

Barnsley NAVE

Energy Statement

For Currie & Brown

Date: 8 December 2023

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1. INTRODUCTION

This Energy Statement has been prepared on behalf of Barnsley Metropolitan Borough Council (BMBC) for the proposed NAVE building development. The proposal consists of the redevelopment of the former Barnsley Metropolitan Borough Council Computer Centre. The proposed development will provide; choral venue rehearsal and performance space, social/meeting space, and office accommodation.

This statement addresses the energy requirements as set out in the Local Plan for Barnsley Metropolitan Borough Council (BMBC) which comprise the Supplementary Planning Document.

The report assesses the feasibility of installing low or zero carbon (LZC) technologies as part of the proposed refurbishment of the existing building in Barnsley town centre. The building is owned by Barnsley Metropolitan Borough Council and locally listed.

The report helps inform the project team’s decision making regarding the selection of LZC technologies and ensure that consideration has been made of drivers for installing LZC technologies, site opportunities and constraints and potential available financial support.

All viable LZC technologies have been assessed based upon technical, financial, aesthetic and practical considerations. The following aspects have been addressed:

- Energy generated from LZC sources and CO₂ savings
- Life cycle costs and payback
- Local planning criteria, including land use and noise
- Potential to export energy from the system
- Any available grants
- All appropriate technologies and reasons for exclusions
- Potential to connect to district energy networks

1.1 Key drivers

The key drivers that will influence the development of a low or zero carbon energy strategy for the project are shown in Table 1.

Table 1 Key drivers relating to LZC technologies

	Requirement	Source	Comment
Renewable Energy	Generate 20% of predicted energy needs from on-site renewable energy, where viable	Barnsley Metropolitan Borough Council (BMBC) Energy Strategy 2015-2025	Not viable as existing building and locally listed
CO ₂ emissions reduction	30% reduction in regulated CO ₂ emissions over Part L requirements, where viable	Barnsley Metropolitan Borough Council (BMBC) Energy Strategy 2015-2025	Not viable as existing building and locally listed
BREEAM	Not applicable	Not applicable	No requirement in project brief
Energy Performance Certificate (EPC)	EPC C rating with ambition to achieve B.	MEES / EPC regulations. From April 2023, E minimum for letting. Speculative further changes to MEES Regulations requiring EPC C from 2025 and B from 2028 for letting.	Project brief to future proof

1.2 Site opportunities and constraints

The site and proposed building offer both constraints and opportunities when considering LZC technologies.

1.3 Location

There are no large water bodies or rivers immediately adjacent to the site allowing the adoption of hydropower or water source heat pump technology for this project.

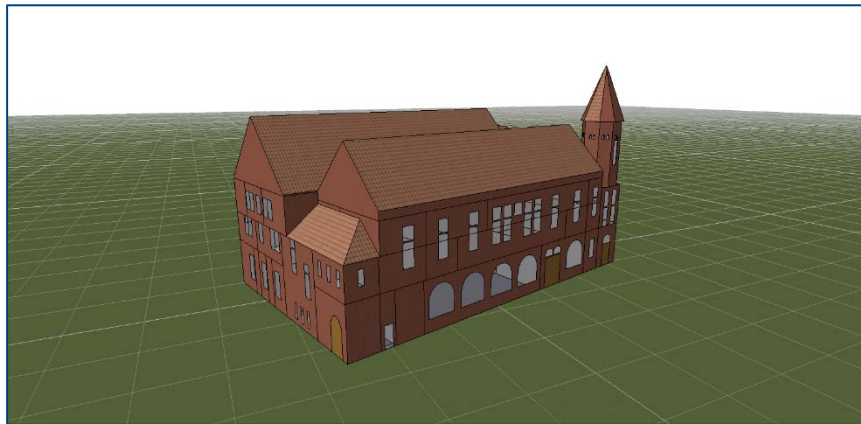
The town centre location of the site does not provide suitable wind speeds for the use of wind turbines.

1.4 District Heating

There is not currently a district heating system serving this area.

1.5 Building

The existing roof space consists mainly of steep double pitched roof with a tower to the North end. Whilst the potential exists to install a Solar PV array with panels located on the roof at an angle of approximately 54 degrees, the roof is not south facing making it unfavourable for the use of PVs.



1.6 Planning

BMBC Local Plan and Supplementary Planning Document, contains the following policies, relevant to this LZC study:

- CC1, Climate Change, Promoting and Supporting the delivery of renewable and low carbon energy.
- RE1, Low Carbon and Renewable Energy, seek to incorporate initially appropriate design measures, and thereafter decentralised, renewable, or low carbon energy sources in order to reduce carbon dioxide emissions and should at least achieve the appropriate carbon compliance targets as defined in the Building Regulations.

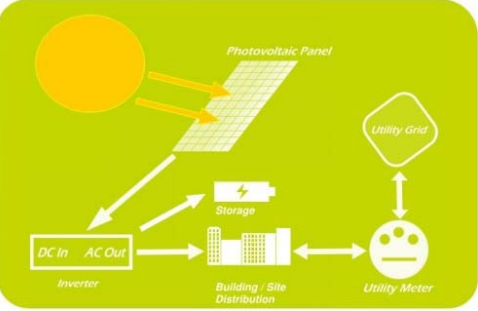
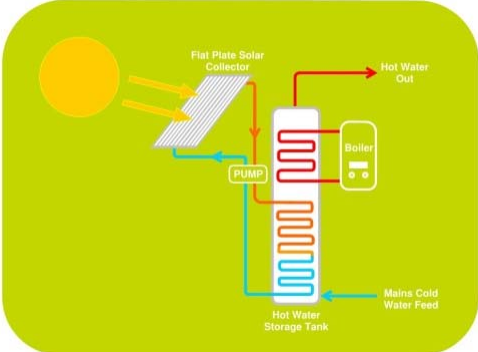
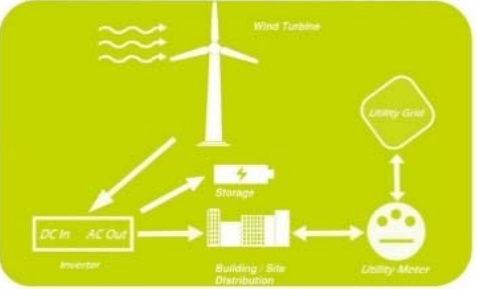
1.7 Financial incentives

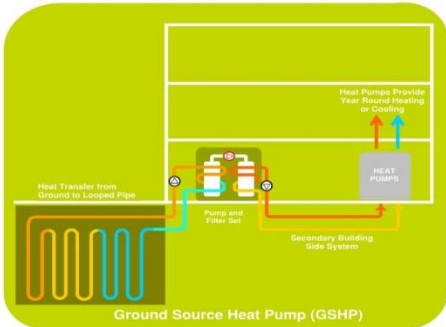
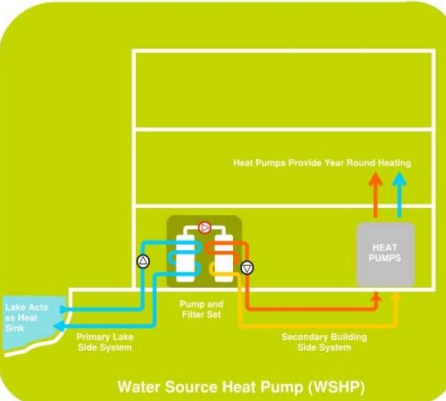
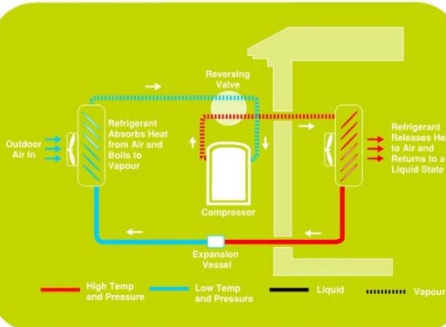
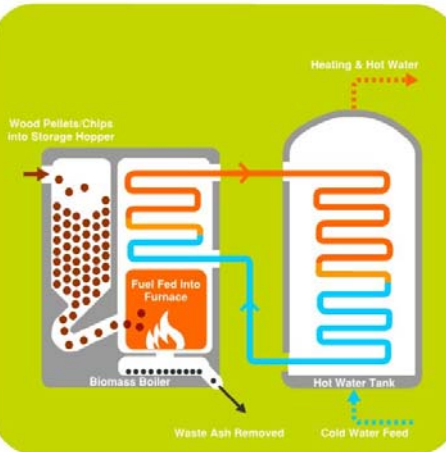
Since the Feed in Tariff (FIT) for low carbon electricity generation came to an end on the 31st March 2019, and the non-domestic Renewable Heat Incentive (RHI) also ended on the 31st March 2021 it is Hydrock's understanding that no capital grants are available for LZC technologies on this project.

2. LZC TECHNOLOGIES APPRAISAL

An initial appraisal of LZC technologies has been carried out to select potential technologies for further assessment, as shown in Table 2. Based on the initial appraisal, potential technologies were assessed in more detail to determine their carbon and cost benefits with consideration of their relative potential for implementation.

Table 2 Initial screening of LZC technologies

LZC technology	Comments in context of proposed development	Subsidy available	To be considered for inclusion
<p>Solar PV</p> 	<p>Roof not south facing means this technology is not viable.</p>	<p>No</p>	<p>No</p>
<p>Solar thermal</p> 	<p>Limited DHW use for the NAVE building means that this technology is not viable. Roof construction also not suitable</p>	<p>No</p>	<p>No</p>
<p>Small and Micro Wind Turbine</p> 	<p>Not viable in town centre location.</p>	<p>No</p>	<p>No</p>

LZC technology	Comments in context of proposed development	Subsidy available	To be considered for inclusion
<p>Ground source heat pump</p>  <p>Ground Source Heat Pump (GSHP)</p>	<p>Limited site area for the size of development precludes this</p>	<p>No</p>	<p>No</p>
<p>Water source heat pump</p>  <p>Water Source Heat Pump (WSHP)</p>	<p>No adjacent water source</p>	<p>No</p>	<p>No</p>
<p>Air source heat pump</p> 	<p>Applicable to this development where space cooling is also provided</p>	<p>No</p>	<p>Yes subject to end user agreement</p>
<p>Biomass boiler</p> 	<p>Conflicts with policies to limit air pollution in city centre location. Storage area required and noise produced by regular fuel deliveries.</p>	<p>No</p>	<p>No</p>
<p>Micro Combined heat and power</p>			

LZC technology	Comments in context of proposed development	Subsidy available	To be considered for inclusion
<p>The diagram illustrates a Combined Heat and Power (CHP) system. It starts with a 'Fuel Source' at the bottom left, which feeds into a 'CHP' (Combined Heat and Power) unit. From the CHP unit, two paths emerge: one goes to 'Generates Electricity' (represented by a lightbulb icon) and another goes to a 'Heat Distribution Unit' (represented by a radiator icon). The Heat Distribution Unit is connected to a 'Central Heating System' (represented by a radiator icon). Additionally, the CHP unit provides 'Waste Heat' which is 'Used by Engine Used to Provide Heating'. This waste heat is then used to provide 'Hot Water Supply' (represented by a faucet icon).</p>	<p>No large base heat load available. Future reductions of grid electricity carbon factors are expected to reduce the viability of this system to reduce carbon emissions</p>	<p>No</p>	<p>No</p>
<p>Windcatchers</p>	<p>May be viable subject to structural roof assessment</p>	<p>No</p>	<p>Yes</p>
<p>Micro Hydroelectric Power</p>	<p>Location unsuitable</p>	<p>No</p>	<p>No</p>
<p>Fuel cell</p>	<p>Not a mature technology for building applications</p>	<p>No</p>	<p>No</p>
<p>Anaerobic digestion</p>	<p>Capacity limited by low grade waste</p>	<p>No</p>	<p>No</p>
<p>Tidal and wave power</p>	<p>Location unsuitable</p>	<p>Renewables Obligation Certificate (ROC)</p>	<p>No</p>
<p>Geothermal</p>	<p>Location unsuitable</p>	<p>Renewables Obligation Certificate (ROC)</p>	<p>No</p>

3. DISCUSSIONS

3.1 Air-source Heat Pump

It is proposed that heating and cooling demand is met by an air-source variable refrigerant flow (VRF) heat pump installation, which can provide simultaneous space and water heating and cooling. The renewable energy provided consists only of the heat extracted from ambient air that contributes to the space and water heating demand and does not include heat extracted from the building for space cooling duty.

The NAVE will become the home of Barnsley Youth Choir (BYC); it is a building primarily used for choir singing. Any plant proposed will have to be quiet in operation particularly the rehearsal spaces. Consideration will need to be given to the end user BYC's comment that air con cooling would affect their singing voices. With this in mind, the option of an alternative utilising natural ventilation strategy is also being reviewed and considered.

3.2 Windcatchers

It is proposed that natural ventilation utilising windcatchers is considered for the large rehearsal spaces with roof overhead. This is subject to a structural review of the existing roof to support the windcatchers.

The windcatcher is a sustainable natural ventilation system that harness the wind and minimises impact on the environment. It is a sustainable low carbon technology and with its unique design incorporates wind driven air intakes to generate positive pressure in the room below, which together with temperature differences, assist the passive stack to exhaust the stale room air.

4. SUMMARY

This statement addresses the energy requirements as set out in the Local Plan for Barnsley Metropolitan Borough Council (BMBC) which comprise the Supplementary Planning Document.

BMBC Local Plan and Supplementary Planning Document, contains the following policies, relevant to this LZC study:

- CC1, Climate Change, Promoting and Supporting the delivery of renewable and low carbon energy.
- RE1, Low Carbon and Renewable Energy, seek to incorporate initially appropriate design measures, and thereafter decentralised, renewable, or low carbon energy sources in order to reduce carbon dioxide emissions and should at least achieve the appropriate carbon compliance targets as defined in the Building Regulations.

In line with the BMBC local plan Policy CC1 AND RE1, the development will maximise the potential use of low and zero carbon technologies in order to reduce carbon dioxide emissions as far as possible, where viable for a locally listed building and fit for purpose for the end user.

An assessment of the feasibility of installing LZC technologies as part of the proposed Barnsley NAVE Building development has been undertaken. An initial appraisal of LZC technologies selected air source heat pump and windcatcher as suitable technologies to be studied in detail.

The key conclusions for technologies considered suitable for the project are:

- Air-source heat pump space heating is proposed as a low carbon alternative to gas fired boilers. Gas will not be provided to the NAVE building; it is proposed that the development will avoid the use of fossil fuels thereby reducing the development's carbon emissions. The air source heat pump proposal is subject to sign off by the end user.
- Windcatchers are considered as an alternative to air source heat pumps, for the large rehearsal spaces with roof overhead. This is subject to a structural review of the roof integrity to support the windcatchers.
- Other technologies are not proposed due to site constraints, financial viability or maturity of technology.

