# Identifying Suitable Sites

## Introduction

This handout provides general information for understanding how strategic evidence prepared in studies such as the Yorkshire & Humber Renewable and Low Carbon study can be taken forward to identify opportunities and constraints in more detail. To help demonstrate this, the handout is focused on onshore wind turbines and biomass CHP.

These two options represent scalable and proven technologies that are likely to be increasingly common in Yorkshire and Humber based on identified resource capacity. They are also the most dependent upon the location of:

1. Related demand for the energy produced (in the case of CHP and specifically the heat it generates); and
2. Required resource (in the case of wind).

## Identifying Priority Areas - Biomass CHP and District Heating

The successful implementation of biomass CHP requires that the use of the heat produced is maximised in order to avoid waste heat being released into the atmosphere. This can be achieved either via direct use of heat energy within a localised process (most commonly in an industrial setting) or via the production and subsequent distribution of hot water via district heating (DH) to service a wide range of uses including domestic and commercial space heating. The following process sets out the basic stages planners need to understand and follow when planning for district heating.

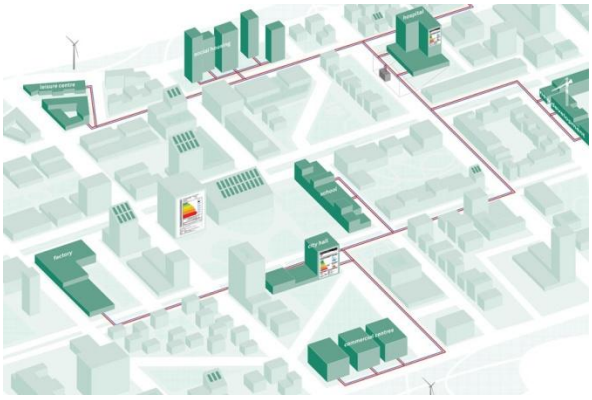
**Phase 1:** A mapping exercise is needed of existing heat density within local authority areas, allowing the identification of a number of locations with high existing heat densities, potentially offering opportunities for district heating.

**Phase 2:** Following the mapping of heat loads a more detailed analysis is needed to determine the nature, location and suitability of the heat loads already present and what heat loads may occur in areas of change such as growth areas and areas of renewal and regeneration. This phase includes the following steps:

- Establishing existing and future potential space types present (i.e. residential, commercial etc).
- Removal of areas for which heat demands are primarily process driven.
- Identification of any potential “anchor” loads (eg hospitals and leisure centres with swimming pools).
- Division of approximate total build floor area by type based on Employment Land and Strategic Housing Land Availability Assessment data.
- Assessment of likely level of maintained heat demand.

**Phase 3:** The purpose of identifying areas of least constraint is to prioritise and focus where more detailed assessment is worth considering. This would typically involve undertaking a feasibility study that includes:

- Stage 1: Briefing Data
- Stage 2: Energy Assessment
- Stage 3: Technology Selection
- Stage 4: Distribution Infrastructure
- Stage 5: Emissions Assessment
- Stage 6: Economic Assessment



## Stage 1: Briefing Data

Once a potential heat share opportunity has been identified, further data should be gathered on:

- Phasing information, floor areas, and design energy and emission targets of the development, community / plot being assessed.
- Heat sources such as spare heat availability and flue gas heat recovery potential, and connotations of potential heat sources including costs of heat sharing modifications, impact on core business, sale value of property, contractual / tenancy agreements, liabilities and insurances.

## Stage 2: Energy Assessment

- **Demand and Consumption:** This is the essential data needed to assess heating demand for each building is the annual heat consumption (kWh /m² / year), peak heat loads (kW), and heating demand profiles. Once this information has been calculated, an accumulated site heat demand profile can be established.
- **Utilisation of Waste Heat:** Flue Gas Heat Recovery or Spare Heat Generation Capacity are considered to be heat sources can be analysed in terms of kW rating and typical hourly operational statistics to find an available heat source profile. The heat source availability profile can then be compared to the heat demand profile to gauge how well they match. Thermal storage can also be integrated when appropriate to increase the compatibility between the two profiles.

## Stage 3: Technology Selection

Subsequent to the above findings, plant can be selected to supplement any viable heat share capacity. Typically this technology may include CHP, Biomass Boiler, Gas Fired Boiler and Thermal Storage.

## Stage 4: Distribution Infrastructure

Analysis of Infrastructure is required to include an estimation of footprint size and location of an 'energy centre' to house plant and calculations for sizing, connections, cost and route of district heating pipework.

## Stage 5: Emissions Assessment

A calculation of the scheme's total CO2 emissions relating to emission rates associated with specified generation plant configuration and savings in CO2 emission; Community Heating in comparison to Base Cases.

## Stage 6: Economic Assessment

This assessment must be carried out to find a simple payback period, cumulative cashflow and financial sensitivity testing. The most economically viable community heating schemes are those with a high demand density and a stable heating requirement throughout the day.

## Identifying Priority Areas - Onshore Wind

Unlike the installation of CHP technology, wind turbines have a reduced requirement to be located in close proximity to areas of high demand for generated energy (although all generation is best located near demand as it reduces the need for higher capacity infrastructure at all voltage levels as well as reducing the losses created by moving electricity across distribution networks).

The key technical driver is that of resource availability, i.e. local wind speeds, and the proximity of electrical distribution network infrastructure.

**Phase 1:** There is a need to outline and quantify potential wind turbine capacity through the rationalisation of NOABL data[1] to account for realistic wind speed availability, including potential obstacles.

Note that industry standard guidance is that average wind speeds in excess of 5 - 6m/s are required to generate worthwhile quantities of electricity. Given the relative imprecision of the data available, areas of least constraint identified would typically be in areas with wind speeds equal to or greater than 6.5m/s.

**Phase 2:** Identifying priority areas will involve producing a best estimate of suitable locations, subject to identified constraints, including Green Belt.

This will lead to the identification of area with least constraint. This should also look at areas where there are existing turbine installations to establish the potential for extension / expansion of infrastructure in an existing area.

**Phase 3:** As with CHP / district heating, the purpose of identifying areas of least constraint is to prioritise and focus where more detailed assessment is worth considering.

This will typically lead to planning applications for anemometers to measure wind speeds for a sustainable period and in greater detail, initiate contact with Ministry of Defence and District Network Operators.

[1] Source: http://www.bwea.com/noabl/index.html