

**Uniper UK Limited**

# Environmental Permit Variation and Partial Low Risk Surrender Application North Killingholme Power Project

Appendix E - Combined Heat and Power Readiness Assessment

Reference: KLCP-ARP-EN-ACB010-0008

P02 | 26 November 2025

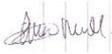
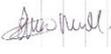
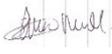
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Job number 305719

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		<b>Signature</b>			
P02	26/11/25	<b>Description</b>	Revision addressing Client Comments		
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Megan Baxter	Stuart Marshall	Stuart Marshall
		<b>Signature</b>			

Issue Document Verification with Document



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# List of Abbreviations

BAT	Best Available Techniques
CHP	Combined Heat and Power
CHP-R	Combined Heat and Power Ready
CCGT	Combined Cycle Gas Turbine
DCO	Development Consent Order
EA	Environment Agency
EP	Environmental Permitting
IP	Intermediate Pressure
LP	Low Pressure
MWe	Megawatt Electrical
MWh	Megawatt Hours
NPS EN-1	Overarching National Policy Statement for Energy
SAC	Special Area of Conservation
SPA	Special Protection Area

# 1. Executive Summary

Uniper UK Limited ('Uniper') are requesting an Environmental Permit variation under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) ('the EP Regulations'). As part of the Environmental Permit variation application, Uniper are seeking to amend the Environmental Permit to enable them to maximise the net output of the Combined Cycle Gas Turbine (CCGT) to meet the available grid connection capacity (540MWe) which is greater than the output currently permitted (470MWe).

A Combined Heat and Power (CHP) readiness assessment was originally undertaken for C. Gen Killingholme Limited in 2013 as part of the original Environmental Permit application. Although the existing Environmental Permit was issued in 2017, construction of the Installation was never started and in 2024 the project was purchased from C. Gen Killingholme Limited by Uniper. Due to the extended time period since the previous assessment the Environmental Agency requested the CHP readiness study to be updated with a periodic review of the opportunities to supply heat to realise CHP (in line with the Third Best Available Techniques (BAT) Test)<sup>1</sup>.

In line with the Third BAT test and recommendations of the 2013 CHP readiness assessment, the consultation with organisations identified as being able to assist in the identification of potential heat off take opportunities, examination of the UK CHP Development Map and further assessment of the CHP-Ready scenarios has been undertaken.

Though a small number of theoretical CHP opportunities were identified in the search area, the consultation found no interest in a heat connection. Therefore, at this time, there are no identified feasible heat off taker opportunities (considering both technical and economic feasibility).

District heating or process CHP is therefore not proposed to be installed from the outset of commercial operation of the Installation. The Installation will be designed to be CHP-Ready (CHP-R), including a connection point, in accordance with the BAT Tests of the CHP-R Guidance.

However, in order to maximise the potential for any identified and additional future CHP opportunities to be realised, we recommend Uniper will:

- a) carry out regular reviews to determine if there have been sufficient changes in circumstances (e.g. due to changes in policy and/ or financial incentives that make it more economically viable) to warrant new technical and economic assessments
- b) ensure that the Installation is designed and built with the appropriate provisions which will allow for the future implementation of CHP (i.e. is built to be CHP-Ready).

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<sup>1</sup> This was agreed with the Environmental Agency as part of the enhanced pre-application advice.

## 2. Introduction

### 2.1 Background and Purpose of Update

This Appendix has been prepared in support of the Environmental Permit variation application for the proposed North Killingholme Power Project to be located in Killingholme, North Lincolnshire. The CHP readiness assessment presents the periodic review and update of the CHP readiness assessment of the North Killingholme Power Project conducted on behalf of Uniper UK Limited ('Uniper').

The CHP readiness assessment was originally undertaken for C. Gen Killingholme Limited in 2013 as part of the Environmental Permit Application. Although the existing Environmental Permit was issued in 2017, construction of the Installation never started and in 2024 the project was purchased from C. Gen Killingholme Limited by Uniper.

Uniper are submitting an Environmental Permit variation application under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) ('the EP Regulations'). As part of this application, Uniper are seeking to vary the Environmental Permit to enable them to maximise the net output of the Combined Cycle Gas Turbine (CCGT) to meet the available grid connection capacity (540MWe) which is greater than the output currently permitted (470MWe).

Due to the extended time period since the previous assessment the Environmental Agency (EA) requested the CHP readiness study to be updated with a periodic review of the opportunities to supply heat to realise CHP (in line with Third Best Available Techniques (BAT) Test).

The Third BAT test states: *'Once an Environmental Permit has been issued for a new CHP-R plant, the applicant / operator should carry out periodic reviews of opportunities for the supply of heat to realise CHP. Such opportunities may be created both by new heat loads being built in the vicinity of the plant, and / or be due to changes in policy and financial incentives which improve the economic viability of a heat distribution network for the plant being CHP'<sup>2</sup>.*

The 2013 CHP readiness assessment made the following recommendations in order to maximize the potential for any identified and additional future CHP opportunities to be realised:

- a) Engage in ongoing consultation with local businesses and industries and other interested parties in an attempt to identify any additional CHP opportunities at the earliest stage.
- b) Monitor the estimated heat loads in the CHP Search Area and amend the CHP Assessment appropriately as discussions progress with any identified CHP heat recipients up to the point that the design of the Installation is finalised.
- c) In conjunction with the Local Authority, inform potential CHP heat recipients of the potential for a heat supply and offer to hold informal discussions with them if they have interest.
- d) Undertake further assessment of the CHP-Ready Scenarios at the Environmental Permit stage; and,
- e) Ultimately ensure that the Installation is designed and built with the appropriate provisions which will allow for the future implementation of CHP (i.e. is built to be CHP-Ready for the selected heat load(s).

The purpose for this appendix is to carry out a periodic review of opportunities for the supply of heat to realise CHP and as such the CHP readiness assessment to support the Environmental Permit variation application.

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<sup>2</sup> CHP Ready Guidance for Combustion and Energy from Waste Power Plants, Feb 2013, [https://assets.publishing.service.gov.uk/media/5a750466ed915d502d6ccd55/LIT\\_7978\\_e06fa0.pdf](https://assets.publishing.service.gov.uk/media/5a750466ed915d502d6ccd55/LIT_7978_e06fa0.pdf)

## 3. CHP Opportunities

### 3.1 Identified CHP Opportunities – 2025 Consultation Results

In accordance with the Overarching National Policy Statement for Energy (NPS EN-1)<sup>3</sup> and the CHP-R Guidance<sup>2</sup>, consultation has been undertaken with organisations identified as being able to assist in the identification of potential heat off takers opportunities. This section summarises the outcomes of the 2025 stakeholder consultation, which was undertaken to identify current and potential opportunities for heat off takers within the North Killingholme area.

The consultation engaged local businesses, industries, and relevant parties to gather up-to-date information on interest in future heat off taker connections. As part of the consultation for the North Killingholme Power Project CHP readiness assessment, organisations identified as being able to assist in the identification of potential heat off takers opportunities and potential heat recipients were contacted outlining the opportunity and invited expressions of interest. This explained Uniper’s review of potential Combined Heat and Power (CHP) opportunities and specifically asked whether recipients would be interested in exploring a connection to the proposed electricity generation station at Killingholme.

The following provides a summary of the consultation and potential CHP opportunities identified:

- 49 consultees were contacted.
- 47 consultees did not provide a response.
- Two facilities responded.
- None expressed interest in pursuing CHP opportunities at this time.

The results of the consultation are presented in Annex A.

### 3.2 Identified CHP Opportunities – 2025 UK Industrial Heat Map results

#### 3.2.1 Overview of 2025 Data Source and Scope

The UK CHP Development Map results from the 2013 CHP readiness assessment were revised in line with the third BAT test<sup>4</sup>. CHP Development Map tool sector breakdowns were no longer available on the CHP development map therefore refreshed figures for the sector breakdown were not available in this review; comparison of the maps was conducted to identify any significant changes. The reporting of heat demand in the CHP Development Map tool has switched from the peak heat demand (kW) to the annual consumption (MWh) since the 2013 assessment. In this section, 2025 data is reported in MWh and 2013 data is reported in kW.

The results of the examination of the CHP Development Map, covering a search area of 15 km radius (centred upon the site location) (the “CHP Search Area”), are presented in Annex B.

The CHP Search area covers the River Humber, due to this the identified potential heat off takers are split into two categories: those north of the River Humber and those south of the River Humber. The site is located south of the River Humber. Locations identified the north of the River Humber are not considered to be feasible at this time, as this would require the installation of supply/ return pipes on, or underneath, the River Humber which would not be economically viable. This would also carry both additional technical constraints and

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<sup>3</sup> Overarching National Policy Statement for Energy (EN-1), Nov 2023, <https://assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf>

<sup>4</sup>UK CHP Development Map, <https://chptools.decc.gov.uk/developmentmap>

environmental constraints (the River Humber is both a Special Protection Area (SPA) and a Special Area of Conservation (SAC)).

The three sectors identified with the largest potential heat loads were:

- Large Industrial;
- Domestic; and
- Small Industrial.

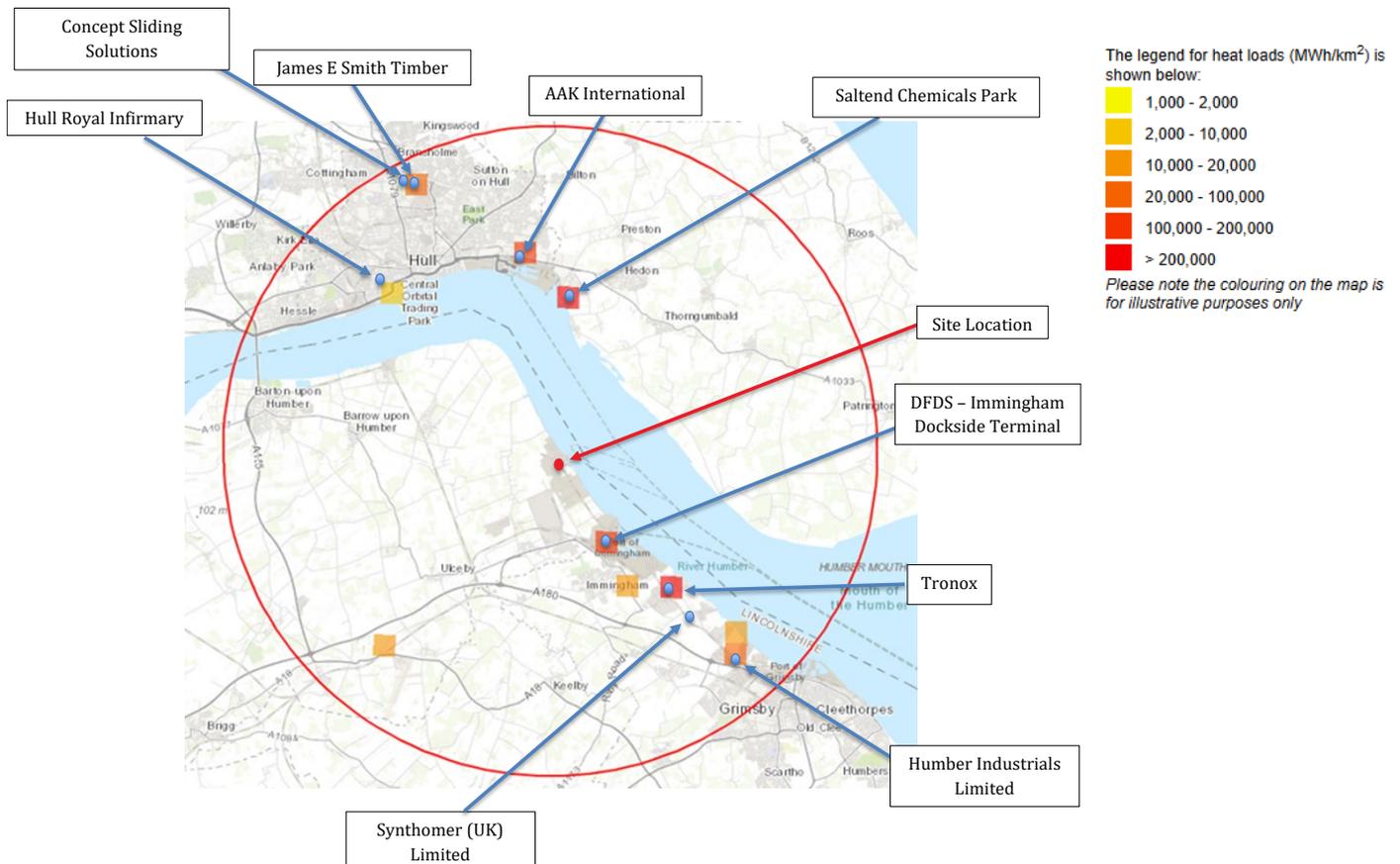
### 3.2.2 Large Industrial Heat Loads

The CHP Development Map outputs, as shown in Table 3.1, indicate a total of 2 million MWh of heat load in a 15km radius from site. Locations of the 2025 operators can be found in Figure 1: Location of Large Heat Loads.

Currently one-third of the heat demand is already accounted for by CHP in the area. The aggregate remaining heat load across the listed large-industrial sites totals to 1.4 million MWh.

**Table 3.1: Details of Large Heat Loads (2025)**

2025 Operator	Total (MWh)	Heat Load Already Taken by CHP (MWh)	Remaining Heat Load (MWh)
Saltend Chemicals Park	1,041,913	431,420	610,492
Humber Industrials Limited	74,047	43,951	30,096
Tronox (Entry 1)	168,165	0	168,185
Tronox (Entry 2)	265,391	119,688	145,703
DFDS - Immingham Dockside Terminal	131,584	0	131,584
Synthomer (UK) Limited	124,966	0	124,966
Concept Sliding Solutions (Carcass & Panel Dept)	30,433	0	30,433
James E. Smith (Timber) Ltd.	24,624	11,806	12,817
AAK International	112,504	0	112,504
Hull Royal Infirmary	28,372	4,891	23,481
<b>Total Heat Load</b>	<b>2,001,999</b>	<b>611,756</b>	<b>1,390,261</b>



**Figure 1: Location of Large Heat Loads (illustrated as blue dots) overlaid on Large Industrial heat load CHP map (illustrated as boxes).**

### 3.2.2.1 Development between 2013 and 2025 Large Heat Loads

**Table 3.2: Details of Large Heat Loads (2013)**

2013 Operator	Total (kW)	Heat Load Already Taken by CHP (kW)	Remaining Heat Load (kW)
SSE Generation Limited	8,343	1,230	7,113
Total UK Limited / Lindsey Oil Refinery Limited	62,769	62,769	0
Saltend Cogeneration Company Limited x	82,951	82,951	0
Humber Energy Limited	56,996	56,996	0
BP Chemicals Limited	53,100	0	53,100
Millennium Inorganic Chemicals Limited /NPowerCogenLimited	43,146	40,770	2,376
Aarhus United UK Limited	15,492	0	15,492
Croda Chemicals Europe Limited	9,618	0	9,618
Novartis Grimsby Limited	8,039	8,039	0
Mill Nurseries Limited	7,852	5,002	2,850
Immingham CHP Limited Liability Partnership	468,795	468,795	0
NPowerCogen Limited Tioxide Grimsby CHP Plant	24,601	22,901	1,700
<b>Total Heat Load</b>	<b>841,703</b>	<b>749,453</b>	<b>92,250</b>

Between 2013 and 2025 the owners of several sites have changed due to mergers and acquisitions. The number of industrial heat loads has decreased due to plant closures such as that of the Lindsey Oil Refinery that ended production in August 2025 due to the Prax Group entering administration<sup>5</sup>, reducing the number of potential heat off takers in the CHP search area.

### 3.2.2.2 Identified potential heat demand loads

Based on the information in Table 3.1, 10 large heat loads were identified through the CHP Development Map.

The large heat loads within the CHP search area located to the north of the River Humber are not considered to be feasible at this time, due to the lack of economic viability due to the additional technical constraints and environmental constraints. Therefore, six large heat loads are deemed not feasible.

The following four sites exhibit the highest remaining heat loads and are identified as potential large heat loads (subject to distance, routing, and commercial feasibility):

- Tronox (Entry 1): remaining 168,185 MWh (total 168,165 MWh; already taken 0 MWh) located south of the river.
- Tronox (Entry 2): remaining 145,703 MWh (total 265,391 MWh; already taken 119,688 MWh) located south of the river.
- DFDS – Immingham Dockside Terminal: remaining 131,584 MWh (total 131,584 MWh; already taken 0 MWh) located south of the river.
- Synthomer (UK) Limited: remaining 124,966 MWh (total 124,966 MWh; already taken 0 MWh) located south of the river.

The four identified (realistic potential) large industrial heat loads in the CHP Search Area have a total heat load of 570,000 MWh.

### 3.2.3 Domestic Heat Loads

The 2013 report noted ~1,020 MW of domestic load across the 15 km search area, with crossing of the River Humber being a key viability constraint for those north of the river. No refreshed Domestic heat-load figures were available due to technical issues in the CHP development map. The updated map showed little variation between the 2025 and 2013 Maps. No new domestic heat load opportunities were identified.

### 3.2.4 Small Industrial Heat Loads

The 2013 assessment indicated ~126 MW within 15 km (split north/ south of the Humber). No refreshed Small Industrial figures were available due to technical issues in the CHP development map. The CHP development map shows an increase in small scale industrial heat loads north of the river however due to economic viability small scale industrial heat loads within the CHP Search Area located to the north of the River Humber are not considered to be feasible at this time.

South of the Humber there may have been a minor increase in the number of small-scale industrial heat loads however the discrepancies may be due to the changes reporting displayed in the UK CHP Development Map. The reporting of heat demand has switched from the peak heat demand (kW) to the annual consumption (MWh) since the 2013 assessment. No new viable small industrial heat loads or clusters were identified.

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<sup>5</sup> BBC New, August 2025, <https://www.bbc.co.uk/news/articles/cg50ye7pj6no>

### 3.3 Summary of CHP Opportunities

The CHP review indicated that there are no viable heat off taker opportunities in the area. The findings were:

- From the Consultation:
  - a. No potential heat loads were identified
- From the UK Development Heat Map:
  - a. A total Large Industrial Heat Load of approximately 2 million MWh, with an actual Large Industrial Heat Load of approximately 1.4 million MWh and an actual realistic Large Industrial Heat Load of 570,000 MWh.
  - b. The total Domestic Heat Load and locations have not significantly changed since the last update.
  - c. The total Small Scale Industrial Heat Load and locations have not significantly changed since the last update.

The site location south of the River Humber prevents the economic viability of potential heat off takers identified in the CHP search area that are located north of the River Humber. The CHP Development map identifies some potential heat users in the CHP search area located South of the River however due to the lack of interest there are no viable heat off take opportunities.

### 3.4 Provisions to allow for Future Implementation of CHP

To allow any identified and additional future heat off taker opportunities to be realised, the design (and final build) of the Installation will incorporate a number of appropriate provisions which will allow for the future implementation of CHP. The Installation will be designed and built CHP-Ready. It is considered that this is an appropriate solution given there is no interest in heat offtake connections.

A CHP-Ready Scenario would be linked to the likely suitable extraction points (within the steam cycle of the Installation) which would be available. The CCGT features a separate high-pressure HP turbine and combined intermediate pressure / low-pressure IP / LP turbine. Heat offtakes would likely come from a range of industrial and domestic heat loads. The most viable option for heat extraction is extraction from the steam cycle. However, extraction from the steam cycle would lead to a loss in electrical efficiency, with this loss greater at higher pressures.

If the CHP was to be used for domestic properties, LP steam could be extracted from the steam cycle to heat cold water returned from the district heating circuit in district heating condensers. The heated water would be returned to the district heating system, and the condensate returned to the steam cycle.

However, this would be subject to discussion and agreement with the Heat Recipient. This would be decided at the detail design stage. It should be noted that the extraction points would be dependent upon the CHP opportunity realised.

#### 3.4.1 Heat Power Envelope

Heat and power envelopes showing the possible operating ranges for the Installation using the LP steam are shown in Figure 2.

The following calculations have been performed to determine the heat and power envelope. The envelope limits are defined as follows:

- A – Minimum Stable Load with No Heat Extraction.
- B – Minimum Stable Load with Maximum Heat Extraction.
- C – Maximum Electrical Power (100% Full Load) with Maximum Heat Extraction; and

- D – Maximum Electrical Power (100% Full Load) with No Heat Extraction.

The CHP efficiency ( $\eta_{CHP}$ ) can be defined as:

$$\eta_{CHP} = \frac{\text{Net Process Heat Output} + \text{Net Power Output}}{\text{Fuel Input}}$$

The performance of the Installation is summarised in Table 3.3: Heat Envelope Calculations.

It should be noted that these heat and power envelopes should not be considered as definitive, and would be subject to steam pressures and steam turbine design.

Full details can be found in Annex C.

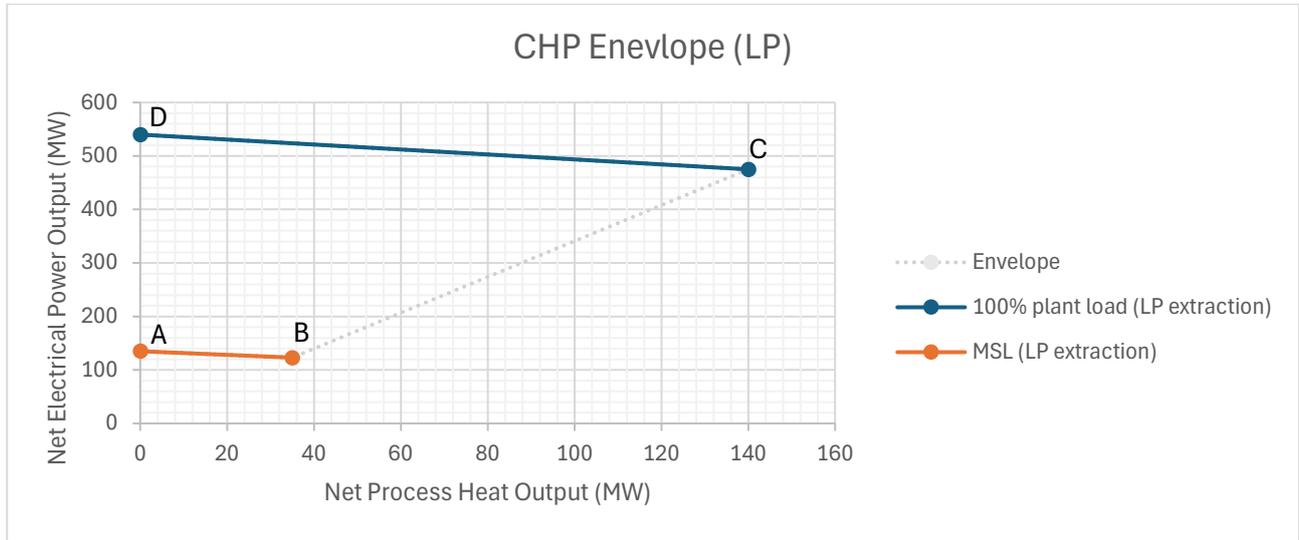


Figure 2: Indicative CHP Envelope (LP)

Table 3.3: Heat Envelope Calculations

	Units	No Heat Extraction	Maximum Heat Extraction
<b>LP Steam Extraction</b>			
<b>100% Plant Load</b>			
		<b>D</b>	<b>C</b>
Fuel Input	MJ/s	900	900
Net Process Heat Output	MW	0	140
Net Electrical Power Output	MW	540	475
Total Heat and Power Output	MW	540	615
CHP Efficiency	%	60%	68%
<b>MSL</b>			
		<b>A</b>	<b>B</b>
Fuel Input	MJ/s	270	270
Net Process Heat Output	MW	0	35
Net Electrical Power Output	MW	135	123
Total Heat and Power Output	MW	135	158
CHP Efficiency	%	50%	58%

## 4. Summary and Conclusions

In line with the requirements of NPS EN-1<sup>3</sup> and the CHP-R Guidance<sup>2</sup>, a periodic review of the CHP readiness assessment to support the Environmental Permit variation application and meet the Third BAT test requirement of the CHP-R Guidance was conducted.

Though a small number of theoretical heat off taker opportunities were identified in the CHP search area, the consultation found no interest in a heat connection. Therefore, at this time, there are no identified feasible heat off taker opportunities (considering both technical and economic feasibility).

District heating or process CHP is therefore not proposed to be installed from the outset of commercial operation of the Installation. However, the Installation will be designed to be CHP-Ready in accordance with the BAT Tests of the CHP-R Guidance.

However, in order to maximise the potential for any identified and additional future CHP opportunities to be realised, we recommend Uniper will:

- a) carry out regular reviews to determine if there have been sufficient changes in circumstances (e.g. due to changes in policy and/ or financial incentives that make it more economically viable) to warrant new technical and economic assessments
- b) ensure that the Installation is designed and built with the appropriate provisions which will allow for the future implementation of CHP (i.e. is built to be CHP-Ready).

# Annex A - Summary of Responses Received

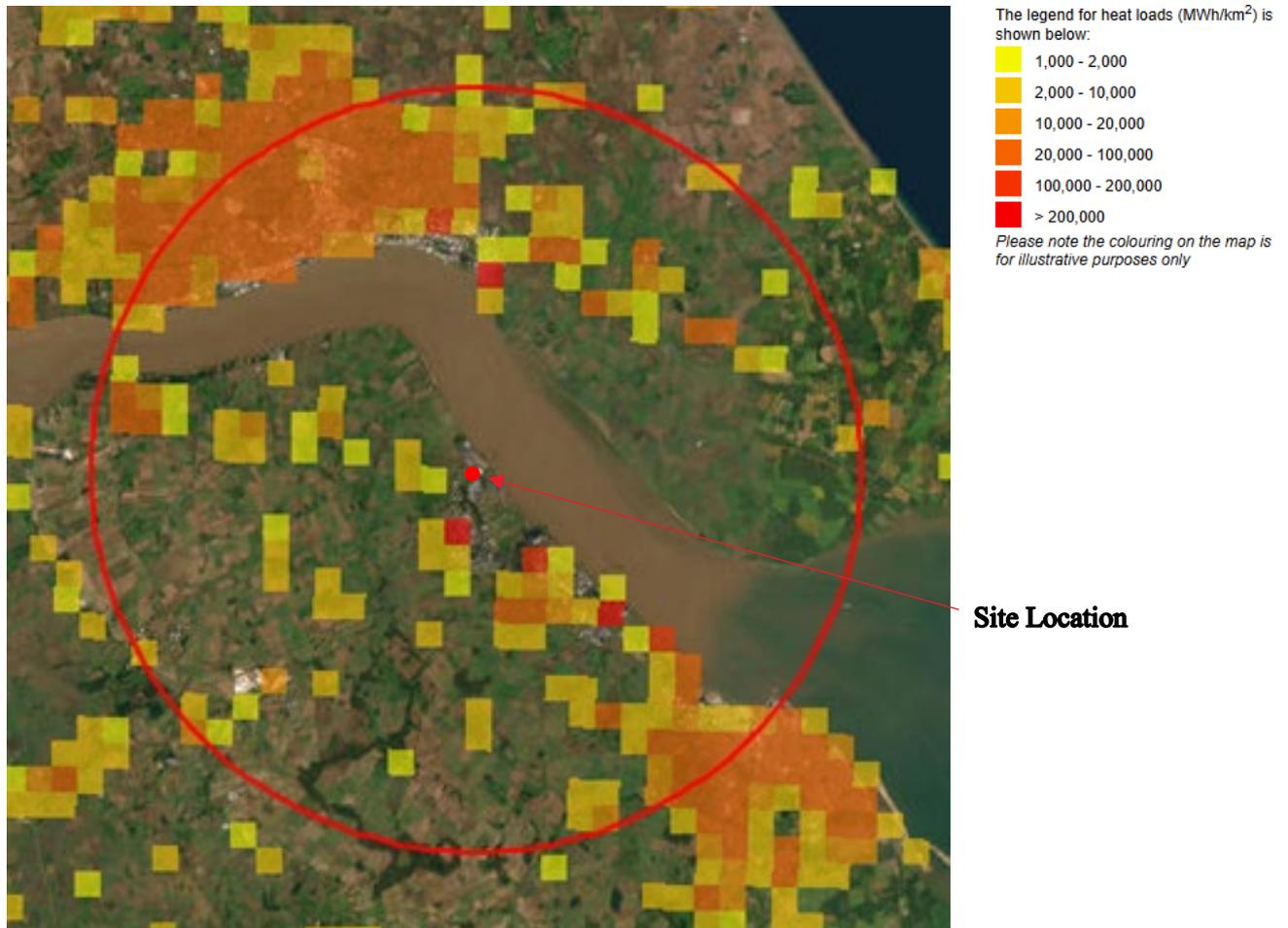
Organisation	Response
Department For Energy Security and Net Zero	No response received
CHPQA (Quality Assurance for Combined Heat and Power) Team	No response received
Homes England and the Regulator of Social Housing	No response received
Local Planning Authority: North Lincolnshire Council	No response received
Local Planning Authority: West Lindsey District Council	No response received
Local Enterprise Partnership: Lincolnshire	No response received
CHPA (Combined Heat and Power Association)	No response received
Energy Saving Trust/ Energy Saving Advice Service	No response received
The Carbon Trust	No response received
Yorkshire and the Humber National Health Service	No response received
Humberside Police and Fire and Rescue	“We do not wish to explore this opportunity further”
Lincolnshire Police	No response received
HM Prison and Probation Service (HMPPS)	No response received
ABLE UK	No response received
APT Jetty	No response received
Brockleby Estates	No response received
Naturewall	No response received
C D M R Limited	No response received
Centrica Killingholme Power Station Ltd	No response received
Coal Products Ltd	No response received
Phillips 66	“We do not wish to explore this opportunity further”
Corus	No response received
CPI (Confederation of Paper Industries)	No response received
Fox Precision Engineering Ltd	No response received
East Halton Primary School	No response received
E-ON	No response received
Esso Petroleum Co Ltd	No response received
GB Terminals Northern Ltd	No response received
Hargreaves Industrial Services	No response received
Harvest Pet Products Limited	No response received
Hewden	No response received
Hoyers Ltd	No response received
Humber Oil Refinery	No response received
C.RO Ports Killingholme Limited	No response received
Humber Work Boats Ltd	No response received

Organisation	Response
Immingham Bulk Terminal (Tata Steel)	No response received
John Vergett Limited	No response received
Killingholme Animal Feeds	No response received
Killingholme Primary School	No response received
Lateshopper	No response received
Luibeg Nurseries	No response received
Nickerson	No response received
North Lincolnshire Homes	No response received
Oxbow Coal Limited	No response received
Power Coatings	No response received
Powerclean 2000 Ltd	No response received
Premier Industries Uk Ltd	No response received
S S M Coal Ltd	No response received
Scangrit	No response received
SHSomerscales Limited	No response received
Simon Storage Group	No response received
Shell	No response received
Tarmac Construction Limited	No response received
Top Mix Concrete	No response received
Total Butler	No response received
Total UK Ltd	No response received
Trinity House	No response received
WCF Fuels Eastern	No response received

# Annex B - UK CHP Development Map

## Results from the UK CHP Development Map

Using the 'Radius Search' Option and the approximate centre of the Operations Area DN40 3JP, the following results are obtained for a 15 km radius CHP Search Area.



Due to the sites location Please note since 2013 the CHP development map has been updated to show MWh/km<sup>2</sup> in replacement of the kW/km<sup>2</sup>. Technical issues with the CHP development map prevented access to the sector breakdown of large heat loads.

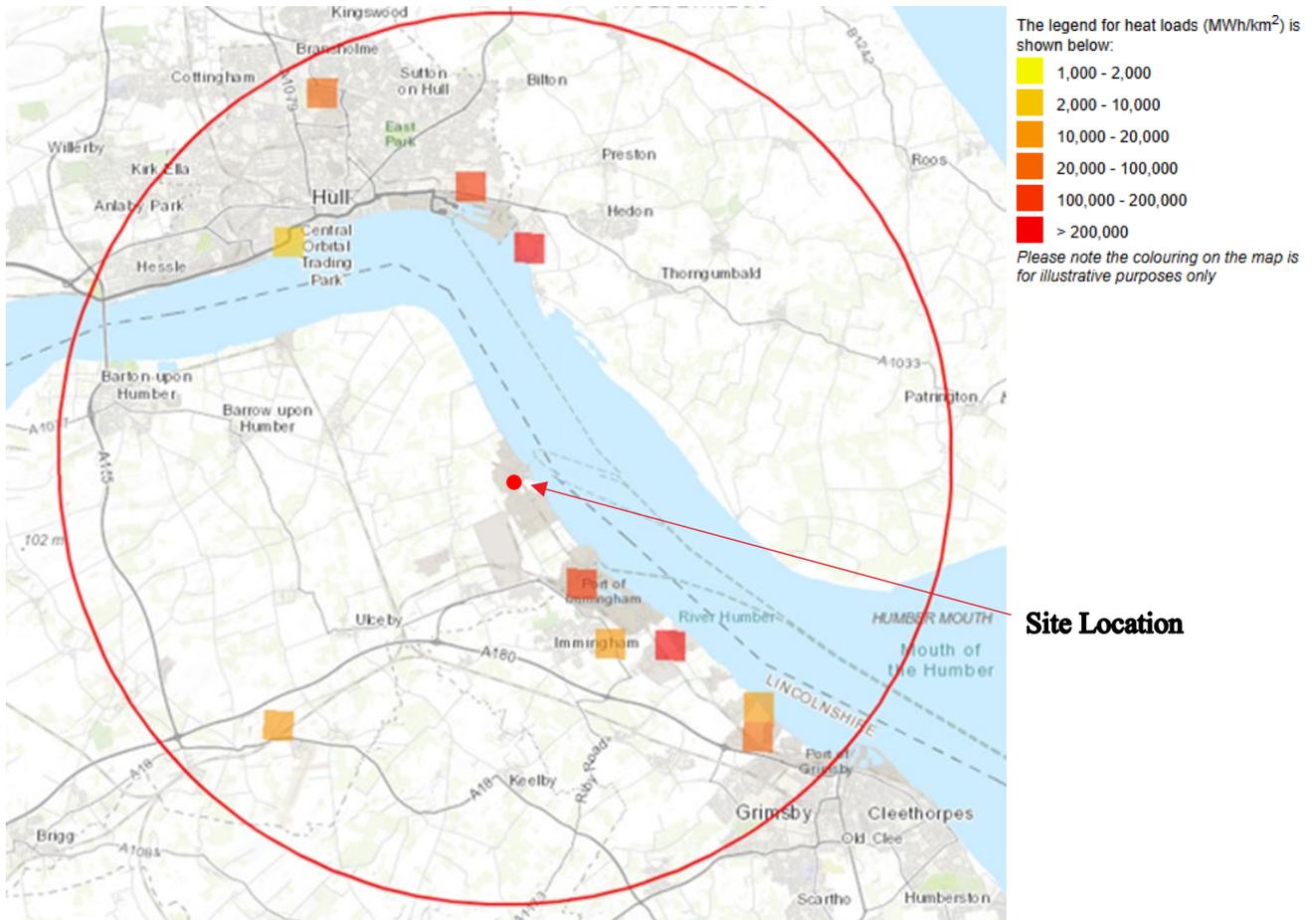
# Domestic

The locations of the Domestic Heat Loads within the CHP Search Area are shown in the insert below.



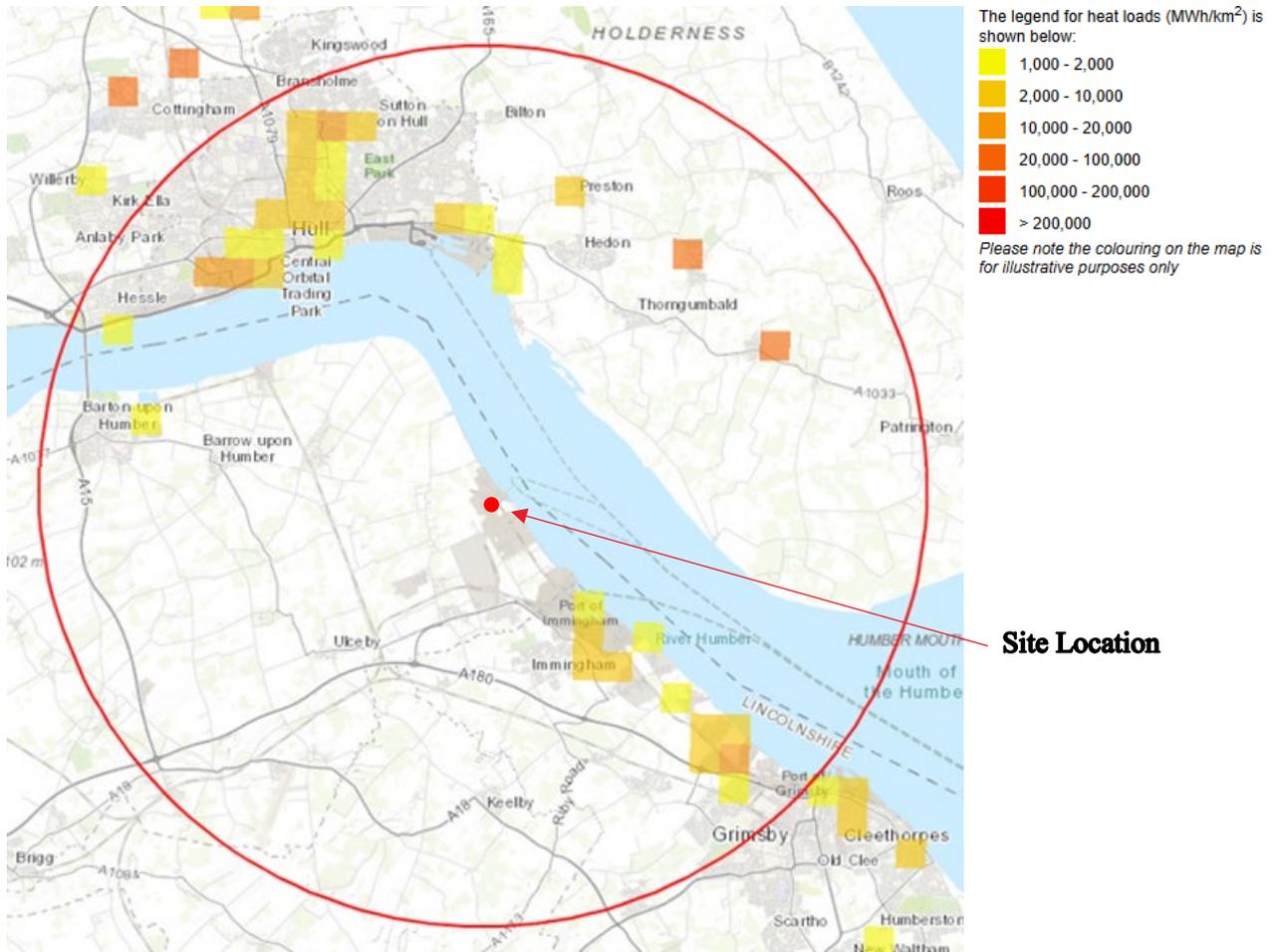
# Large Industrial

The locations of the Large Industrial Heat Loads within the CHP Search Area are shown in the insert below.



# Small-scale Industrial

The locations of the Small-scale Industrial Heat Loads within the CHP Search Area are shown in the insert below.



# Annex C - CHP-Ready assessment template

# 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
<b>Requirement 1: Plant, Plant location and Potential heat loads</b>			
1.1	<b>Plant name</b>		North Killingholme Power Project
1.2	<b>Plant description</b>		<ul style="list-style-type: none"> <li>Natural Gas Fired CCGT</li> <li>Thermal Input: 900MWth</li> <li>Net electrical power output 540MWe</li> </ul>
1.3	<b>Plant location (Postcode / Grid Ref)</b>		DN40 3JP

<p>1.4</p>	<p><b>Factors influencing selection of plant location</b></p>	<p>There are a range of site-specific issues which affect the decision making process on the suitability of a site for a power plant. These site-specific issues fall broadly into three categories, which comprise:</p> <p>a) Proximity to vital facilities and resources, including:</p> <ul style="list-style-type: none"> <li>i) The close proximity of the National Grid Electricity Transmission System, with capacity to export electrical power;</li> <li>ii) The close proximity of the National Grid Gas Transmission System which will be required for operation of the power plant;</li> <li>iii) The close proximity to the existing port facilities for solid fuel importation;</li> <li>iv) The close proximity to the existing rail network for solid fuel importation;</li> <li>v) The availability of make-up water for cooling;</li> <li>vi) The likely suitability for carbon capture, transportation and storage;</li> <li>vii) The potential for CHP opportunities*; and,</li> <li>viii) The potential opportunities to link beneficially with local industry (i.e. the direct supply of power to minimise transmission losses)*.</li> </ul> <p>b) Factors which affect the potential magnitude of likely significant environmental impacts, including:</p> <ul style="list-style-type: none"> <li>i) The availability of industrial / brownfield sites with sufficient land area; and,</li> <li>ii) The compatibility with Planning Policies and Local Development Plans;</li> </ul> <p>c) Presence of receptors i.e. conservation designations and the presence of protected species) sensitive to environmental impacts.</p>
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<b>1.5</b>	<b>Operation of plant</b>		
a)	Proposed operational plant load	%	100
b)	Thermal input at proposed operational plant load	MW	900
c)	Net electrical output at proposed operational plant load	MW	540
d)	Net electrical efficiency at proposed operational plant load	%	60
e)	Maximum plant load	%	100
f)	Thermal input at maximum plant load	MW	900
g)	Net electrical output at maximum plant load	MW	600
h)	Net electrical efficiency at maximum plant load	%	60
i)	minimum stable plant load	%	30
j)	Thermal input at minimum stable plant load	MW	270
k)	Net electrical output at minimum stable plant load	MW	135
l)	Net electrical efficiency at minimum stable plant load	%	50
<b>1.6</b>	<b>Identified potential heat loads</b>		
			As detailed above, no immediate suitable heat loads have been found.
<b>1.7</b>	<b>Selected heat load(s)</b>		
a)	Category (e.g. industrial / district heating)		A mix of domestic, small and large scale industrial uses have been considered.
b)	Maximum heat load extraction required	MW	<b>N/A</b>
<b>1.8</b>	<b>Export and return requirements of heat load</b>		
a)	Description of heat load extraction		Low pressure (LP) steam
b)	Description of heat load profile		Low pressure (LP) steam
c)	Export pressure	bar a	For industrial applications this would be specific to future connections. For purposes of assessment the stream may be as follows LP :3.5bar
d)	Export temperature	°C	For industrial applications this would be specific to future connections. For purposes of assessment the stream has assumed to be typical steam conditions.
e)	Export flow	t/h	

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f)	Return pressure	bar a	For industrial applications this would be specific to future connections.
g)	Return temperature	°C	For industrial applications this would be specific to future connections.
h)	Return flow	t/h	

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<b>Requirement 2: Identification of CHP Envelope</b>			
<b>2.0</b>	<b>Comparative efficiency of a standalone boiler for supplying the heat load</b>	90 % LHV	
<b>2.1 Heat extraction at 100% plant load</b>			
a)	Maximum heat load extraction at 100% plant load	MW	140
b)	Maximum heat extraction export flow at 100% plant load	t/h	206
c)	CHP mode net electrical output at 100% plant load	MW	475
d)	CHP mode net electrical efficiency at 100% plant load	%	53
e)	CHP mode net CHP efficiency at 100% plant load	%	68
f)	Reduction in primary energy usage for CHP mode at 100% plant load	%	5
<b>2.2 Heat extraction at minimum stable plant load</b>			
a)	Maximum heat load extraction at minimum stable plant load	MW	35
b)	Maximum heat extraction export flow at minimum stable plant load	t/h	51
c)	CHP mode net electrical output at minimum stable plant load	MW	123
d)	CHP mode net electrical efficiency at minimum stable plant load	%	46
e)	CHP mode net CHP efficiency at minimum stable plant load	%	58
f)	Reduction in primary energy usage for CHP mode at minimum stable plant load	%	5.1
<b>2.3</b>	<b>Can the plant supply the selected identified potential heat load (i.e.is the identified potential heat load within the 'CHP envelope')?</b>		No Viable Heat Loads have been identified.

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**Requirement 3: Operation of the Plant with the Selected Identified Heat Load**

<b>3.1</b>	<b>Proposed operation of plant with CHP</b>		
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

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#### Requirement 4: Technical provisions and space requirements

4.1	<b>Description of likely suitable extraction points</b>		<p>IP steam could be taken from the cold reheat line within the steam cycle. Process pressure would be controlled by the IP steam turbine control valves. In terms of likely technical provisions to be Process CHP-Ready (for IP steam), a flanged tap-off point could be provided. To avoid a flanged tap off point connection, it might be preferred to identify a section of pipe which can be readily replaced with a forged branch piece, welded into the section at the time of conversion.</p> <p>LP steam could be taken from: The LP system of the heat recovery steam generator; the IP turbine exit; and / or modified IP / LP crossover pipe.</p> <p>Within the Domestic CHP-Ready Scenario ,LP steam is extracted from the steam cycle to heat cold water returned from the district heating circuit in district heating condensers. The heated water is returned to the district heating system and the condensate is returned to the steam cycle.</p>
4.2	<b>Description of potential options which could be incorporated in the plant, should a CHP opportunity be realised outside the 'CHP envelope'</b>		N / A
4.3	<b>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</b>		N / A
4.4	<b>Provision of site layout of the plant, indicating available space which could be made available for CHP-R</b>		Suitable provision will be included in the detailed design of the plant.

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## Requirement 5: Integration of CHP and carbon capture

<b>5.1</b>	<b>Is the plant required to be CCR?</b>		See Section 2.3 of Environmental Permit Variation Application North Killingholme Power Project
<b>5.2</b>	<b>Export and return requirements identified for carbon capture</b>		
	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
	<b>Minimum stable plant load</b>		
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
<b>5.3</b>	<b>Operation of plant with carbon capture (without CHP)</b>		
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

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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
<b>5.4 Heat extraction for CHP at 100% plant load with carbon capture</b>			
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
<b>5.5 Heat extraction at minimum stable plant load with carbon capture</b>			
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

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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
<b>Requirement 6: Economics of CHP-R</b>			
6.1	Economic assessment of CHP-R		Not Required.
<b>BAT assessment</b>			
	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

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