



Biomass and EfW CHP; latest developments and CHPQA interaction with CfDs, RHI and RO

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CHPQA



Focus on...

➤ CHPQA and CfDs

- Eligibility for '*with CHP*' CfDs, particularly biomass and waste
- CHPQA Certification for CfDs (CHPQA GN44 Certificate)

➤ CHPQA and the RHI

- A specific tariff for biomass-fuelled GQCHP, doesn't apply to EfW CHP
- Schemes need to be certified by CHPQA in order to benefit
- Only for heat produced via the engine/turbine
- Introduction of power efficiency threshold

➤ CHPQA and the RO

- ROC eligibility for Good Quality CHP
- CHPQA Certification for ROCs (CHPQA GN44 Certificate)



Contracts 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' (cost of investing in the specific low carbon technology) 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



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 **must** be ‘*with CHP*’.
- Provision for other technologies to be ‘*with CHP*’ (ACT, AD and geothermal)
- Support 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.
- It is expected that biomass, but not EfW, Schemes seeking CfDs, will also be able to apply for the RHI. This is, however, set for each CfD round.



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

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.



Dual CHPQA Certification

Department for
Business, Energy
& Industrial Strategy

**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:	29 %
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:	1.31 %
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 operated 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.

Department for
Business, Energy
& Industrial Strategy

**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 is:	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 %

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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



Renewable Heat Incentive (RHI)



Renewable Heat Incentive (RHI)

- Non-domestic RHI launched in November 2011
- Provides support for variety of renewable heat technologies, including
 - Solid biomass boilers and CHP
 - Solid biomass in waste
 - Biogas
 - Geothermal
 - Heat pumps
 - Solar thermal
- Support only for eligible heat ([see Ofgem RHI guidance](#))
- Specific tariff for Solid biomass fuelled GQCHP
- Tariff has changed on the 20th of September 2017

** Tariff for Schemes accredited to the RHI on or after 1st October 2016*



RHI

Recent scaling back introduced for schemes with low electrical efficiency . Further details later.....

- The specific tariff for solid biomass GQCHP of 4.29p/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
- 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 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.



Latest Tariff announcement

- Tariffs that apply for installations with an **accreditation date on or after 20 September 2017**:
 - From 20 Sept 2017 the tiering threshold for small and medium biomass boilers will change **from 15% to 35% of heat load**
 - Large biomass boilers will move from a single tariff to 2 Tier tariff with the same 35% threshold for Tier 1.
 - Tier 1 and Tier 2 tariff for non-domestic biomass boilers will be the same for all sizes
 - CHP no change to tiering, a single tier for all sizes.
 - Biomass CHP will be eligible for Tariff Guarantees. This will apply from the date of full accreditation, and the tariff at that time will apply.



Tariff rates for RHI accreditation before 20th September 2017

Tariff name	Eligible sizes	Tariff, p/kWh	
Small commercial biomass	< 200 kWth	Tier 1 Tier 2	3.15 0.83
Medium commercial biomass	200 kWth to ≤ 1MWth	Tier 1 Tier 2	5.32 2.31
Large commercial biomass	>1MWth	n/a	2.08
Solid biomass CHP systems	All capacities	n/a	4.29

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.



Tariff rates for RHI accreditation from 20th September 2017

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Small commercial biomass	< 200 kWth	Tier 1 Tier 2	2.96 2.08
Medium commercial biomass	200 kWth to ≤ 1MWth	Tier 1 Tier 2	2.96 2.08
Large commercial biomass	>1MWth	Tier 1 Tier 2	2.96 2.08
Solid biomass CHP systems	All capacities	n/a	4.29

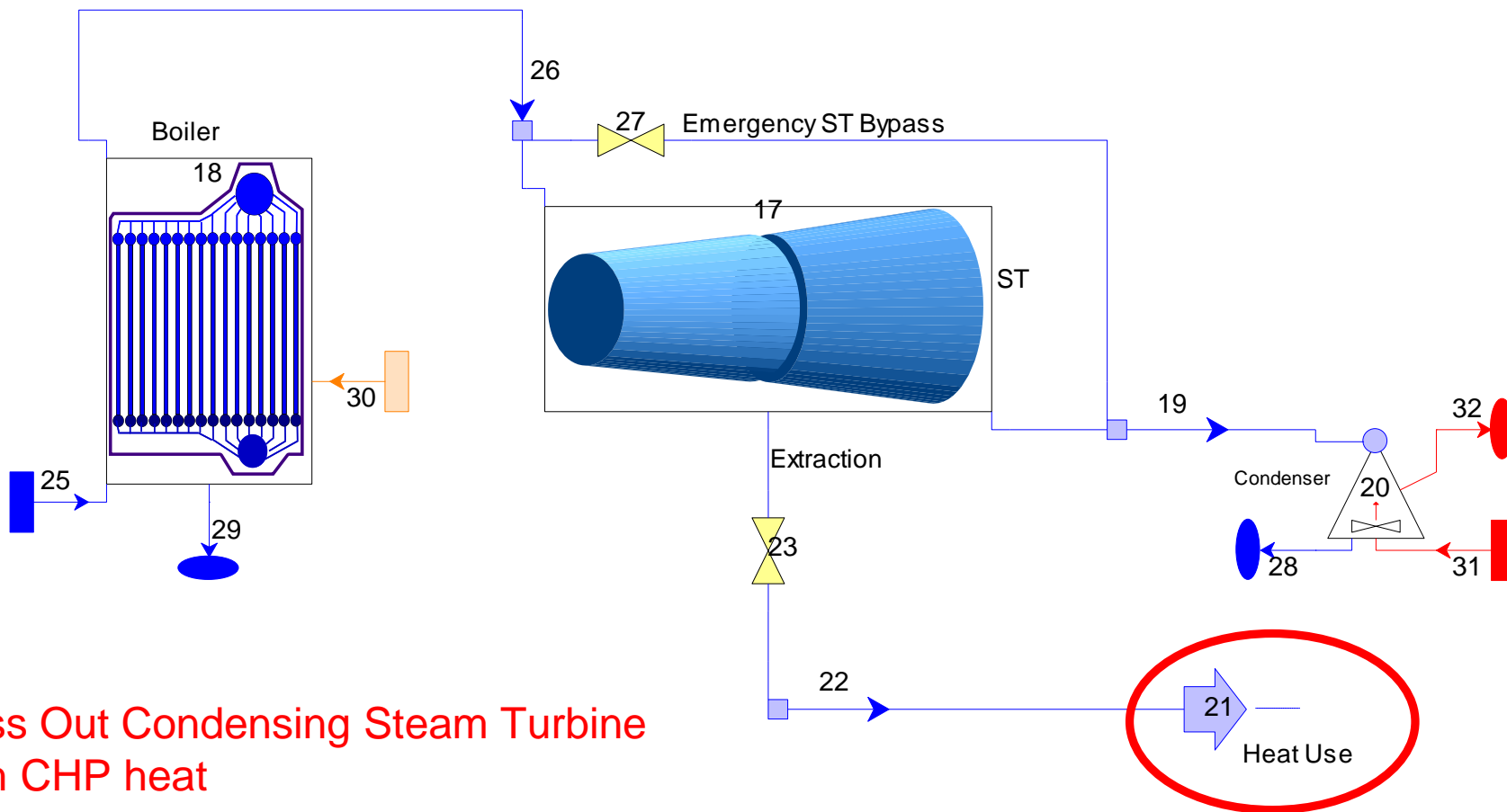


The RHI Recent Consultation

- Earlier this year 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.”



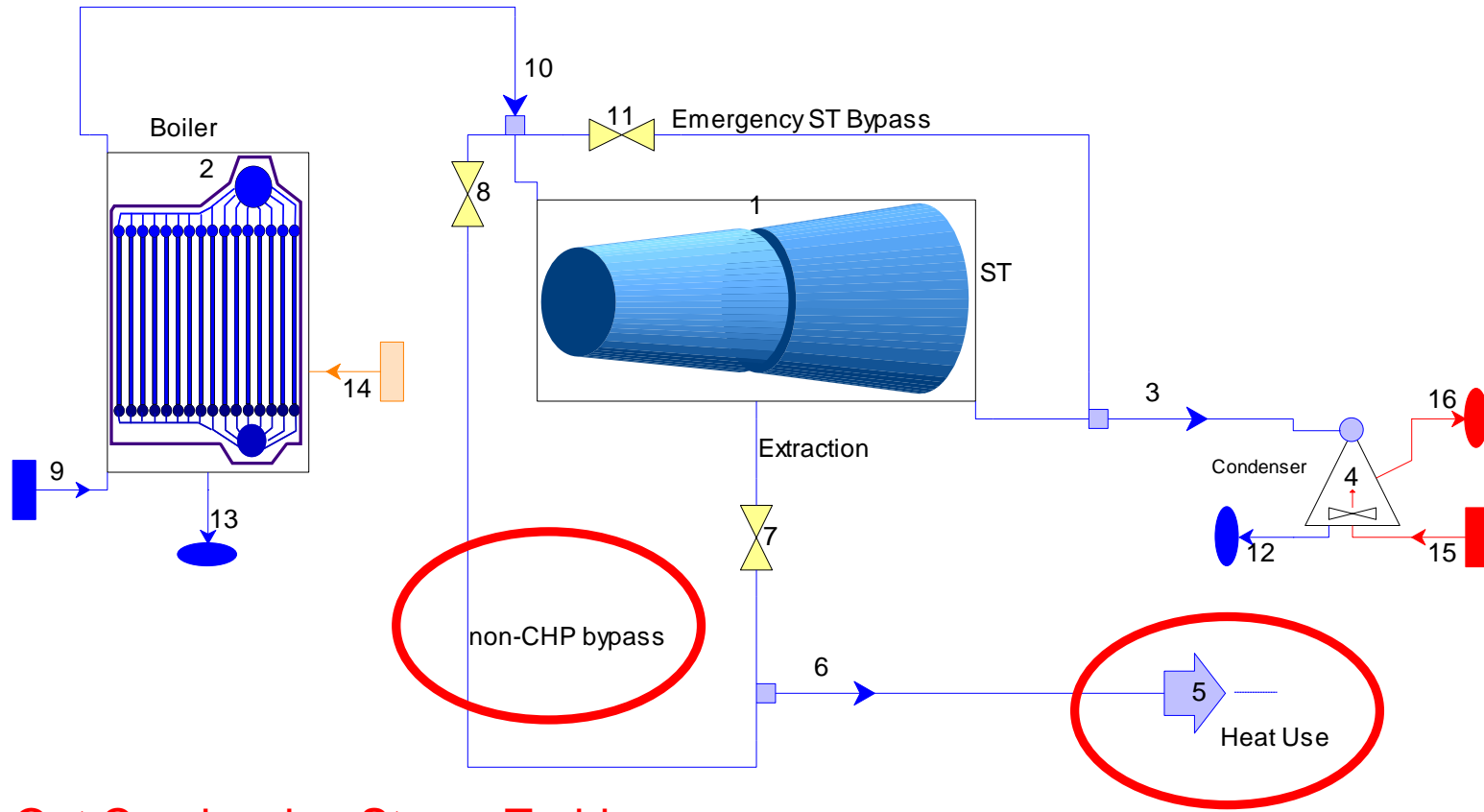
ST Example CHP



Pass Out Condensing Steam Turbine
with CHP heat



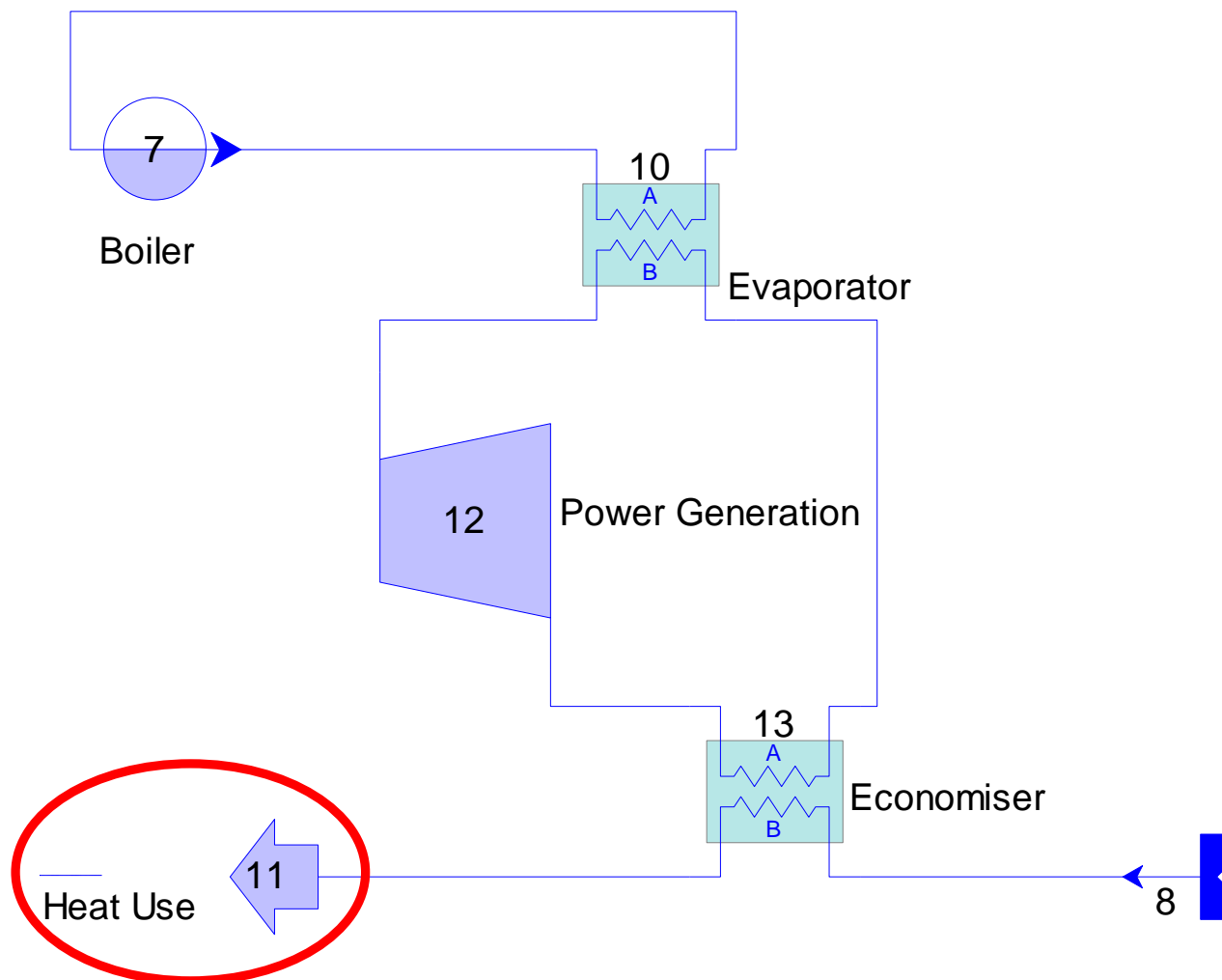
ST Example with non-CHP Heat



Pass Out Condensing Steam Turbine
with non-CHP heat in bypass



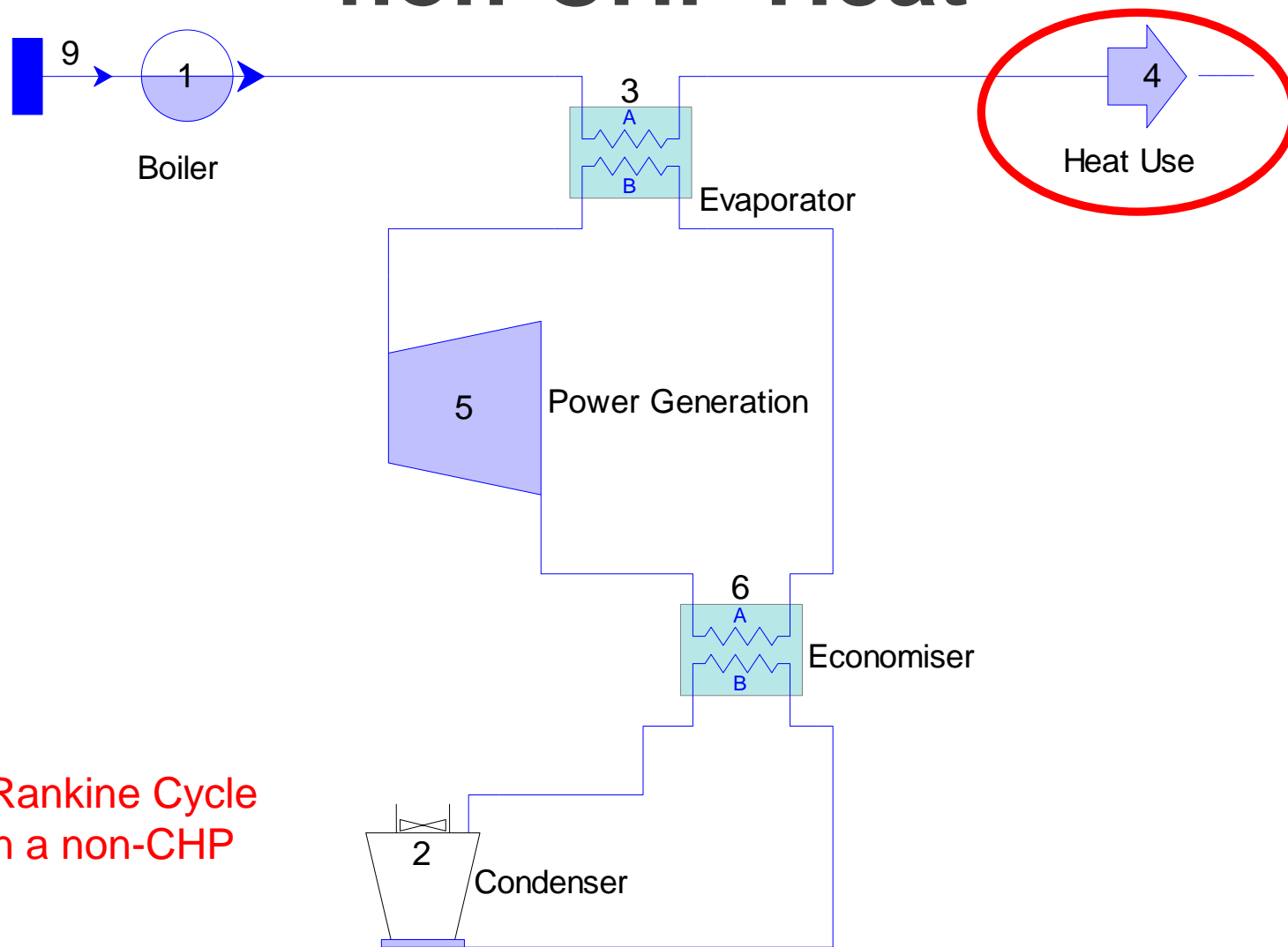
CHP Heat



Organic Rankine
Cycle Turbine as
CHP mode



non-CHP Heat



Organic Rankine Cycle
Turbine in a non-CHP
mode



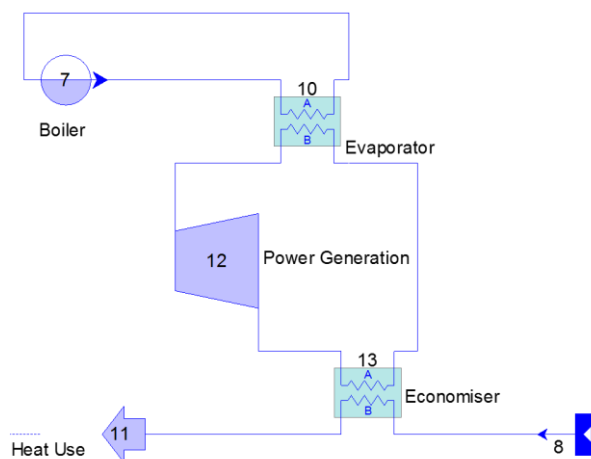
Example of Biomass CHP

TPC = 200 KWe

Thermal Capacity = 1 MWth

Power efficiency = 12%

QHO = 6,000 MWh



- CHP tariff will apply to $6,000 * (12/20) = 3,600$ MWh
- The remaining 2,400 MWh will be supported under Biomass Boiler tariff.
 - Tier 1 will apply to, $1 \text{ MW} * 8760 * 35\% * 40\% = 1,226.4$ MWh
 - Tier 2 will apply to, $2,400 - 1,226.4 = 1,173.6$ MWh
- CHP RHI payment $= 3,600 * 42.9 = \text{£}154,440$
- Biomass boiler Tier 1 payment $= 1,226.4 * 29.6 = \text{£}36,301.4$
- Biomass boiler Tier 2 payment $= 1,173.6 * 20.8 = \text{£}24,410.8$
- Total RHI payment = $\text{£}215,152$



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**



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



The RO 'Grace Period'

The Renewable Obligation Closure Order (2014):

- Set out the RO closure date to new renewable capacity as 31 March 2017
- Ensured that projects already supported under the RO will continue to receive support for 20 years under the RO
- Introduced an 18 month 'grace period' designed to protect projects against certain risks of delay and not being able to obtain RO accreditation after 31 March 2017

Biomass CHP that wished to make use of this grace period needed to be CHPQA certified prior to 9th November 2014



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

‘New’ Schemes

- As a result of the recent CHPQA review, updated QI formulae have been developed for ‘new’ Schemes
- Such ‘new’ Schemes are those that have **not previously** been certified under CHPQA **or were certified for the first time** between 1 January and 31 December 2016 on the basis of an F3 submission. For these Schemes, the QI formulae in Table 2 of Guidance Note 44 **Issue 6** must now be used

‘Existing’ Schemes

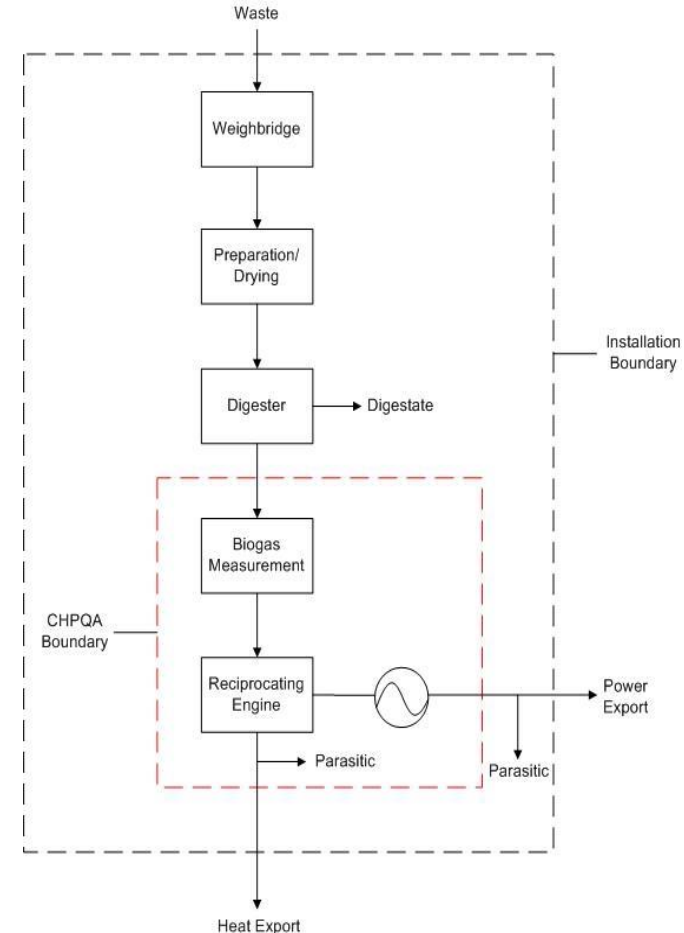
- For other Schemes, the set of QI formulae on which they were previously certified will apply. i.e. the formulae are grandfathered



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





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