CHP-Ready assessment template

This is a Word version of Appendix A of our CHP Ready guidance for combustion and energy from waste power plants for you to use as a template

February 2013

You can use this template to carry out a CHP-Ready assessment if you are making an environmental permit application for a new combustion or energy from waste power plant. This is a copy of the CHP-R Assessment Form in Appendix A of the CHP Ready Guidance and we recommend you read the guidance before completing it.

We would normally expect you to discuss CHP-Readiness as part of the pre-application process for your permit, and so if you have any queries about completing this template, please speak to the local Environment Agency Officer allocated to your pre-application.

#	Description	Units	Notes / Instructions
Requirement 1: Plant, Plant location and Potential heat loads			
1.1	**Plant name**		Wealden Works 3Rs
1.2	**Plant description**		See Section 2 of the CHP-R Report
1.3	**Plant location (Postcode / Grid Ref)**		The Wealden Works 3Rs site is located at Former Wealden Brickworks Waste Transfer Station, Langhurstwood Road, Horsham, West Sussex, RH12 4QD. The approximate National Grid Reference for the facility is TQ 17148 34313.
1.4	**Factors influencing selection of plant location**		See Section 4 of the CHP-R Assessment

1.5	**Operation of plant**		
a)	Proposed operational plant load	%	100% MCR
b)	Thermal input at proposed operational plant load	MW	80 MW
c)	Net electrical output at proposed operational plant load	MW	21 MW
d)	Net electrical efficiency at proposed operational plant load	%	29%
e)	Maximum plant load	%	100%
f)	Thermal input at maximum plant load	MW	80 MW
g)	Net electrical output at maximum plant load	MW	21 MW
h)	Net electrical efficiency at maximum plant load	%	29%

i)	minimum stable plant load	%	65%
j)	Thermal input at minimum stable plant load	MW	52 MW
k)	Net electrical output at minimum stable plant load	MW	12.6 MW
l)	Net electrical efficiency at minimum stable plant load	%	26.2%
1.6	**Identified potential heat loads**		
			See Section 4 of CHP-R Report

1.7	**Selected heat load(s)**		
a)	Category (e.g. industrial / district heating)		No suitable heat load found - see discussion in Section 4 of CHP-R Report.
b)	Maximum heat load extraction required	MW	**N/A - as above**
1.8	**Export and return requirements of heat load**		
a)	Description of heat load extraction		n/a - no suitable heat load found
b)	Description of heat load profile		n/a - no suitable heat load found
c)	Export pressure	bar a	n/a - no suitable heat load found
d)	Export temperature	°C	n/a - no suitable heat load found
e)	Export flow	t/h	n/a - no suitable heat load found
f)	Return pressure	bar a	n/a - no suitable heat load found

g)	Return temperature	°C	n/a - no suitable heat load found
h)	Return flow	t/h	n/a - no suitable heat load found
Requirement 2: Identification of CHP Envelope			
2.0	**Comparative efficiency of a standalone boiler for supplying the heat load**	90 % LHV	
2.1	**Heat extraction at 100% plant load**		
a)	Maximum heat load extraction at 100% plant load	MW	See Section 4.4 of CHP-R Report
b)	Maximum heat extraction export flow at 100% plant load	t/h	See Section 4.4 of CHP-R Report
c)	CHP mode net electrical output at 100% plant load	MW	See Section 4.4 of CHP-R Report
d)	CHP mode net electrical efficiency at 100% plant load	%	See Section 4.4 of CHP-R Report
e)	CHP mode net CHP efficiency at 100% plant load	%	See Section 4.4 of CHP-R Report
f)	Reduction in primary energy usage for CHP mode at 100% plant load	%	See Section 4.4 of CHP-R Report
2.2	**Heat extraction at minimum stable plant load**		
a)	Maximum heat load extraction at minimum stable plant load	MW	See Section 4.4 of CHP-R Report
b)	Maximum heat extraction export flow at minimum stable plant load	t/h	See Section 4.4 of CHP-R Report
c)	CHP mode net electrical output at minimum stable plant load	MW	See Section 4.4 of CHP-R Report
d)	CHP mode net electrical efficiency at minimum stable plant load	%	See Section 4.4 of CHP-R Report
e)	CHP mode net CHP efficiency at minimum stable plant load	%	See Section 4.4 of CHP-R Report
f)	Reduction in primary energy usage for CHP mode at minimum stable plant load	%	See Section 4.4 of CHP-R Report
2.3	**Can the plant supply the selected identified potential heat load (i.e.is the identified potential heat load within the 'CHP envelope')?**		n/a - no suitable heat load found
Requirement 3: Operation of the Plant with the Selected Identified Heat Load			

3.1	**Proposed operation of plant with CHP**		
a)	CHP mode net electrical output at proposed operational plant load	MW	n/a
b)	CHP mode net electrical efficiency at proposed operational plant load	%	n/a

c)	CHP mode net CHP efficiency at proposed operational plant load	%	n/a
d)	Reduction in net electrical output for CHP mode at proposed operational plant load	MW	n/a
e)	Reduction in net electrical efficiency for CHP mode at proposed operational plant load	%	n/a
f)	Reduction in primary energy usage for CHP mode at proposed operational plant load	%	n/a
g)	Z ratio		n/a
Requirement 4: Technical provisions and space requirements			
4.1	**Description of likely suitable extraction points**		Steam for a district heating system could be supplied via a controlled steam flow extraction from low pressure turbine bleed at approximately 1.6 bar(a).
4.2	**Description of potential options which could be incorporated in the plant, should a CHP opportunity be realised outside the 'CHP envelope'**		All potential options are expected to be within the CHP Envelope
4.3	**Description of how the future costs and burdens associated with supplying the identified heat load / potential CHP opportunity have been minimised through the implementation of an appropriate CHP-R design**		If the scheme were to be implemented, suitable space has been allowed for within the design of the Facility to house CHP export infrastructure. It is anticipated that standby boilers could be located within the turbine hall. The turbine design will be selected to maximise electrical efficiency while allowing for the option of heat export to be implemented in the future. This is in line with the EA CHP-Ready Guidance which states that the initial electrical efficiency of a CHP-R plant (before any opportunities for the supply of heat are realised) should be no less than that of the equivalent non-CHP-R plant.
4.4	**Provision of site layout of the plant, indicating available space which could be made available for CHP-R**		Detailed design of the Facility has not been undertaken at this stage. However, suitable space has been allowed for within the design of the Facility to house CHP export infrastructure. The heat network will (likely) include steam extraction piping, control and shutoff valves, heat exchanger, district heating supply and return lines, district heating circulation pumps, condensate return piping (to the condensate tank), control and instrumentation / electrical connections, an expansion tank for pressurisation of the district heating pipe network and heat metering.

Requirement 5: Integration of CHP and carbon capture			
5.1	**Is the plant required to be CCR?**		No
5.2	**Export and return requirements identified for carbon capture**		
	100% plant load		
a)	Heat load extraction for carbon capture at 100% plant load	MW	n/a
b)	Description of heat export (e.g. steam / hot water)		n/a
c)	Export pressure	bar a	n/a
d)	Export temperature	°C	n/a
e)	Export flow	t/h	n/a
f)	Return pressure	bar a	n/a
g)	Return temperature	°C	n/a
h)	Return flow	t/h	n/a
i)	Likely suitable extraction points		n/a
	Minimum stable plant load		
j)	Heat load extraction for carbon capture at minimum stable plant load	MW	n/a

k)	Description of heat export (e.g. steam / hot water)		n/a
l)	Export pressure	bar a	n/a
m)	Export temperature	°C	n/a
n)	Export flow	t/h	n/a
o)	Return pressure	bar a	n/a
p)	Return temperature	°C	n/a
q)	Return flow	t/h	n/a
r)	Likely suitable extraction points		n/a
5.3	**Operation of plant with carbon capture (without CHP)**		
a)	Maximum plant load with carbon capture	%	n/a
b)	Carbon capture mode thermal input at maximum plant load	MW	n/a
c)	Carbon capture mode net electrical output at maximum plant load	MW	n/a
d)	Carbon capture mode net electrical efficiency at maximum plant load	%	n/a
e)	Minimum stable plant load with CCS	%	n/a
f)	Carbon capture mode CCS thermal input at minimum stable plant load	MW	n/a
g)	Carbon capture mode net electrical output at minimum stable plant load	MW	n/a
h)	Carbon capture mode net electrical efficiency at minimum stable plant load	%	n/a
5.4	**Heat extraction for CHP at 100% plant load with carbon capture**		
a)	Maximum heat load extraction at 100% plant load with carbon capture [H]	MW	n/a
b)	Maximum heat extraction export flow at 100% plant load with carbon capture	t/h	n/a
c)	Carbon capture and CHP mode net electrical output at 100% plant load	MW	n/a
d)	Carbon capture and CHP mode net electrical efficiency at 100% plant load	%	n/a
e)	Carbon capture and CHP mode net CHP efficiency at 100% plant load	%	n/a
f)	Reduction in primary energy usage for carbon capture and CHP mode at 100% plant load	%	n/a

5.5	**Heat extraction at minimum stable plant load with carbon capture**		
a)	Maximum heat load extraction at minimum stable plant load with carbon capture	MW	n/a
b)	Maximum heat extraction export flow at minimum stable plant load with carbon capture	t/h	n/a
c)	Carbon capture and CHP mode net electrical output at minimum stable plant load	MW	n/a
d)	Carbon capture and CHP mode net electrical efficiency at minimum stable plant load	%	n/a
e)	Carbon capture and CHP mode net CHP efficiency at minimum stable plant load	%	n/a
f)	reduction in primary energy usage for carbon capture and CHP mode at minimum stable plant load	%	n/a
5.6	**Can the plant with carbon capture supply the selected identified potential heat load (i.e. is the identified potential heat load within the 'CHP and carbon capture envelope')?**		n/a
5.7	**Description of potential options which could be incorporated in the plant for useful integration of any realised CHP system and carbon capture system**		n/a
Requirement 6: Economics of CHP-R			

6.1	**Economic assessment of CHP-R**		It has not been possible to assess the economic feasibility of a CHP scheme as no suitable heat users have been identified and the infrastructure required remains unknown. It is likely, however, with the heat sale price between £0.45 and £0.65 per MWh, estimated by HNDU for established properties, and the distance to potential consumers being around 4.5 km away, the net present value of any network will probably be negative without a large user, and therefore not yield an economically viable scheme. The economic feasibility of the scheme will be reassessed in the future when there is a better understanding of heat demands and the proposals for Land North of Horsham becomes better understood.
BAT assessment			
	Is the new plant a CHP plant at the outset (i.e.are there economically viable CHP opportunities at the outset)?		No
	If not, is the new plant a CHP-R plant at the outset?		Yes.
	Once the new plant is CHP-R, is it BAT?		Yes