

# FICHTNER

Consulting Engineers Limited

**CONRAD ENERGY (HOLDINGS)  
LIMITED**

**CHATTERLEY**

**COST BENEFIT ANALYSIS  
SCREENING**

Fichtner Consulting Engineers Limited  
Kingsgate (Floor 3), Wellington Road North,  
Stockport, Cheshire, SK4 1LW, United Kingdom

t: +44 (0)161 476 0032 f: +44 (0)161 474 0618 [www.fichtner.co.uk](http://www.fichtner.co.uk)

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	<b>NAME</b>	<b>SIGNATURE</b>	<b>POSITION</b>	<b>DATE</b>
<i>Prepared by:</i>	Vildan Taylor		Consultant	21/09/2018
<i>Checked by:</i>	James Sturman		Senior Consultant	21/09/2018

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## 1 INTRODUCTION

Conrad Energy (Holdings)Limited ("Conrad Energy") is applying for an Environmental Permit (EP) for a Medium Combustion Plant (MCP) for the Chatterley facility ("the Facility"). In accordance with Schedule 24 - Efficiency in heating and cooling energy: Energy Efficiency Directive of the Environmental Permitting Regulations, a cost-benefit analysis (CBA) is required for certain activities.

The Environment Agency (EA) has published draft guidance, titled '*Draft guidance on completing cost-benefit assessments for installations under Article 14 of the Energy Efficiency Directive*', dated April 2015 which sets out a methodology approach for determining whether a CBA is required. This report follows the EA's guidance.

2 ENERGY EFFICIENCY DIRECTIVE

From 21<sup>st</sup> March 2015, operators of certain types of combustion installations are required to carry out a CBA of opportunities for combined heat and power (CHP) when applying for an EP. This is a requirement under Article 14 of the Energy Efficiency Directive and applies to a number of combustion installation types, as detailed in the following table. The requirements of Article 14 have been transposed into legislation in England via an amendment to Schedule 24 of the Environmental Permitting Regulations.

As a new electricity generation installation with a total aggregated net thermal input of more than 20 MW, the Chatterley Facility will be classified as an installation type 14.5(a).

<b>Installation type reference</b>	<b>Type of combustion installation</b>	<b>What should the CBA cover?</b>
14,5(a)	New thermal electricity generation installation with a total aggregated net thermal input of more than 20 MW (e.g. power station or EfW plant).	CBA for the operation of the installation as a high-efficiency cogeneration installation.
14,5(b)	Existing thermal electricity generation installation with a total aggregated net thermal input of more than 20 MW which is substantially refurbished (e.g. power station or EfW plant).	CBA for the operation of the installation as a high-efficiency cogeneration installation.
14,5(c)	New industrial installation with a total aggregated net thermal input of more than 20 MW generating waste heat at a useful temperature level, or an existing such installation where the combustion unit is to be substantially refurbished (e.g. cement kiln, steel works, factory).	CBA of utilising the waste heat to satisfy economically justified demand by connection of that installation to a district heating and / or cooling network, or CBA of supplying the installation's needs with a cogeneration plant.
14,5(d)	New district heating and cooling network with a total aggregated net thermal input of more than 20 MW, or a new energy production installation with a total aggregated net thermal input of more than 20 MW in an existing district heating or cooling network, or an existing such installation where the combustion unit is to be substantially refurbished.	CBA of utilising the waste heat from nearby industrial installations.

In April 2015, the EA issued draft guidance on completing the CBA, entitled '*Draft guidance on completing cost-benefit assessments for installations under Article 14 of the Energy Efficiency Directive*<sup>1</sup>'. The following methodology describes the process that must be followed for type 14.5(a) and 14.5(b) installations.

<sup>1</sup> Draft guidance on completing cost-benefit assessments for installations under Article 14 of the Energy Efficiency Directive, V9.0 April 2015

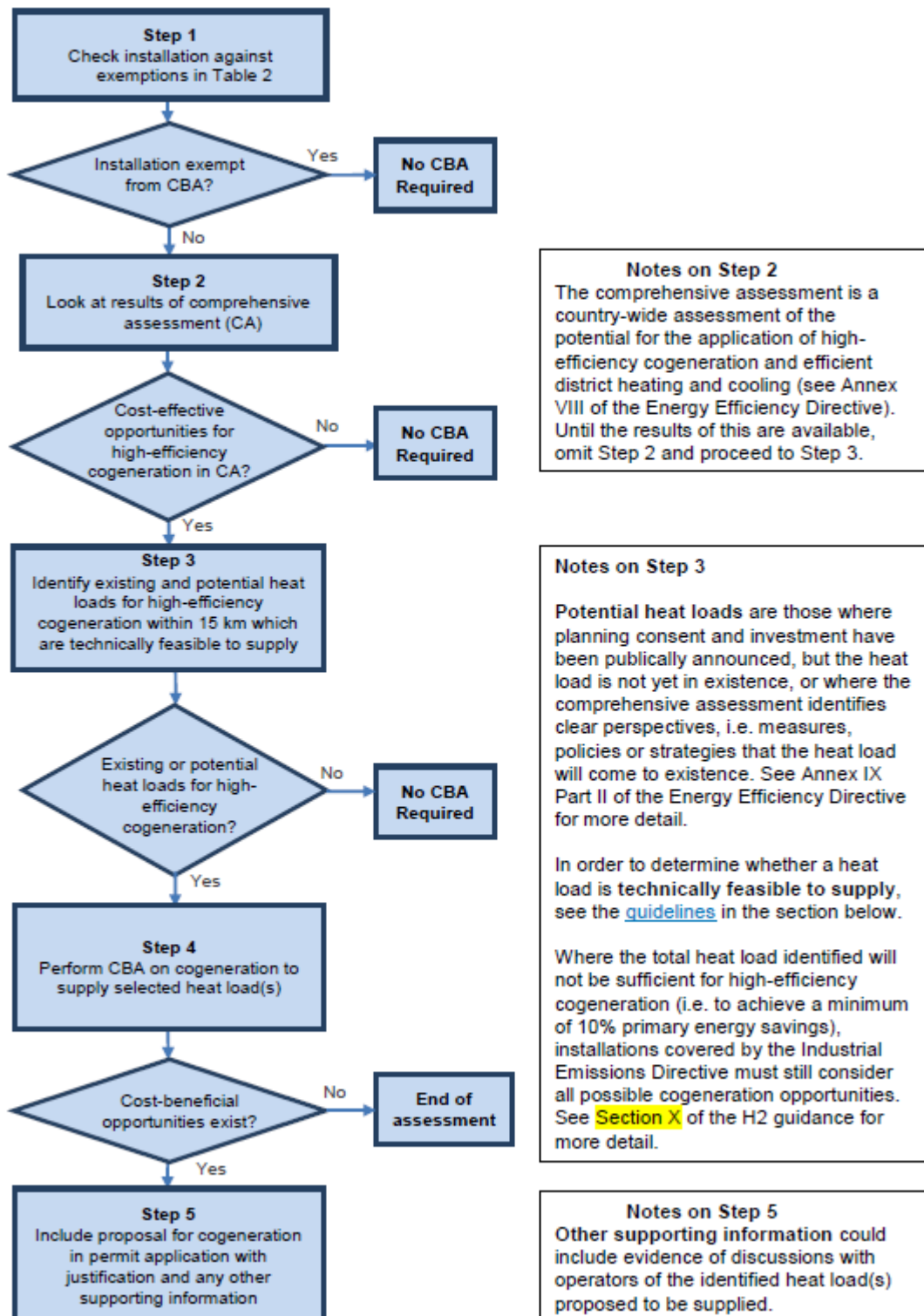


Figure 2.1: CBA assessment methodology for type 14,5(a) and 14,5(b) installations

## 2.1 Step 1 - exemptions

Table 2 of the draft EA guidance states that the following installations are exempt from the need to carry out a CBA:

- (1) Those peak load and back-up electricity generating installations which are planned to operate under 1,500 operating hours per year as a rolling average over a period of five years;
- (2) Nuclear power installations; and
- (3) Installations that need to be located close to a geological storage site approved under Directive 2009/31/EC.

The Chatterley site will operate for up to 2,500 hours per annum. Therefore, the exemptions do not apply to the Facility.

## 2.2 Step 2 - National Comprehensive Assessment

The results of the National Comprehensive Assessment (NCA) should be reviewed following the methodology detailed below:

'*National Comprehensive Assessment of the Potential for Combined Heat and Power and District Heating and Cooling in the UK*'<sup>2</sup>, dated 16<sup>th</sup> December 2015, was published by Ricardo AEA Ltd on behalf of the Department of Energy and Climate Change (DECC). The report was produced to fulfill the requirement (under Directive 2012/27/EU on energy efficiency) on all EU Member States to undertake a National Comprehensive Assessment (NCA) to establish the technical and socially cost-effective potential for high-efficiency cogeneration. The report also sets out information pertaining to heat policy development in the UK.

Section 3 of the report presents results of the NCA. The proposed Chatterley site is located in Stoke-on-Trent, which falls within the West Midlands region. Aggregated 2012 heat consumption in this region and equivalent figures projected to 2025, split by sector, are presented in Table 2.2.

<b>Sector</b>	<b>2012 consumption (TWh per annum)</b>	<b>2025 consumption (TWh per annum)</b>
Industry (including agriculture)	3	3
Commercial services	2	1
Public sector	2	2
Residential	26	23
<b>Total</b>	<b>33</b>	<b>29</b>

Evidently there is a downward trend in heating consumption anticipated over the next 10 years. The energy projections take account of climate change policies where funding has been agreed and where decisions on policy design are sufficiently advanced to allow robust estimates of policy impacts to be made, including measures such as building regulations. Aggregated 2012 cooling consumption and equivalent figures projected to 2025, split by sector, are presented in Table 2.3. Given the paucity of available data on energy consumption for cooling, these figures are estimates based on consumption indicators, building types and floor areas; consequently, they should be considered as indicative.

<sup>2</sup> National Comprehensive Assessment of the Potential for Combined Heat and Power and District Heating and Cooling in the UK, Ricardo AEA, December 2015

<b>Sector</b>	<b>2012 consumption (TWh per annum)</b>	<b>2025 consumption (TWh per annum)</b>
Industry (including agriculture)	2	2
Commercial services	1	1
Public sector	0	0
<b>Total</b>	<b>3</b>	<b>3</b>

Due to the low resolution of the data, the results of the NCA can be considered as an overview only. While heating and cooling demand does exist in the region under consideration, this is below the average demand across all regions in England.

### 2.3 Step 3 - Identify existing and potential heat loads

The EA guidance stipulates that a search radius of 15km, measured from the centre of the installation, should be used as the basis for identifying existing and potential heat consumers for high-efficiency cogeneration which are technically feasible to supply.

The Chatterley site was awarded a 15-year Capacity Market Agreement in the 2016 T-4 auction. From 1<sup>st</sup> October 2020, the generators will be contracted to supply 20MW of electrical output when requested to by National Grid. Therefore, Conrad Energy intends to operate the Chatterley site for up to 2,500 hours per annum to:

- (1) cover the obligations under their Capacity Agreement; and
- (2) trade in the wholesale electricity market.

Under the terms of the Capacity Agreement, the Chatterley site will need to be operational during any 'System Stress Event' declared by National Grid. There is limited data available regarding System Stress Events, meaning there is uncertainty as to when exactly the site will need to be operational.

National Grid has stated<sup>3</sup> that it is very difficult to predict how many System Stress Events may occur each year, as past events have been rare, and the declaration of an Event depends on a number of other market factors. In addition, there is no fixed duration of a System Stress Event, even if one is declared. Industry analysis<sup>4</sup> has suggested that up to half will last for less than one hour, and National Grid has previously estimated<sup>5</sup> a mean duration of approximately two hours.

Therefore, generation from the site will be intermittent and will be determined by market factors, making it unpredictable. This is not feasible for heat export.

<sup>3</sup> National Grid Frequently Asked Questions, How many System Stress Events can be expected each year? available at: <https://gbcnm.nationalgrid.co.uk/faq/system-stress-events/how-many-system-stress-events-can-be-expected-each-year>

<sup>4</sup> Proposal for a Capacity Market Rules Change, EDF Energy, Ref: CP176, dated 11th November 2016, available at: [https://www.ofgem.gov.uk/system/files/docs/2016/11/edf\\_-\\_capacity\\_market\\_rules\\_cp176.pdf](https://www.ofgem.gov.uk/system/files/docs/2016/11/edf_-_capacity_market_rules_cp176.pdf)

<sup>5</sup> National Grid EMR Electricity Capacity Report submitted to BEIS, dated 31<sup>st</sup> May 2017.



In summary, heat export from the Chatterley site is not feasible because of the short yearly running hours and the fact that operational hours cannot be reliably forecast, all of which significantly lessen the likelihood that consumers would be willing to accept heat under these terms. Because of this, the heat consumers would need their own heat supply infrastructure for more reliable continuous heat supply. This would make a scheme less economically viable. Additionally, the capital investment in heat export infrastructure is far less likely to be justified for plant operated with such low utilisation. As the Chatterley site will be subsidised through the Capacity Market, the site does not qualify for other forms of State Aid (i.e. on exported heat), making the commercial case unfeasible.

It is therefore concluded that it is not feasible to supply heat from the Chatterley site, and no CBA is required.



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