

Phase 5 Public Sector Low Carbon Skills Fund: Guidance on how to prepare a heat decarbonisation plan

Contents

1. Purpose of this guide	3
2. Guidance on writing a heat decarbonisation plan (HDP)	3
2.1 Purpose of a heat decarbonisation plan.....	3
2.2 Key components of a heat decarbonisation plan	4
Purpose	4
Executive Summary	4
Introduction	4
Buildings.....	5
Energy consumption and carbon emissions.....	5
Heating and hot water systems.....	6
Estimating cost	7
Delivery Plan	7
Resources	8
Determining the whole solution.....	9
Previous energy efficiency projects and existing low carbon heating technology	9
Heating networks and opportunities on site	10
Electricity loading capacity to support a switch to electric heating solutions	10
Supporting information	11
Plans for the sites	12
Key challenges.....	12
3. Preparation for Public Sector Decarbonisation Scheme	12
4. Information about the Phase 5 Public Sector Low Carbon Skills Fund	14
Dates for submission of the heat decarbonisation plan	14
Supplementary Building Information Tool	14
Advice and support.....	14
5. Glossary	15

1. Purpose of this guide

The Department for Energy Security and Net Zero (DESNZ) working in partnership with Salix Finance has launched the Phase 5 Public Sector Low Carbon Skills Fund (LCSF) which will provide grant funding to the public sector to put in place a plan to decarbonise heat in public buildings. The purpose of this guide is to support public sector organisations in creating their first heat decarbonisation plan or wishing to upgrade and improve their plan following the completion of Phase 5 Low Carbon Skills Fund funded activities.

Other documents available on our [website](#) to support your application to Phase 5 LCSF are:

- Phase 5 LCSF Scheme Guidance, which details the eligibility criteria
- Heat Decarbonisation Project Development Guidance, details of the specific activities eligible for funding

2. Guidance on writing a heat decarbonisation plan (HDP)

2.1 Purpose of a heat decarbonisation plan

The purpose of a heat decarbonisation plan is to describe how an organisation intends to reduce direct greenhouse gas emissions by replacing fossil fuel heating plants with low carbon alternatives (for example heat pumps, electric heating, or other low-carbon fuel sources) within its estate. Heat decarbonisation plans should outline the most cost-effective pathways to decarbonising heat through integration of energy efficiency measures that reduce a site's heat demand, ensuring that a 'whole building' approach to decarbonisation is taken.

A HDP is a living document and may not be complete until all heat decarbonisation has been completed across your estate. When you are beginning your journey, it is likely to be a strategic document, defining objectives, setting targets and capturing key contextual information. As you progress to planning specific projects your HDP will expand to encompass this planning, and you will be able to update your strategy with more detail or updated information.

Depending on the complexity of your estate and decarbonisation programme your HDP may be one document, or multiple documents. For example, if there is only one building in your estate, your initial strategy document might be expanded to include specific project plans in a single HDP. If you have many buildings and sites in your estate, you might have multiple HDPs covering different parts of the estate with strategy documents and project specific documents separated out. However, your HDP(s) are structured, it is important that they form a coherent portfolio, with project specific plans reflecting an overarching strategy.

Although the scope, maturity, and structure of HDPs can vary, all HDPs should include a common set of information, as set out by this document. All HDPs should set out an organisation's targets and objectives, its energy use, where the energy is derived, and plans for reducing energy use and decarbonising the source. All HDPs should set out what has already been achieved, and what needs to be planned for the future. They should reflect the organisation's current level of knowledge, an understanding of the technical solutions that are needed to decarbonise, and associated costs and timelines.

This document sets out the key components that should be included in any HDP. The Heat Decarbonisation Project Development Guidance and the [Energy Systems Catapult's Public Sector Decarbonisation Guidance suite](#) provide more detailed information on developing a HDP, including the specific activities you can carry out as part of heat decarbonisation planning and that you can apply for via the LCSF, and what the outputs of these activities are. This will help you to understand in more detail what your HDP should look like, reflecting your organisation, estate, and level of progress.

2.2 Key components of a heat decarbonisation plan

Purpose

At the beginning of a HDP, it is useful to set out its purpose by covering the following questions. How is this plan going to contribute to the goals of your organisation and the UK? Why is it important for your organisation and how has this plan been agreed upon through your governance procedures? The purpose can outline the ambitions of the organisation and what would need to be completed to achieve net zero. This section can also cover the committee or person that has endorsed and signed off the HDP.

Executive Summary

The Executive Summary should summarise the report and provide you with a clear understanding about the current energy usage and carbon emissions as well as the steps needed to decarbonise of buildings. The Executive Summary should include as a minimum:

1. Overview of estate and current heating systems
 - a. Number of buildings involved in surveys and plan
 - b. Issues within buildings: listed or heritage, in conservation area
 - c. Average age of buildings in years
 - d. Existing technologies and summary of condition, heat / light systems and insulation on site
 - e. Current energy usage and total base line carbon emissions from buildings
2. Proposed technologies / systems
 - a. Ideal technologies and measures to improve the building fabric and decarbonise the heating systems
 - b. Carbon savings achieved
 - c. Indicative cost of equipment, materials and installation
 - d. Timescales to implement plan

Introduction

Use the introduction section to provide a summary of your organisation's current situation and set your plan in context.

This includes an overview of the organisation's estate and a summary of what is included within the scope of this decarbonisation plan (you may wish to link it to other documents/strategies, roadmaps or plans you have). You should describe the estate, its use, age, location, characteristics, if it is close to other public sector buildings, as well as the existing heating systems, covering their age and performance.

A summary of energy consumption, costs and associated emissions should be included, with later sections of the HDP going into more detail on this. This will enable you to set a

baseline to measure future interventions against. You should also look at future projections of your energy consumption and whether strategic changes (e.g., new buildings/disposals) will impact your energy consumption, emissions, and energy costs.

Are you just starting or has your organisation already undertaken a lot of work to decarbonise its buildings? It is worth considering that the decarbonisation of heat is one of the later steps in the journey and any plan must include reducing heating demand to a minimum first (fabric first approach) as well as any enabling works (for example changes to the existing heating system to support lower operating temperatures). The introduction will describe what the priority areas are and what monitoring needs to be in place to help identify necessary works. The priority areas set out in your plan will be supported by the findings resulting from the activities undertaken during the delivery of your Phase 5 LCSF project.

Buildings

A section in your heat decarbonisation plan needs to provide background information on the condition and energy consumption of the buildings covered by the HDP. Table 3 provides key information that should be included.

Table 1 - Building information to be included in HDP

Portfolio
How many buildings are included in this plan?
Do you hold a building inventory? This can be just for buildings that are owned or occupied under long term leases by the Public Sector Body.
Building characteristics
What age are the buildings?
Where are they located (urban, rural): in groups/clusters or close to each other?
What is located in the surrounding area?
What is the buildings Gross Internal Areas (GIA) in metres squared (m ²)?
What is their use in terms of activity and occupants and hours of use?
What is the condition of the building fabric such as roofs, windows and walls?
What is the estimated heat loss of the building and could this be a barrier to low carbon heating?
Are there any proposed disposals, changes in use, major refurbishments or new builds planned?

Energy consumption and carbon emissions

The HDP should include a section on your current energy consumption which allows you to reflect on your current usage, the quality of the data, how you collect it and what your organisation could do in the future to track change. You should also think about your carbon emissions and do a forecast with future emissions factors to enable you to understand your business-as-usual trajectory.

Energy Consumption
Do you know what types of energy sources are used in your buildings?
Do you have energy billing information?
Is existing metering/submetering installed in the buildings and are they monitored? What are MPRN and MPAN numbers of the meters?
Who pays the energy bills for these buildings?
Do you have a breakdown of the current heat demand performance of these buildings (kWh/m ²), including floor area of the buildings? (for example, DEC sheet)
Are there plans to implement additional meters?
Do you have historical energy consumption which will provide you with a baseline?
Do you have a monitoring and verification plan in place for any proposed measures?
Carbon Emissions
Do you know what your carbon emissions are against energy sources?
Have you calculated them in the past so you can start to see a pattern?
Do you know what the future emissions for the site will look like to 2050 (for example, using the Green Book to model emissions into the future)?

Heating and hot water systems

A section in your heat decarbonisation plan needs to be about the current state of your buildings' heating and hot water systems. This section aims to provide background on the condition and energy consumption of the heating systems and should provide answers to the following questions.

- What is the age and condition of the heating systems?
- How are they controlled and how should they be controlled?
- What are the current heating technologies for the buildings? Or is it connected to a heat network?
- What fuel is being used by the heating system?
- If it is a heat network, what is the source of the heat?
- Is it a wet system? If so:
 - What heat emitters are used in the building(s)? (e.g., radiators/under floor heating)
 - How is heat transferred throughout the building? (e.g., Low, Medium, High Temperature Hot Water/Steam)
- What is the total output load of your heating system?
- What is the condition of the primary heat source of the system (such as the boiler)? How close is to the end of its useful life?
 - What is the condition of the distribution system (pipework)?
 - What is the condition of the heat emitters? Are they suitable for a new low carbon heating measure such as heat pump?

- What is the current seasonal efficiency of your system? (Benchmark for Salix boiler efficiency is equal to or above 75% to classify an end-of-life boiler)
- If heat is provided through or combined with an air conditioning system:
 - What is the heat distribution to the air conditioning?
 - What type of air conditioning is it?
 - What is the cooling system? How is that fuelled?
- How is hot water provided e.g., heating system, separate gas fired water heaters, use electric heaters? What is it used for? e.g., showers, washing hands, catering
- What does the ongoing maintenance programme look like?
- Are there sites where heating equipment is at the end of its life and due for replacement?

The information relating to your building estates existing age, condition, and the current state of existing heating systems, will be covered by the activities in the strategy stage (e.g. desktop assessments). This will provide the necessary data inputs required to give an initial impression of your sites existing demands and areas for improvement.

Applicants that already have an existing HDP and some information on their existing buildings and heating systems will benefit from updating this section, incorporating findings from the feasibility stage activities with more intrusive works such as building audits, site surveys that provide more information on your buildings and help to identify and prioritise sites with end-of-life heating systems to help focus your plan.

Estimating cost

You should explain what the budget costs are in an appropriate level of detail and accuracy for the stage that you are at (initial budgets to finalised quotes from contractors). You should think about if everything has been included in your budget cost and not just the purchase and installation of the equipment, maintenance costs should also be considered. As a check you should ask yourself these questions:

- Has the HDP captured costs from all the different parts of the process?
- Within the installation, are there other things that will need to be considered such as asbestos removal, temporary heat generation, preliminaries, ancillaries and making good.

The HDP should indicate what the solution would be and how you would install it and if you have any other steps to complete to get to that point (i.e., involving an M&E engineer for design, tendering or gaining quotes). The next section on delivery covers this in more detail.

Delivery Plan

The HDP needs to consider how your organisation will deliver the recommended works. You might wish to consider how you are going to get the plan through internal sign off and working with consultants or contracts to install the proposed measures.

- How are the solutions going to be assessed?
- What metrics will you need to generate to gain internal sign off?
- Who is going to do that?
- How much will each proposal cost? (see estimating cost)
- How are you going to commission the work/what procurement route?
- How long will it take to deliver each proposal?

- How are you going to manage the contract and oversee the outputs (linked to the section on Resource)?
- What you think the overall longer-term delivery might look like (it is expected that this will be very approximate but show a rough plan for the overall delivery)

If this has already been established, then the plan should show what the overall implementation plan is detailing and how it will be taken forward, including:

- Expected overall budget costs and benefits
- Timeline for delivery
- What project could be complete in one year and which projects will require multiyear timeline?
- What the delivery model is likely to look like
- How it is going to be managed (linked to resource)

For organisations preparing a heat decarbonisation strategy and completing activities under the strategy stage, following completion of these activities you will be expected to incorporate an initial delivery schedule which you intend to implement your proposed solutions to decarbonise your estate. Whilst developing an initial delivery plan, cost estimates will be included in the plan, but these may be based on previous schemes and works.

For organisations undertaking works at the feasibility stage, the HDP should provide updated timescales and costs estimates resulting from financial and technical assessments completed by your consultants/contractors.

Resources

This section of the heat decarbonisation plan aims to provide context on the existing resources available and outline the future resources required to develop and deliver the heat decarbonisation plan. Once you know what you are planning to deliver (see delivery plan section for more details), it is essential to make sure that your organisation has the resources to deliver the proposed projects. Things you would need to know in advance of considering resource are:

- How many projects you plan to undertake across the portfolio?
- The timescale for delivery
- Who would undertake which roles? What would you outsource and what would remain within your organisation?
- What is the governance for the investment and delivery?

With those in mind, you are in a position to consider:

- How would this programme be driven within the organisation?
- Who would be responsible for coordinating it?
- Who is going to be senior sponsor and report on progress?
- Who is responsible for managing and monitoring the ongoing energy consumption across the estate and who will be overseeing the delivery of the HDP? Would they be the same person? Would they have time to take on these responsibilities?
- Are the individuals overseeing the project(s) appropriately trained, or will additional training be required to deliver the heat decarbonisation plan?
- What is the existing resource for the identification, development, and delivery of the heat decarbonisation plan? Is it sufficient to deliver the scale that you need to?

- What are the anticipated resource requirements for the delivery of heat decarbonisation plan?
- Will it require additional financial resources?
- What is the resource plan which would support delivery?

Determining the whole solution

With the knowledge of the site and existing conditions (as well as understanding your heating systems) and the understanding gained from exploring the following, you should be in a position to explain in your plan what your solution will be:

- Previous energy efficiency projects and existing low carbon heating technology
- Heating networks and opportunities on site
- Electricity loading capacity to support a switch to electric heating solutions
- Plans for the sites

Depending on the stage you are at, your plan may be more or less mature. If you are at an initial stage, you should record your conceptual plans to decarbonise your buildings. You may have more than one and should capture them all, but with them, note how easy and effective they may be to implement, and if they will achieve your organisational goals. This will help to evaluate a shorter list of possible solutions. Questions to consider are:

- Is the solution going to work for this site?
- Will it be easy to install?
- How will it fit with other technologies on the site (will it complement them or overlap or be difficult to work together)?
- Are there other elements of a system that ought to be installed in advance or in parallel to get it to work better (i.e., building fabric improvements (fabric first approach), controls upgrades, or ventilation)?
- What energy reduction will it offer? Will it move away from fossil fuels in part or fully? What will the replacement fuel supply be? Is that readily available (i.e. biomass or electricity)?
- Are there permissions and other agreements one would need to seek before being able to go ahead (planning permission, access to land etc,)?
- Who will install the technology?
- How easy will it be to operate? Who will operate it?

If you are at the feasibility or design stage of your project, the conceptual ideas outlined in your existing HDP can be amended to include project plans which have been reviewed and assessed as viable capital works.

Previous energy efficiency projects and existing low carbon heating technology

This section of the heat decarbonisation plan aims to outline all previously implemented energy efficiency works that have taken place and if any further energy efficiency works are planned and how these have been factored into the transition to low carbon heat.

- Have any energy efficiency works been completed in the buildings previously? If so, what did they deliver?
- Are there more projects that are planned?
- What type of projects are they? Have you got a list of the projects knowing which are heat (direct/nontraded/scope 1 related) and other (primarily scope 2)?

Within the pipeline are there plans to improve the thermal efficiency and airtightness of the buildings? (Note that these might come from routine end of life replacement of windows, doors, roofing materials etc.). This stresses the importance of making the link between estate management and energy management in ensuring these aspects are captured.

- If applicable, has the proposed reduction in energy demand resulting from these energy efficiency measures been incorporated into the sizing of the low carbon heating system?

Heating networks and opportunities on site

This section aims to understand whether there are any existing or planned local heat networks available that could facilitate the transition to low carbon heat. It is important to understand what the heat source is, to establish if it is low carbon. For example, there may be a network that takes heat from a nearby river or energy from waste plant. If a low carbon heat network is being planned, then considering whether a short delay to wait for the heat to be available via the network will be important. Large public sector buildings or campuses with a high heat demand can provide significant 'anchor loads' for a large heat network which will have benefits for the wider community.

In addition, the government has committed to introducing [heat network zoning](#) from 2025. This will see the development of more heat networks across England. Zoning will designate geographic zones where heat networks are expected to be the lowest cost solution for decarbonising heat. Being in a potential zone will signify that a heat network is expected to be the lowest cost route to decarbonising heating in that area.

- Are there any existing or planned heat network developments located close to the sites that your buildings could connect to?
- Do you know if your building/campus is expected to be in a future heat network zone?
- Is there scope for the organisation to provide a potential baseload for a future heat network to benefit the wider community?
- Are there any other sources of secondary heat in proximity to the site(s) or on site?
- These may include:
 - Heat Sources such as: water, air, ground
 - Heat recovery opportunities
 - Sewer, industrial sites or anywhere where there is waste heat such as data centres or battery storage sites
 - Energy from waste e.g. Potential for anaerobic digestion
 - Significant cooling plant

Electricity loading capacity to support a switch to electric heating solutions

By adding additional electrical loading through the switching of your heat source, there is a chance that there won't be enough electrical capacity coming into your building(s) or in the wider area.

The cost of increasing the electrical supply to a site can vary substantially (and can be high). Therefore, it should be investigated before any projects are commissioned.

This section aims to ask the questions which would help you understand what you might need to do.

- Do you know what the increased demand of a heat pump or other electrified heat load, plus any electric vehicle (EV) charging would be for your building (s)?
- Do you know what the current capacity of the building(s) are?
- Do the sites have their own medium voltage network?
- Can you give some details on the rating and the loading capacity of the network?
- Is there sufficient capacity for the additional electrification of your estate (refer to the contract agreement with your Distribution Network Operator (DNO))?
- Have any energy efficiency or renewable generation measures been implemented previously to reduce electricity consumption of the buildings?
- Are there any further significant measures that can be considered to reduce electricity demand of the buildings (e.g. light emitting diode (LED) lighting and controls)?
- Are there plans to increase capacity?
- Have you contacted the Distribution Network Operator about increasing electrical loading?
- Is there potential on site to install/increase renewable generation to support the increase in electrical demand from low carbon heating solutions?
- Does the site have any existing EV charging stations and future plans (note that this will also affect the overall site capacity)?

Supporting information

This section brings together the energy data you have used to support the heat decarbonisation plan. It should include the following supporting information:

- Display Energy Certificates (DECs)
- Age of buildings and, where possible, U values of building elements
- Heat loss calculation for the buildings.
- Energy consumption data across the estate, to include where possible half hourly data and as granular as possible
- Energy costs across the estate
- Maintenance costs
- Current contractual agreements (e.g., facilities management) and their targets
- Target emission savings for the decarbonisation plan
- Site surveys
- Schematics for proposed low carbon heating system
- Schematics for existing fossil fuel heating plant
- Floor plans
- Images of the systems and building fabric.
- Heating system/building fabric condition reports.
- Heating and electrical schematics and data sheet.

Depending on the organisation, the supporting information available to include as part of the HDP will differ as applicants at the strategy stage are not likely to include site surveys, schematics of low carbon heating measures etc. However, information on the buildings condition, energy consumption and maintenance costs will be available following completion of desktop assessments and audits. Organisations that have progressed to the feasibility or design stage, will be in a position to include information such as heat loss calculations, schematics and designs of proposed low carbon solutions following completion of more in-depth studies on the proposed scheme and its deliverability.

Plans for the sites

This section outlines plans for sites and the proposed expansion or rationalisation of sites that are in the public domain. This section could consider:

- Any planning restrictions or planning guidance in your area (including listed status of buildings)?
- The plans for demolition and rebuilding, major refurbishment or change of use, occupancy, or operational hours
- Are there plans that are in the public domain for expansion or rationalisation of sites or change of usage?
- Plans for new builds and the planning standards for new builds in your area
- Planning guidance for heating systems and energy efficiency in new builds in your area/buildings
- Building standards and building regulations

Key challenges

This section aims to explain the main challenges that the organisation faces in decarbonising heat and the support that the organisation needs to meet your decarbonisation targets. The challenges (i.e. barriers or key risks) can be summarised and are likely to include:

- What is the internal governance?
- Who would need to sign off on this work?
- Does the current business case process allow for carbon emissions?
- What are the challenges in decarbonising heat in your buildings?
- Are any of your buildings listed buildings?
- What options are available?
- What is the cost?
- What resources are required?
- Are partnership arrangements in place for different organisations to work together?
- Are procurement frameworks in place to enable timely delivery? Are they able to cover the technology and the scale?
- What commercial agreements for funding and finance are available beyond Salix?
- Are there public consultation exercises that are required to take place and has this been factored into the plan?
- Are there border issues that must be considered?
- Are there other environmental issues that impact on the plan?
- Are there any challenges within the supply chain for the recommended technologies?
- Installation/onsite risks

3. Preparation for Public Sector Decarbonisation Scheme

For organisations that are looking to make an application to the Public Sector Decarbonisation Scheme (PSDS) or progress to capital works using alternative funding resources, it is important to note the key information that needs to be included alongside your application.

The Public Sector Decarbonisation Scheme is focused on the decarbonisation of heat in non-domestic buildings and the installation of low carbon heating solutions. Applicants are expected to take a 'whole building' approach to prepare their buildings for a low carbon

heating system. Therefore, an organisation must be able to demonstrate that building heating demands have been reviewed and minimised to optimise the operation of the low carbon heating system.

Organisations that have completed a HDP and preliminary designs ready to apply for funding, must have identified buildings that contain an end-of-life fossil fuel heating system. End-of-life evidence is vital to meet the eligibility rules for PSDS. As part of the application, it is equally important to have sufficient data on the state of buildings included in an application, particularly existing building fabric and the existing energy consumption, as this is key to understanding the rationale for the proposed measures included in an application. Some of this information may be covered in an applicants' HDP or supporting building audits/desktop assessments, and so applicants are encouraged to submit this information along with an application.

Some key data points needed to support an application that form part of the projects design includes, *peak heat loss calculations (pre and post building fabric improvements); existing total cooling load and proposed cooling load (if applicable); domestic hot water demand (if applicable)*. It is important to note the information listed above is related to projects in the design stage.

In addition to submitting evidence in relation to the buildings included in the application, applicants must have data on the new low carbon solution, the associated electrical demands of the new system, and the capacity of the premises where these measures will be installed. This information is covered in completed feasibility studies, site surveys and options appraisals and should be submitted along with an application as this information helps to support that the low carbon solution selected is the most appropriate for the site. The key details to provide at this stage are as follows:

- Low carbon solution size (kW output)
- Low carbon solution flow and return temperatures (°C)
- Existing incoming voltage level of the premises (kV)
- Existing supply capacity/maximum capacity of the premises (kVA)
- Current typical loading v your maximum capacity (%)
- Maximum current demand the proposed low carbon solution would draw (kVA)

Finally, an applicant needs to provide the total project costs broken down into the cost of the low carbon solution selected, energy efficiency measures and the like for like replacement costs for the fossil fuel heating system. The costs for the project are important to finalise prior to applying especially the marginal costs and expected direct carbon saved against the scheme carbon compliancy criteria, as this impacts the eligible grant value to be received for a project if approved for funding.

It is important to note the requirements outlined in this section relate to the Phase 3c PSDS scheme and these requirements may change in future rounds of funding.

4. Information about the Phase 5 Public Sector Low Carbon Skills Fund

Dates for submission of the heat decarbonisation plan

Heat decarbonisation plans which have been funded by the Phase 5 LCSF must be completed by the 31 March 2025. Completed heat decarbonisation plans should be submitted to Phase5LCSFgrants@salixfinance.co.uk or your Salix relationship manager.

When the heat decarbonisation plan is submitted there should be clear information explaining how the heat decarbonisation plan was formally approved by the organisation.

Supplementary Building Information Tool

The supplementary building information tool can be found within [Phase 5 LCSF Application Form](#). This supplementary building information tool provides a place to capture information, such as the Unique Property Reference Number and heating system in the buildings you would like to include in your heat decarbonisation plan(s).

The supplementary building information tool is a compulsory part of the application and must be populated and submitted within the application form. Therefore, it is vital to complete this tool before you are ready to apply.

To align with proportionality of assessment, for applications over £100k, additional information will be collected through the tool. This information will be requested from all successful applicants before completion of the project. If you have any questions about using the tool or think you cannot provide the information asked for in the tool, please get in touch with Salix who will provide support.

Heat decarbonisation plan examples

We have provided on our [website](#), example heat decarbonisation plans, produced in previous iterations of LCSF, covering a range of organisations. We hope these allow applicants to gain an understanding of what a heat decarbonisation plan could look like, whilst recognising that plans for different organisations will be different.

Advice and support

Salix is available to answer questions regarding the application process in advance of the application deadline. Please email our dedicated team at Salix at Phase5LCSFgrants@salixfinance.co.uk. Our team will endeavour to answer your query within three working days, for complex enquiries this may take a little longer.

We will also be running a series of webinars aimed at talking clients through the application process, these will be advertised on our event area of our [website](#).

5. Glossary

Carbon baseline – A greenhouse gas or carbon emissions baseline is the estimate of the emissions over a set period that can be used to measure progress. Any year can be used, the more data that is available and the earlier the baseline, the better.

District heating – Heat networks use insulated underground pipes to distribute heat from centralised sources to a variety of different customers, such as public buildings, shops, offices, hospitals, universities, and homes. This could be across entire cities or to a selection of neighbouring buildings. They remove the need for individual boilers or heaters in each building and can use any source of heat such as renewables, large rivers, geothermal or waste heat from industry. Those currently powered by gas can be converted to low carbon heat sources in the future.

Distribution Network Operator (DNO) – Electricity grid operator, there are fourteen across the UK.

Direct carbon – Carbon emissions that are emitted either directly within an organisation's site boundary from combustion of fossil fuel, or where district heat networks are used, carbon emissions which are emitted from combustion of fossil fuel in a district heating plant room. For most public sector organisations this will primarily be fossil fuels (gas, oil and coal) which are combusted on site. (Previously referred as non-traded carbon.)

Electrical loading – The electrical power required by an appliance to operate.

Feasibility studies – A report that evaluates the practicality and deliverability of a proposed project. A feasibility study aims to: holistically appraise the strengths and weaknesses of an existing system; deduce opportunities and risks present in different solutions; consider the resources required to complete the project; and conclude the best course of action or likelihood of success.

Green Book – supplementary guidance on the valuation of energy use and greenhouse gas emissions is used to quantify proposals that impact direct and indirect carbon emissions. The guidance includes data tables that model carbon emissions by fuel source out into and beyond the 2050s. The guidance can be [found here on the government website](#).

Heat demand – The quantity of heat needed to maintain the desired internal temperature of a building during the external variable temperatures in a year.

Heat loss calculation - Heat loss of an area is determined by the U value (rate of the heat transfer of the material) and the difference in temperature inside and outside of the area. By conducting a heat loss calculation, you can determine the overall heating demand for the building, the required temperatures and correctly size your low carbon heating system accordingly. This assessment requires knowledge of the building size, fabric condition and internal/external temperatures.

Indirect carbon - Carbon emissions from power generated off site by another organisation. For the vast majority of public sector organisations this will primarily be carbon emissions arising from grid electricity use. (Previously referred as traded carbon.)

Kilowatt hour (kWh) - A unit of energy equal to one kilowatt (kW) of power sustained for one hour. This is the standard unit for measuring energy usage.

Local network demands – The increased pressure placed on a DNO by the added electrical loading of appliances, such as, heat pumps and solar PV units.

Low Carbon heating - A heating system which emits little or no carbon to provide the heating. Electric heat pumps are considered to be low carbon heating, and whilst there can be carbon emissions associated with the electricity used to power them, these emissions will reduce over time to zero as the power grid decarbonises. This includes the following measures: Air source heat pump, water source heat pump, ground source heat pump, electric heating and connect to existing district heating.

M&E engineer – Mechanical and electrical systems engineers can also be referred to as building services engineers. They are responsible for the heating, water, electrical and telecoms systems inside a building. These engineers are typically involved in the design and installation of building systems or oversee their maintenance and operation.

Net zero – A target to achieve a state in which the activities of an organisation result in no net impact on the climate from the release of greenhouse gas emissions. This is achieved by reducing greenhouse gas emissions, in line with 1.5°C pathways or time-based targets, and by balancing the impact of any remaining greenhouse gas emissions with an appropriate amount of carbon sequestration.

Scope of emissions (1, 2 & 3) - Greenhouse gas emissions are categorised into three groups or 'Scopes'. Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers the indirect emissions of an organisation from the generation of purchased electricity, steam or heating and cooling. Scope 3 includes all other indirect emissions that occur in a company's value chain, for example, purchased goods or services, travel and waste disposal. Useful information can be found at this link: [Greenhouse conversion factor 2021](#)

Temporary heat generation – A heat source that is used when the primary heat supply is unavailable. The most common are electric heaters or electric radiators and are used during the replacement or maintenance of the primary heat source.

U Value – A unit to measure the rate of transfer of heat through a material (watts per square metre-kelvin), typically through the fabric of a building (e.g. roof, walls and windows). A lower U-value indicates the slower rate of heat transfer across a material.

Wet system – In this system, the heating medium used to reach the desired internal temperature of a building is a liquid and in most cases water. The heating medium is distributed via a pipe network and heat is emitted through radiators or under floor heating. The heating medium then flows back to the heat source.

'Whole building' approach – Taking a system-based approach is to consider the demands and interactions between different elements of a building in the context of a site or campus. A 'whole building' approach is where all of the factors that contribute to a building's energy consumption are considered together to identify the most cost-effective way to achieve the objective. For example, investment in improving the insulation levels of the building fabric will reduce the overall size of low carbon heating plant required, as well as save on fuel bills. Also, investment in reducing the peak electricity consumption, such as through installation of LED lighting, can reduce the need to upgrade a building's electrical infrastructure to accommodate the installation of a heat pump.