

Midlands Net Zero Hub

Horticultural Waste and Energy Mapping Study

WP1: Stakeholder Engagement and Mapping

January 2022

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Table of Contents

1.0	<i>Introduction</i>	3
1.1	Opportunities	3
1.2	Co-location of Horticulture with Sources of Waste Heat	3
2.0	<i>Stakeholder Engagement</i>	3
2.1	Publicity	3
2.2	Targeted Messaging	4
2.3	Results	4
3.0	<i>Mapping</i>	5
3.1	Methodology	5
3.2	Results.....	5
4.0	<i>Clustering Exercise</i>	6
5.0	<i>Follow Up Engagement and Site Selection</i>	6
6.0	<i>Next steps</i>	8
	<i>Appendix 1: Press Release</i>	9
	<i>Appendix 2: Expression of Interest Survey</i>	10

1.0 Introduction

District Eating Ltd (DEL) were asked by the Midlands Net Zero Hub (MNZH) to identify, quantify, and map sources of waste heat and CO₂ from the agri-food sector in the Midlands Net Zero Hub area. This will allow clusters where potential users and sources of waste heat could be brought together to be identified. DEL were also asked to engage with key stakeholders to help understand energy flows in farming, agri-food and land-based sectors. Mapping the region for potential sources of waste heat will enable collaborative circular economy partnerships in the agri-food supply chain to emerge. This could play a vital part in decarbonising the sector in line with the country's low carbon transition.

1.1 Opportunities

The potential opportunities of the mapping and stakeholder engagement include:

- Identify stakeholders with available heat for horticulture.
- Create a map which can be used to identify clusters of waste heat.
- Engage farmers to help maintain a vibrant rural economy.
- Develop projects that provide fresh, hyper-local, low-carbon food and create jobs in the Midlands.

1.2 Co-location of Horticulture with Sources of Waste Heat

In the UK, heating and lighting costs are the most significant outlay for greenhouse horticultural businesses and, depending on the fuels used for supply of heat and power, can lead to a high carbon footprint. This means that fresh produce imported from warmer climates overseas can often be more cost efficient and lower carbon than locally grown produce. Low carbon horticulture allows British growers to compete with imported produce in terms of carbon footprint, and utilising waste heat and CO₂ can bring down operational costs of running a greenhouse, making local produce more sustainable and economically viable.

Through co-location of horticulture with waste heat from industry and elsewhere in the agri-food supply chain, there are win-win scenarios for both the heat supplier and the growers:

- The heat supplier generates an income from heat that was previously being wasted, gains an anchor load on the district heat network, and reduces their return temperature which can improve the overall efficiency of the heat network system.
- The grower gets access to a large amount of heat, a consistent supply, and can negotiate a competitive price.

2.0 Stakeholder Engagement

2.1 Publicity

DEL publicised the project by writing a press release (Appendix 1) and sharing it widely via Twitter, Linked In, and MNZH contact networks. The press release contained a link to an 'expression of interest' survey (Appendix 2) where potential stakeholders could record their interest in the project and provide information about their available resources. As well as this, an article was written about the project in popular magazine, Farmers' Weekly. This gained attention from farmers, most of whom had anaerobic digestors or biomass burners. DEL and MNZH team members shared the Farmers Weekly article on LinkedIn and Twitter.

2.2 Targeted Messaging

Alongside the marketing campaign, DEL carried out targeted messaging. DEL identified heat producers by downloading the following lists from online sources:

- National grid compressor stations
- RO/ROS NIROC EI Stations <50kW
- Renewable energy planning database
- Large electricity generation UK
- CCA Companies
- Environmental Permitted sites

This returned thousands of respondents, who were filtered down to the MNZH region. We also filtered them based on suitability for the project and likelihood of having waste heat. All suitable businesses were listed in a spreadsheet database. This consisted of potential stakeholders in the MNZH area from the following categories: environmentally permitted sites, water companies, compressor stations, large electricity generators, energy from waste plants, anaerobic digestion plants, and large biomass. In total, 585 potential respondents were identified.

A list of contacts from local authorities, LEPs, and other MNZH networks was provided by the MNZH. DEL sent each of these a copy of the press release and asked them to distribute it to relevant stakeholders.

Members of the DEL team were assigned different stakeholder groups contact. Speculative messages with links to the press release were sent via LinkedIn, or via email/phone where these contact details were available. We contacted the relevant staff members on LinkedIn. Where requests for connection were accepted, a second follow up message was sent. All contact was recorded in a contact log. Overall, 360 stakeholders were contacted. Of these, 34 people responded to messages, giving a response rate of 9%.

2.3 Results

As a result of the marketing campaign and the targeted messaging, the expression of interest survey had 40 responses. Of these, 24 were correctly filled in and in the MNZH area. Some provided locations of sites outside of the region, and others did not provide locations. Some stakeholders provided locations and contact details but did not fill in all questions about resource availability. Of the 24, 21 stakeholders selected 'Yes' under the question 'Do you produce excess heat?'. Most survey responses came from farmers with anaerobic digestors and biomass burners. This provides a wide range of options of rural sites for development of projects. Expressions of interest were also gained from Nottingham City Council EnviroEnergy, the operators of Nottingham's district heat network, and the University of Nottingham, which could provide urban sites for micro-feasibility work.

As a result of the targeted messaging, a meeting was held with Ancala, who own a large portfolio of assets including renewable energy, transport, and utilities. The Ancala representatives expressed willingness to be involved in the project. DEL held a meeting with 3 senior members of the Ancala team in December 2021. Ancala expressed an interest and provided a spreadsheet of their key assets in the MNZH region which include 14 Biogen AD plants that vary in scale. The smallest produces 2.2GWh/yr and the largest produces 13.6GWh

annually. Ancala have not yet provided any further detail on available power or land availability however DEL have used Google Earth to view each site, and have been able to indicate whether there is land availability at each site. Further engagement will confirm availability.

Another meeting was held with Severn Trent, the main water company in the MNZH region. The representatives present expressed strong interest in the project and explained they have hundreds of assets in the MNZH region, however there are several assets that have waste heat available, with some assets also producing CO₂. Methane upgrade is typically done through a water scrubbing process, and so the CO₂ by-product is not likely to be of horticultural grade.

3.0 Mapping

3.1 Methodology

As data was gathered throughout the engagement work, DEL identified geographical coordinates for as many businesses/organisations identified in the stakeholder ID as possible. Co-ordinates were obtained for the following stakeholder groups: environmentally permitted sites (intensive agriculture), compressor stations, energy from waste plants, anaerobic digestion plants, and large biomass. Although they were not prioritised in the stakeholder engagement, DEL also obtained coordinates of sewage gas and landfill gas sites. Stakeholders that had expressed interest were marked on the map with star symbols to make them stand out. Shapefiles of the LEPs within the MNZH region were obtained and merged, to act as a boundary for the map. Layouts were created to best display and communicate the data represented in the map.

3.2 Results

The following map shows the locations of respondents from the previously mentioned stakeholder groups within the MNZH region. Engaged stakeholders (those who completed the expression of interest survey) are shown by red star symbols. Severn Trent sites are highlighted with blue stars. Ancala sites are shown by yellow stars.

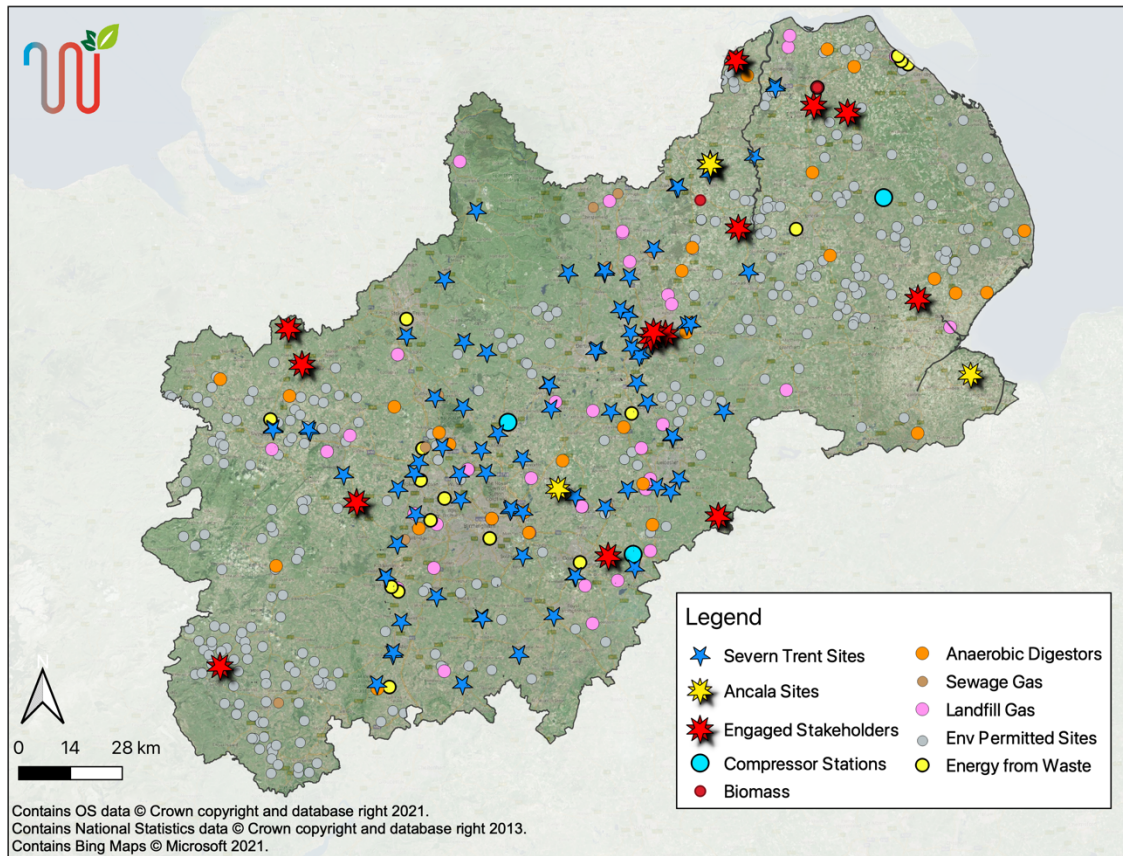


Figure 1: Map showing potential sources of waste heat and engaged stakeholders in the Midlands Net Zero Hub region

4.0 Clustering Exercise

DEL held a meeting with the MNZH to discuss priorities and criteria for site selection. The main findings of the meeting were as follows:

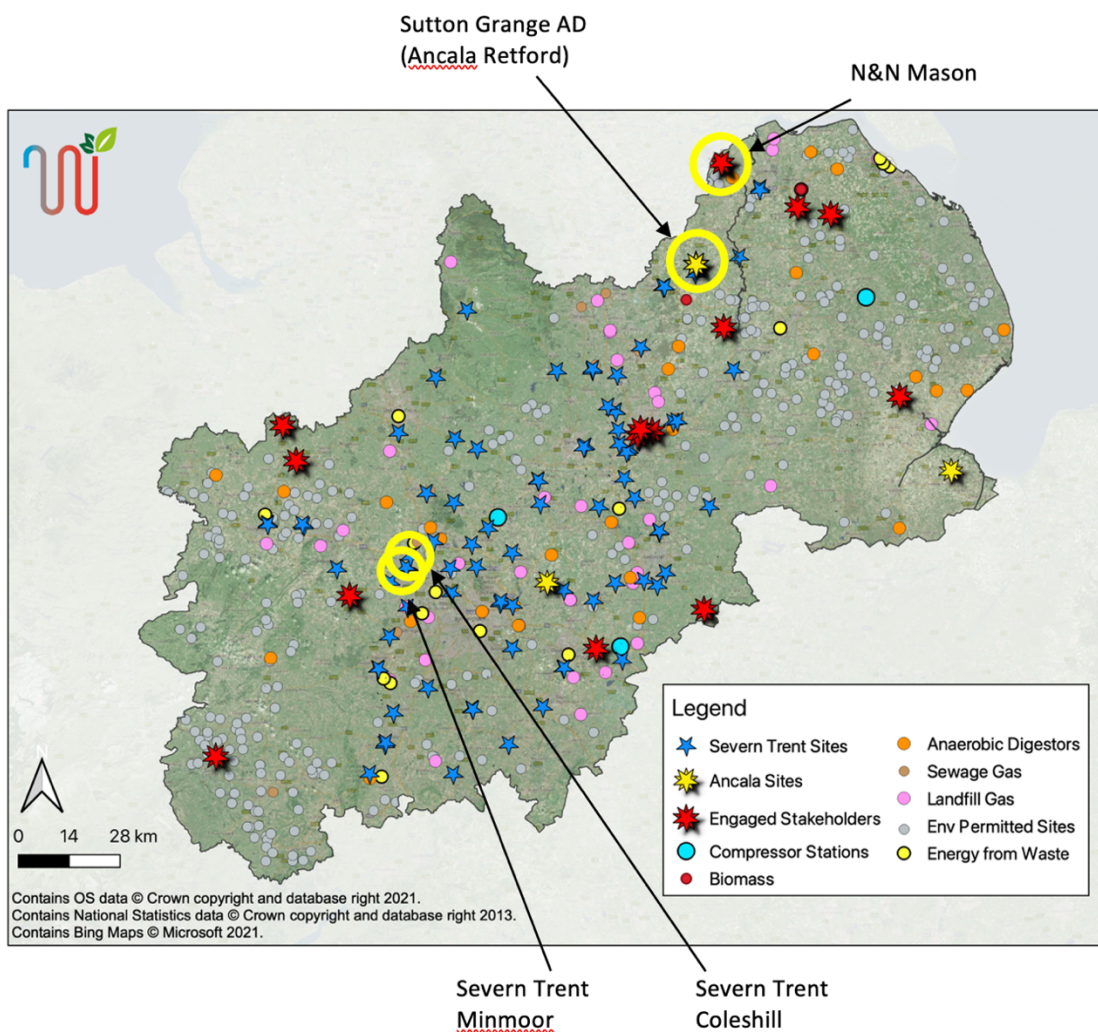
- The three chosen sites should be representative of the Midlands region, encompassing urban and rural sites.
- The selected sites should have some geographical spread, including at least one site in the East Midlands and one site in the West Midlands.
- The focus should remain on decarbonising heat but should also encompass social benefit.
- Sites where stakeholders have shown high levels of engagement should be prioritised.
- The goal of the micro-feasibility work is to create a blueprint that can be applied to other areas, so options for project development and commercial delivery should remain open and unrestricted at this stage.

5.0 Follow Up Engagement and Site Selection

The DEL team contacted all engaged stakeholders by phone call to gather more data about heat availability, power availability, land availability and quality, and level of enthusiasm for the project. This resulted in longer conversations with ten stakeholders, including Severn Trent, Ancala, five farms with biomass boilers or ground source heat pumps, and three anaerobic digestion plants. These were then ranked using a scoring matrix that measured enthusiasm,

land quality, resource availability, building potential and number of stakeholders. This resulted in the selection of three sites:

- **N&N Mason:** A farm in North Lincolnshire producing heat through anaerobic digestion and power with solar panels. Available land is 1.5 hectares good quality, flat pasture next to heat and power generation. The land has had minimal chemical treatment and could be suitable for organic production. More land could be available for a larger project if it provides an attractive business case to the stakeholder. Heat and power availability could also be increased with the addition of biomass CHP.
- **Anaerobic Digestion Plant in Retford:** A farm in Retford with 3MW power production and 2MW heat production by anaerobic digestion. Land quality and spatial challenges around the AD plant mean that on initial evaluation this project could be more suitable for vertical farming. The site is owned by Ancala and is located on a farm owned by a farmer.
- **Severn Trent - Coleshill/Minmoor:** Two nearby Severn Trent sites in Birmingham. Both sites have anaerobic digestion with biogas CHP, and the Minworth site also has natural gas CHP and anaerobic digestion with biomethane. These sites are both in an urban setting with unknown land availability. They would be best suited to modular greenhouses or vertical farms.



6.0 Next steps

The next steps after the completion of Work Package 1 are as follows:

- Continue engagement with stakeholders at selected sites.
- Complete a micro-feasibility study for a low-carbon horticultural project using waste resources at each selected site.

Appendix 1: Press Release

District Eating Ltd. is undertaking a ground-breaking project in partnership with the Midlands Net Zero Hub to highlight opportunities in agri-food supply chains and propose new business models. The study, funded by the Department for Business, Energy and Industrial Strategy (BEIS), will identify sites suitable for low carbon horticulture using waste heat and develop innovative projects. These projects could help your company generate additional income, reduce waste and CO₂ emissions, contribute to carbon targets and social responsibility strategy.

If you work in industry in the Midlands and have excess waste heat, or if you are a grower, interested in learning more about using recovered heat and CO₂ for your site, you could be the perfect fit! If you would like to know more about this exciting opportunity, please [Register Your Interest](#).

Background

Every year, greenhouses in the UK are estimated to use 3.3 TWh of heat. Heat production is dominated by natural gas boilers and Combined Heat and Power (CHP), which contribute to our national CO₂ emissions. Meanwhile, recoverable waste heat from UK industry is estimated to be 10-50 TWh per year. This is enough to heat the UK's greenhouses three times over! So why is using waste heat for horticulture not the norm? The technology is available, but changing established practices takes time. However, in the transition to Net Zero, a shift towards more localised heat and power systems is inevitable. This study aims to get the ball rolling for low carbon, collaborative waste heat solutions between UK industry and horticulture.

The Project

By mapping sources of waste heat and horticultural growers across the Midlands region, District Eating Ltd will be able to identify clusters where there are opportunities for innovative use of resources, such as sale of industrial waste heat into horticultural projects. Implementing these circular economy solutions will contribute to the Midlands Net Zero Hub's Net Zero targets by reducing CO₂ emissions from heat, and fruit and vegetable imports.

The most promising sites identified in mapping will be selected for micro-feasibility studies and further project development, funded by BEIS. Potential benefits include access to reduced and stabilised heat cost for growers and income to suppliers of heat that is currently wasted. Other potential benefits include increased supply chain resilience, positive social and economic outcomes through increased employment.

Further Details

If you are interested in this exciting opportunity, please [Register Your Interest](#) and we will be in touch. For more details, please contact jenna@districteating.com.

Appendix 2: Expression of Interest Survey

Tick box:

- I am interested in the project and would like my site to be considered in the study.

- 1. Company Name
- 2. Contact Name
- 3. Contact email address
- 4. Contact phone number

- 5. Do you produce excess heat?
 - a) Yes
 - b) No

- 6. How much?
 - a) 0-100kW
 - b) 100-500kW
 - c) 500kW-1MW
 - d) 1MW-2.5MW
 - e) 2.5MW-5MW
 - f) 5MW-10MW
 - g) 10MW+
 - h) Prefer not to disclose at this stage

- 7. Is the heat supply continuous or variable?
 - a) Continuous
 - b) variable

- 8. If variable, please explain whether it varies throughout the day week month or year;
 - a) Daily
 - b) Weekly
 - c) Monthly
 - d) Seasonally

- 9. Do you have an electricity connection onsite?
 - a. yes
 - b. no

- 10. Do you produce power onsite?
 - a. Yes
 - b. No

- 11. Is the power onsite renewable or fossil fuel based?
 - a. Renewable
 - b. Generated through combustion of fossil fuels

- 12. If you produce power onsite, please can you provide an indication of how much power is currently being exported to grid, and could be available for sale;

- a. 0-50kW
- b. 50-200kW
- c. 200kW-500kW
- d. 500kW-1MW
- e. 1MW-2MW
- f. 2MW-5MW
- g. 5MW-10MW
- h. 10MW+
- i. Prefer not to disclose at this stage

13. Do you produce CO₂?

- a) Yes
- b) No

14. Please describe how the CO₂ is produced? Eg through burning gas, another fuel, or as the result of a process.

15. What is the address/location of your site?

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