CPS rates
- All electricity output subject to 100% CCL -
same as grid electricity



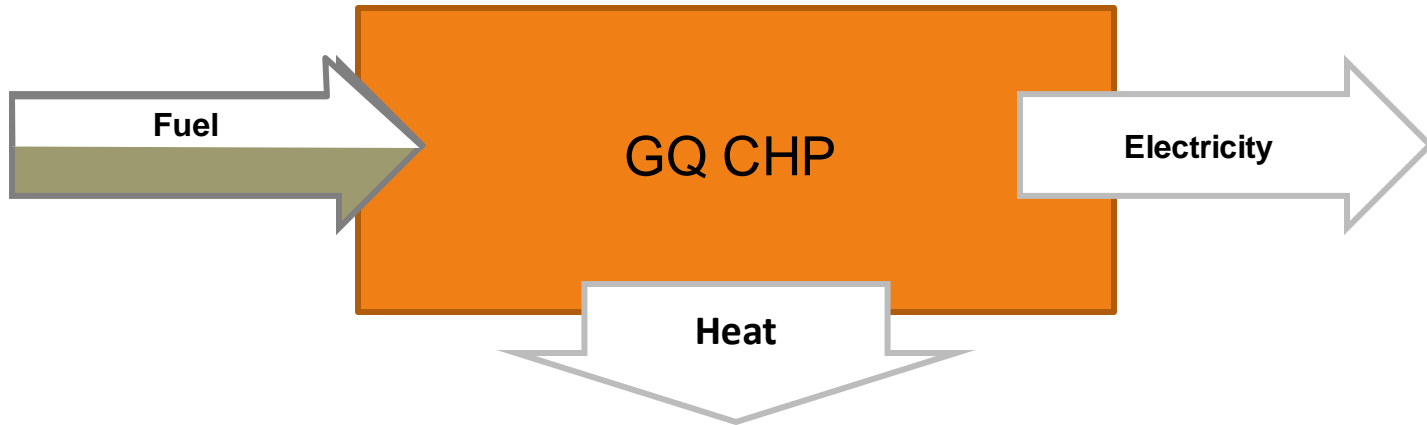
GQCHP – Fully Qualified with Capacity $\leq 2\text{MW}_e$



- Fuel input exempt from CPS
- Exempt from CCL on fuel input
- Electricity output exempt from CCL (Direct Supply)



GQCHP – Fully Qualified with Capacity $>2\text{MW}_e$

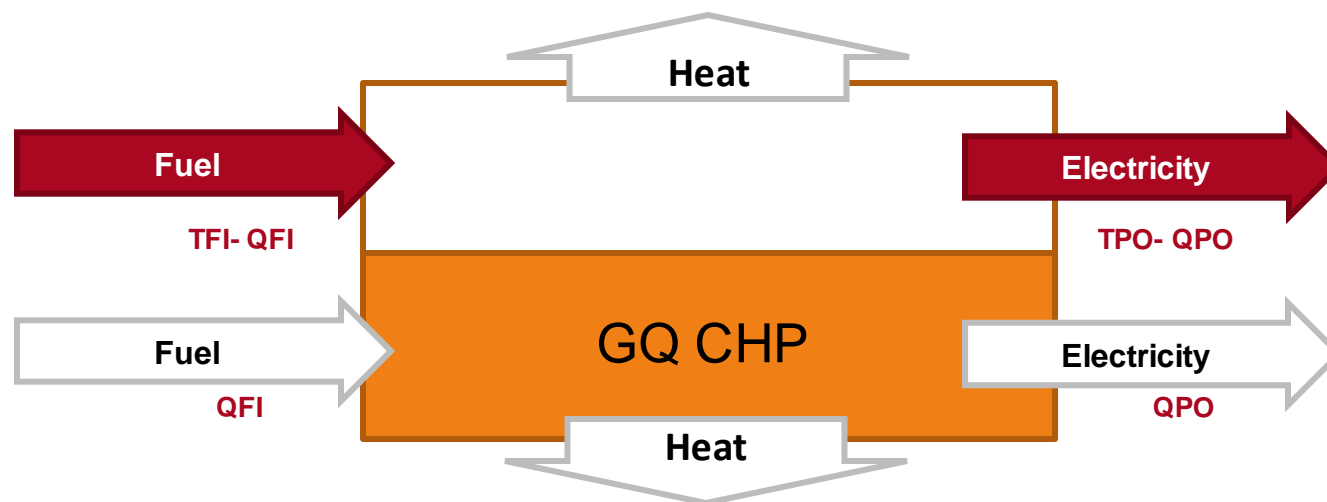


- Fuel input exempt from CCL
- Electricity output exempt from CCL (Direct supply).
- Fuel for heat (QHO) not liable to CPS rates
- Fuel input referable to electricity generation used on site not liable to CPS rates (from April 2015)

In this case No CCL or CPS Liability



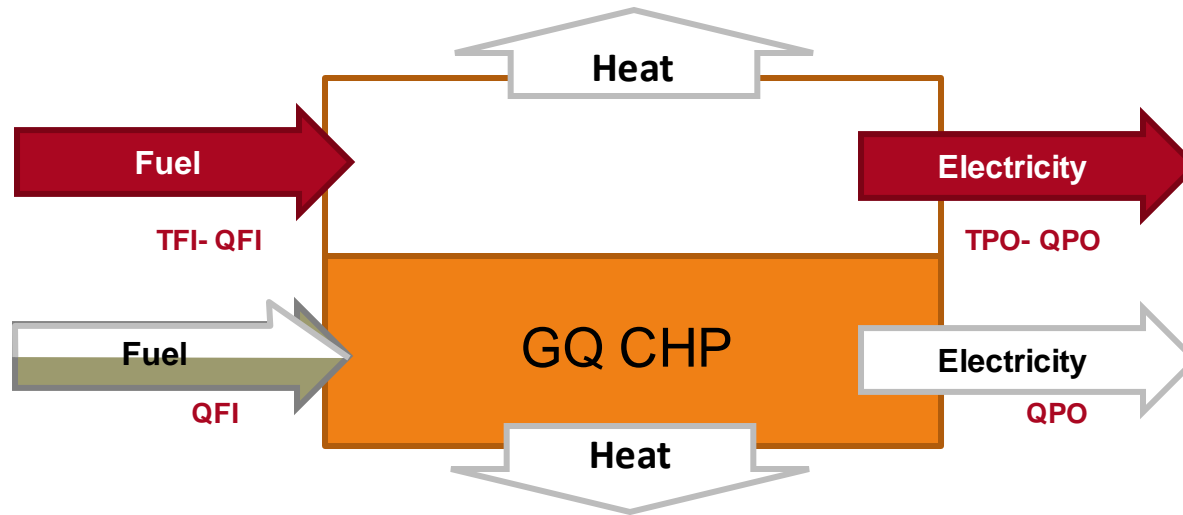
GQCHP – Partially Qualified with Capacity $\leq 2\text{MW}_e$



- No CPS
- Qualifying fuel input (QFI) exempt from CCL
- Qualifying power output (QPO) exempt from CCL where directly supplied



GQCHP – Partially Qualifying with Capacity $>2\text{MW}_e$



- Qualifying fuel input (QFI) exempt from CCL
- Qualifying power output (QPO) exempt from CCL **if directly supplied**
- Fuel for heat (QHO) not liable to CPS rates
- Fuel attributable to QPO **used on site** is not liable to CPS rates.

(Electricity used on site means...if it is self-supplied or supplied to a consumer by an exempt unlicensed electricity supplier)



Advising CPS Liability for GQCHP



Quality Certification for an existing CHP Scheme

CHPQA		
Scheme: CHPQA SITE Z GEMINI BUILDING HARWELL OXFORD OX11 0QR	6. The Percentage of Fuel Input Referable to Electricity Generation is:	56.22 %
	7. The Percentage of Conventional Fuel is:	1.31 %

CHPQA Scheme Reference No: 8760 Z

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

- The Total Power Capacity of this Scheme is: 50,000 MWe
and the Qualifying Power Capacity is: 50,000 MWe
- The threshold Power Efficiency criterion for this Scheme is: 20 %
and the Power Efficiency of this Scheme is: 25.85 %
- The Qualifying Heat Output from this Scheme is: 135,461 MWh
and the Heat Efficiency of this Scheme is: 35.46 %
- The threshold Quality Index criterion for under Annual Operation is: 100
and the Quality Index of this Scheme is: 97.75
- The Total Fuel Input to this Scheme is: 382,033 MWh
and the Qualifying Fuel Input is: 382,033 MWh
- The Percentage of Fuel Input Referable to Electricity Generation is: 56.22 %
- The Percentage of Conventional Fuel is: 1.31 %
- The Total Power Output from this Scheme is: 98,764 MWh
and the Qualifying Power Output is: 89,049 MWh
- The fuel supply reference(s) (e.g. TRANSCO/MFR gas meter reference nos. and/or other unique ID descriptors) for this Scheme are:

See HMRC Excise Notice CCL1/6:
a guide to carbon price floor
(updated 20 April 2016)

This certificate is a statement of Scheme performance over the period 01/01/2016 to 31/12/2016 and is valid until 31/12/2017.

Approved by the CHPQA Administrator on behalf of BEIS. Date: 14th November 2017

This 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 purpose of the Climate Change Levy (General) (Amendment) Regulations 2003 only, the QPD limit 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.



CPS liability Calculation

- Fuel referable to the production of electricity is determined by:

$$Q = \left(TFI - \frac{QHO}{\eta_{h,ref}} \right) \times \left(1 - \frac{MO}{TPO} \right)$$

- Percentage of fuel input referable to Electricity Generation is given on the CHPQA certificate
- For fuel input referable to non-GQ CHP electricity it was decided not to incorporate this into the CHPQA certificate (**See HMRC document CCL1/6 - a guide to carbon price floor**)
- Fuels referable to the production of non-qualifying electricity use the following formula:

$$\text{Fuel Subject to CPS,} \quad R = Q \times \left(1 - \frac{ES}{TPO - MO} \right)$$

Where:

Q = Fuel for Electricity

ES = Electricity used on site ($\leq QPO$)

MO = Mechanical Power

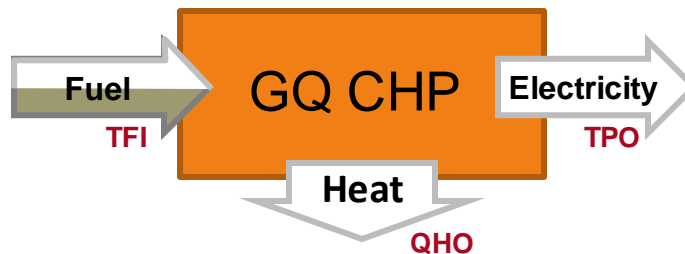
$\eta_{h,ref}$ = Reference boiler efficiency (81%)



Example 1: Full GQCHP >2MWe

Fuel input referable to electricity production:

$$Q = \left[\text{TFI} - \left(\frac{\text{QHO}}{81\%} \right) \right] \times \left[1 - \left(\frac{\text{MO}}{\text{TPO}} \right) \right]$$



TPC	-	150 MWe
TFI	-	1,234 GWh
TPO	-	439 GWh
QHO	-	420 GWh
η_p	-	35.6% ✓
QI	-	102.87 ✓
MO	-	0
10% of electricity exported		

Fuel Subject to CPS:

$$R = Q \times \left[1 - \left(\frac{\text{ES}}{\text{TPO} - \text{MO}} \right) \right]$$

$$R = 715 \times \left\{ 1 - \left(\frac{439 \times 0.9}{439 - 0} \right) \right\}$$

$$R = 71.5 \text{ GWh}$$

$$R/\text{TFI} = 71.5/1,234 = \underline{5.8\%}$$

$$\text{Fuel for electricity, } Q = \text{TFI} - \left(\frac{\text{QHO}}{81\%} \right)$$

$$= 1,234 - \left(\frac{420}{81\%} \right)$$

$$= 715 \text{ GWh} = \underline{58\% \text{ of TFI}}$$

This means 94.2% of TFI is exempt from CPS, worth in the order of £3.9M pa, based on CPS rate of £3.34/MWh of Gas



Example 2: Partial GQCHP >2MWe

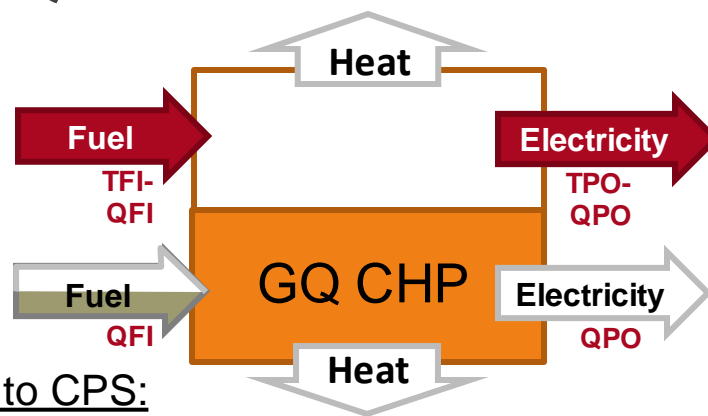
Fuel input referable to electricity production:

$$Q = \left[TFI - \left(\frac{QHO}{81\%} \right) \right] \times \left[1 - \left(\frac{MO}{TPO} \right) \right]$$

TPC	-	7.2 MWe
TFI	-	57 GWh
TPO	-	9.5 GWh
QHO	-	21 GWh
η_p	-	16.6% ✗
QI	-	73.97 ✗
QFI	-	48 GWh
QPO	-	5.8 GWh
All QPO used on site		

$$\text{Fuel for electricity, } Q = 57 - \left(\frac{21}{81\%} \right)$$

$$= 31 \text{ GWh} = \underline{54.4\% \text{ of TFI}}$$



Fuel Subject to CPS:

$$R = Q \times \left[1 - \left(\frac{ES}{TPO - MO} \right) \right]$$

$$R = 31 \times \left\{ 1 - \left(\frac{5.8}{9.5 - 0} \right) \right\}$$

$$R = 12.1 \text{ GWh}$$

$$R/TFI = 12.1/57 = \underline{21.2\%}$$

This means 78.8% of TFI is exempt from CPS, worth in the order of £150k pa based on CPS rate of £3.34/MWh of gas



Total CPS exemption value

- Currently about 180 large CHP schemes benefit from CPS exemption
- Some with mixed fuel
- The majority are using conventional fuel
- CPS exemption on Fuel for heat is worth in the order £120 million per year.
- The value of CPS exemption on Fuel for **QPO used on site** is the order of £90 million.



Fiscal Measures for Renewable CHP, covering

- RO
- CfD
- RHI



Renewables Obligation (RO)



The Renewable Obligation (RO) and Banding

- First introduced in 2009 and gave:
- “Banding” concerns the provision of varying levels of support (ROCs/MWh) for different types of generation technology
- New banding regime introduced in April 2013 to run through to March 2017
- **NOW CLOSED TO NEW CAPACITY**
- **But accredited schemes under the RO will need to continue with CHPQA certification to end of the policy period in 2037.**



Banding Regime 2016/17

Generation Type	CHP Qualifying Power Output [ROCs/MWh]	Non-CHP Power Output [ROCs/MWh]
Co-firing of regular bioliquid with CHP	1.0	0.5
Low-range co-firing of relevant energy crops with CHP	1.5	1.0
Dedicated biomass with CHP*	1.8	1.4
High-range co-firing with CHP	1.4	0.9
Mid-range co-firing with CHP	1.1	0.6
Low-range co-firing with CHP	1.0	0.5
Station/unit conversion with CHP†	1.5	1.0
Energy from Waste with CHP	1.0	0.0

Ref: *The Renewables Obligation Order 2015*

* Only available in Northern Ireland as NI RHI has been closed.

† Where conversion has been from co-firing CHP

These are only available where support under the RHI is not available



ROC Eligibility

For GQCHP, the power output eligible for the award of ROCs is determined using:

$$\text{Eligible Power Output} = \text{Net Power Output} \times \text{Biomass Content (\%)} \times \left(\frac{\text{QPO}}{\text{TPO}} \right)$$

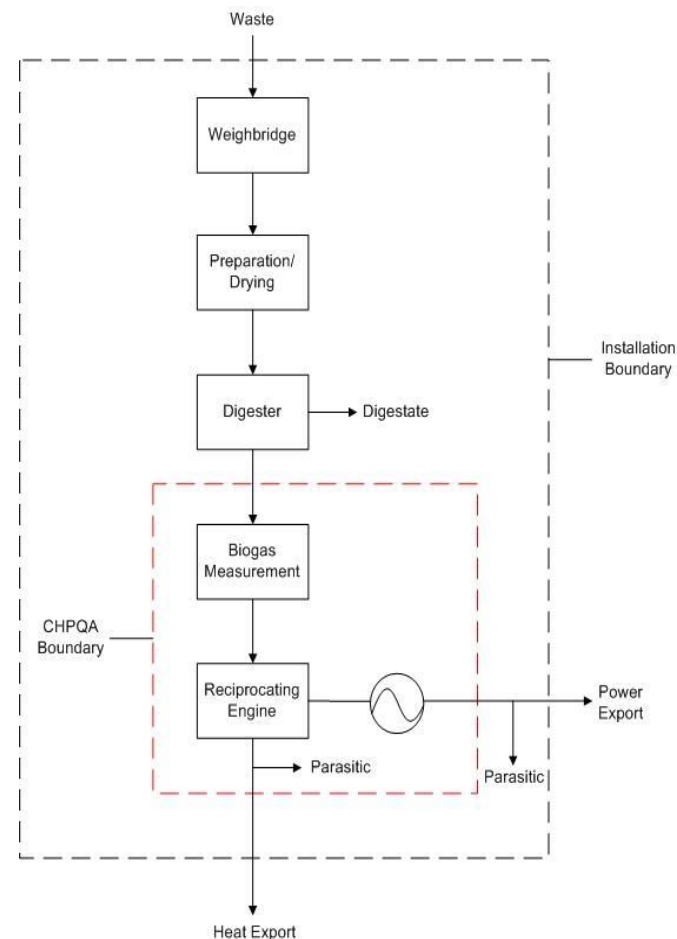
From CHPQA
Certificate



ROC Eligibility – QI Definitions

Advanced Conversion Technologies (ACTs)

- Gasification
 - Pyrolysis
 - Anaerobic Digestion
- For biogas fired schemes, the fuel input boundary should normally be drawn at the gas inlet to RE
- Should use the Biogas QI formula





Contract for Difference (CfD)



Contracts for Difference (CfD)

- Regulations for CfDs came into force in Great Britain on 1/8/2014
- CfDs replace the RO for all new projects from 1/4/2017
- Generators are paid the difference between the 'strike price' and the 'reference price' (average market price for electricity in GB market). If 'reference' exceeds 'strike' price, generator must pay difference.
- CfDs are awarded via allocation rounds, which government can tailor to specific technologies
 - ❑ The first allocation round was in October 2014: **two EfW CHP stations were awarded CfDs**
 - ❑ Second allocation round was announced in April 2017. Technologies include:
 - Advanced Conversion technologies (with or without CHP)
 - Anaerobic Digestion (with or without CHP)
 - Dedicated Biomass with CHP
 - ❑ Third allocation round planned for 2019



Contracts for Difference (CfD)

Round 2, Successful applications:

- 2 Dedicated biomass CHP, total capacity 85.64 MWe
- 1 ACT CHP, capacity of 0.05 MWe

Technology	Capacity (MWe)	Strike Price (£/MWh)	2021/22 Administrative Strike Price (£/MWh)
Advanced Conversion Technologies (with or without CHP)	0.05	74.75	125
Dedicated Biomass CHP	85.0	74.75	115
Dedicated Biomass CHP	0.64	74.75	115



CHP-specific CfD Eligibility

- Dedicated Biomass and Energy from Waste generators are only supported if they are ‘with CHP’.
- Provision for other technologies to be ‘with CHP’ (ACT, AD and geothermal)
- Support is paid only on the proportion of metered electrical output assessed by CHPQA to be QPO.
- Uses the CHP Qualifying Multiplier, $CHPQM = QPO/TPO$.
- Provide evidence of intended “useful heat” load in F3 submission.
- For ‘with CHP’ technologies, the generator must maintain annual CHPQA certification (full or partial) including **GN44 certification** for the duration of the CfD.
- **Biomass (not EfW) schemes seeking CfDs will also be able to apply for the RHI. This is, however, set for each CfD round.**



Dual CHPQA Certification

Quality Certification for an existing CHP Scheme

CHPQA Certificate No: P04231498

Scheme: **CHPQA SITE Z
GEMINI BUILDING
HARWELL
OXFORD
OX11 0QR**

DRAFT

CHPQA Scheme Reference No: 8760 Z

This is to Certify that the Self-Assessment of the above CHP Scheme undertaken by TEST USER 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:	50,000 MWh
and the Qualifying Power Capacity is:	50,000 MWh
2. The threshold Power Efficiency criterion for this Scheme is:	20 %
and the Power Efficiency of this Scheme is:	25.85 %
3. The Qualifying Heat Output from this Scheme is:	135,461 MWh
and the Heat Efficiency of this Scheme is:	35.46 %
4. The threshold Quality Index criterion for under Annual Operation is:	100
and the Quality Index of this Scheme is:	97.75
5. The Total Fuel Input to this Scheme is:	382,033 MWh
and the Qualifying Fuel Input is:	382,033 MWh
6. The Percentage of Fuel Input Referable to Electricity Generation is:	56.22 %
7. The Percentage of Conventional Fuel is:	2.31 %
8. The Total Power Output from this Scheme is:	98,764 MWh
and the Qualifying Power Output is:	89,049 MWh
9. The fuel supply reference(s) (e.g. TRANSCOMPR gas meter reference nos. and/or other unique ID descriptors) for this Scheme are:	

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 (General) (Amendment) 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 referred to at item 8 above over the Total Power Output referred to at item 8 above.

Quality Certification for an existing CHP Scheme for CfD eligibility

CHPQA Certificate No: F04231498/CID

Scheme: **CHPQA SITE Z
GEMINI BUILDING
HARWELL
OXFORD
OX11 0QR**

DRAFT

CHPQA Scheme Reference No: 8760 Z

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

Information for CfD Eligibility

1. The Total Power Capacity of this Scheme is:	50,000 MWh
2. The Power Efficiency of this Scheme is:	25.85 %
3. The Qualifying Heat Output from this Scheme is:	135,461 MWh
and the Heat Efficiency of this Scheme:	35.46 %
4. The threshold Quality Index criterion for this Scheme under Annual Operation is:	100.00
and the Quality Index of this Scheme is:	114.33
5. The Total Fuel Input to this Scheme is:	382,033 MWh
6. The Total Power Output from this Scheme is:	98,764 MWh
and the Qualifying Power Output is:	98,764 MWh
7. The CHP Qualifying Multiplier for this Scheme is:	1.00
8. The Technology Type for this Scheme is:	Pass-out condensing steam turbine
9. The Main Fuel Type for this Scheme is:	Wood Fuel
10. The Percentage of Renewable Fuel is:	98.69 %

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 (General) (Amendment) 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 referred to at item 6 above over the Total Power Output referred to at item 6 above.

6. The Total Power Output from this Scheme is:
and the Qualifying Power Output is:

98,764 MWh
98,764 MWh



CfD Investor Safeguard

- During the CfD contract lifetime biomass (but not EfW or other technologies) CHP Schemes are protected against risk of loss of heat customer(s) for up to 5 years (5 CHPQA certification periods)
- Under this “investor safeguard”, a plant may elect to have their CHP Qualifying Multiplier (QPO/TPO) assessed on the most recent CHPQA F3 ‘design’ Certificate, rather than previous year’s operation



Safeguard Provision for QI

This has changed
to 70% for round 3

Three policy criteria:

- The minimum primary energy saving requirement of 10% (0% for schemes <1MW electrical capacity).
- A new requirement for a minimum heat efficiency of 10% (gross calorific value).
- An overall efficiency of at least 35% (gross calorific value) for schemes >25MW electrical capacity.

Schemes that meet all 3 criteria but do not achieve a QI of 100 will be awarded a QI of 100 based on the design data, and an appropriate X value will be developed.



QI Threshold for DH/DC schemes

New Renewable CHP primarily supplying Heating/Cooling Networks:

- **QI threshold of 95** for an initial period of operation of **5 years** will be allowed
- Need a Business Plan to demonstrate network load build up.
- Subject to :
 - ❑ Achieving a QI of 100, by the 6th full calendar year or an increase by at least 5 points by the 6th full calendar year.
 - ❑ Achieving this by means of network connection to heat loads in additional buildings, on additional sites or to additional industrial or commercial users.



Renewable Heat Incentive (RHI)



CHP in RHI

- The specific tariff for solid biomass GQCHP of 4.42p/kWh
- Schemes need to be certified by CHPQA in order to benefit from CHP tariff
- EfW plants are only eligible for the biomass tariff for the biomass percentage contained in the waste
- No special CHP RHI tariffs for EfW or other fuels (biomass boiler tariff is applied)
- RHI eligible heat from CHP is not the same as QHO
- CHP scheme boundaries for CHPQA certification are not always the same as for RHI eligible installation
- Only heat produced via the engine/turbine can qualify for the CHP tariff
- This needs to be metered separately



The RHI (Amendment) Regulations 2016

- **Effective from the 1 August 2016**, the government introduced a threshold of **20% power efficiency** below which the heat qualifying for the RHI CHP tariff would be scaled back proportionately.
 - For example, if the power efficiency was 15%, the amount of heat that could qualify for the CHP tariff would be reduced by $(20-15)/20 \times 100\% = 25\%$.
This means 25% boiler heat and 75% CHP heat.
- Introduced to address concerns that a number of Schemes with **low power efficiencies** and high heat to power ratios (25:1 up to 90:1) were receiving **disproportionate support** where significant heat was simply passing through the prime-mover
- **However:** given feedback from the industry, the government has reduced the threshold to **10% power efficiency from 1 Jan 2017** for a transitional period to allow for Consultation to be carried out.



The RHI Recent Consultation

- In 2017 the Government published a consultation “The Renewable Heat Incentive: Support for Biomass Combined Heat and Power, to gather additional views on power efficiency threshold issue.
 - ❑ Response to Consultation was published in September 2017.
 - ❑ This stated that “The Government has decided to implement a 20% power efficiency threshold requirement.....”
 - ❑ This also stated “Participants with an application effective date between 1 Aug 2016 and the date on which the regulations containing the new 20% power efficiency requirements come into force will continue to have a 10% power efficiency requirement.”



Tariff rates for RHI accreditation after 1 April 2018

Tariff name	Eligible sizes	Tariff, p/kWh	
Small commercial biomass	< 200 kWth	Tier 1 Tier 2	3.05 2.14
Medium commercial biomass	200 kWth to \leq 1MWth	Tier 1 Tier 2	3.05 2.14
Large commercial biomass	>1MWth	Tier 1 Tier 2	3.05 2.14
Solid biomass CHP systems	All capacities	n/a	4.42

Tier 1 rate paid for the initial amount of heat generated each 12 month period equal to the amount of heat that would be generated by the installation running at its installation capacity for 3,066 hours (35% load factor). Remainder of heat generated in the 12 months paid at Tier 2 rate.



Interactions

1- Biomass CHP can obtain ROC uplift and ECA

or

2- Standard ROC (no uplift) and RHI but no ECA

and

3- From 2017 can only apply for CfD & RHI but no ECA



To summarise...

To obtain any of the fiscal benefits available for GQCHP the Scheme must be certified by CHPQA and must have a valid Certificate

Submission any time from 1 Jan 2019

Thank You