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Phase 3 Public Sector Low Carbon Skills Fund (LCSF)

Guidance on the preparation of heat decarbonisation plans

May 2022

Guidance on the preparation of heat decarbonisation plans

This guide is to support all eligible public sector organisations wishing to upgrade, improve or create their first heat decarbonisation plan through Phase 3 of the Public Sector Low Carbon Skills Fund (Phase 3 LCSF).

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Purpose of this guide

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Purpose of this guide

The Department for Business, Energy and Industrial Strategy (BEIS) working in partnership with Salix Finance has launched the Phase 3 Public Sector Low Carbon Skills Fund (Phase 3 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 wishing to upgrade, improve or create their first heat decarbonisation plan through Phase 3 LCSF.

Purpose of a heat decarbonisation plan

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Purpose of a heat decarbonisation plan

In 2019, the UK Government set out one of the world's most ambitious carbon emissions targets: to achieve net zero greenhouse gas emissions across the whole UK by 2050.

To meet our Net Zero goal, we urgently need to address the carbon emissions produced in heating our public buildings.

We use energy for heating and cooling, lighting, hot water, and other energy-using products. And while the electricity that powers our lighting and appliances is decarbonising fast, the majority of buildings still rely on burning fossil fuels for heating, hot water and catering.

There are around 30 million buildings in the UK which in total are responsible for around 30% of our national emissions. The vast majority of these emissions result from heating: 75% of buildings emissions and about 22% of all UK emissions.

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 systems 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, taking a 'whole building approach' to decarbonisation.

It is also recognised that the plans need to be approached in a way that supports the type of estate an organisation operates. Estate and property portfolios can range from one building to multiple buildings, to campus style activities, or a combination of the above.

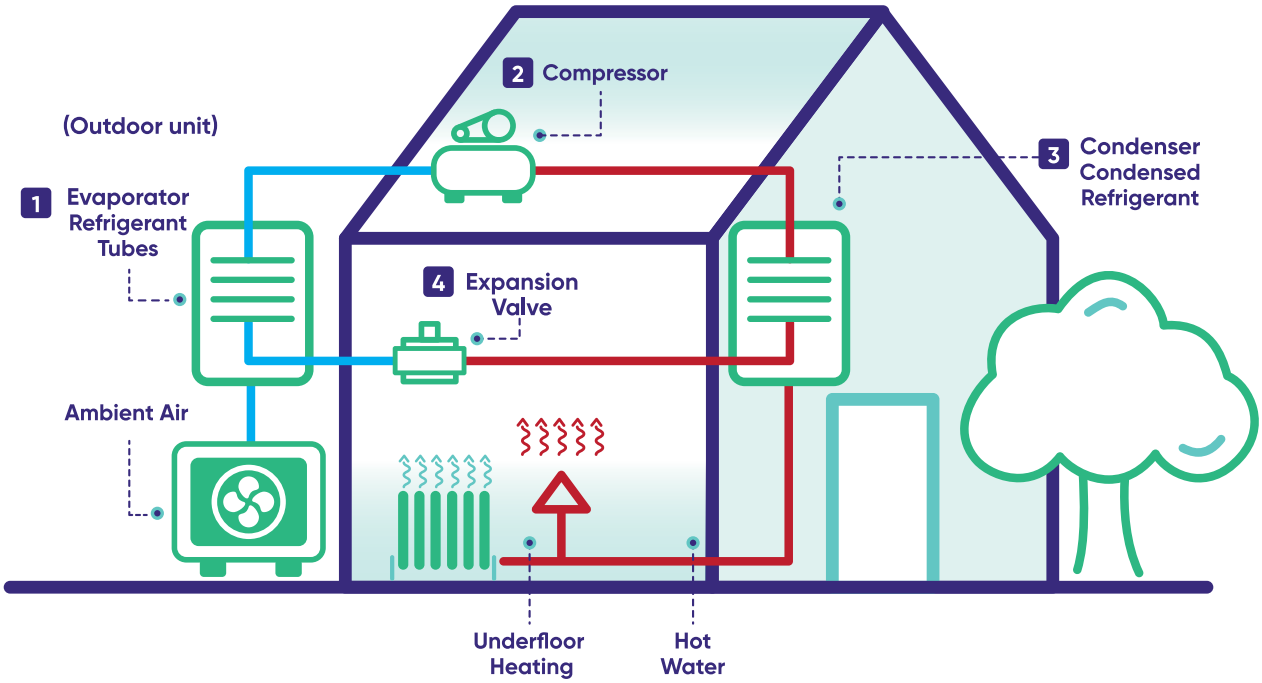
To meet the challenge of net zero, organisations throughout the UK need to decarbonise their buildings.

An example of a heat decarbonisation project could include the replacement of gas boilers with air source (ASHP) or ground source (GSHP) heat pumps.

Heat pump technology provides heat to a building by extracting energy from outside air or the heat stored in the ground (even when the outside temperature is low) and transferring the extracted heat to internal building spaces through a specific thermodynamic process (movement of heat between different mediums) that uses electricity to operate.

Electricity from UK national grid is becoming less carbon intensive (greener) and utilising renewable energy such as wind or solar power is contributing far more to the energy produced to support these technologies, therefore enabling heat pumps to become a very low-carbon solution in providing heating and hot water to buildings.

Air Source Heat Pumps / Heating cycle



With the diversity of estates in mind a heat decarbonisation plan should describe the current state of an organisation's energy use and utilisation, where the energy is derived from, and the organisation's plans for reducing and/or decarbonising its energy use.

The plan should outline what an organisation has already achieved, what it is currently doing to support and deliver decarbonisation, and what needs to be planned for the future.

It is expected that a plan will lay out the current thinking and vision of how decarbonisation will be achieved. The plan should reflect the organisation's level of knowledge, an understanding of the technical solutions that are needed to decarbonise, the associated budget costs or estimates, as well as how and when over a timeline initiatives could be delivered.

It is expected that an outline plan will provide information at a very high level, and could incorporate feasibility studies as the next step, or be more mature, with the detail covering implementation of measures as the next step.

A decarbonisation plan is a live document and should be updated regularly to reflect the current status and to track progress towards decarbonisation and/or a net zero strategy.

We know that not all public sector organisations have an existing heat decarbonisation plan, so Salix has created this guide on heat decarbonisation plans, to enable you to get started or to engage specialists to help prepare the plan.

Purpose of the Phase 3 Public Sector Low Carbon Skills Fund

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Purpose of the Phase 3 Public Sector Low Carbon Skills Fund

Phase 3 LCSF enables public sector organisations to access grant funding to help them produce a heat decarbonisation plan.

If you do not have either the resources or the skilled personnel needed to complete a heat decarbonisation plan, you can apply for funding to either produce an entire plan or expand an existing plan.

For a list of the organisations eligible to apply, please visit 'who can apply?' section on the Salix Finance website.

Public sector organisations can use this funding to produce a heat decarbonisation plan, which may include the following outputs:

- Heat decarbonisation strategy
- Feasibility studies
- Investment Grade Proposals (IGP)
- Desktop analysis
- Building audit or site surveys
- Specialist technical site surveys
- Detailed design of heat decarbonisation measures.

The information collected to produce the heat decarbonisation plan and other outputs listed above will support your organisation to move towards the next step and apply for a capital project utilising Phase 3 Public Sector Decarbonisation Scheme (Phase 3 PSDS), or other available capital funding, should you desire to do so.

The Public Sector Decarbonisation Scheme supports the aim of reducing emissions from public sector buildings by 75%, compared to 2017 levels, by 2037. Phase 3 PSDS provides £1.425 billion over the financial years 2022/23 to 2024/25, with £475 million to be spent each financial year on heat decarbonisation and energy efficiency measures.

Multiple application windows may be made available during this period, in which public sector organisations are able to apply for Phase 3 PSDS funding. Scheme guidance and application criteria is subject to change throughout Phase 3 PSDS and funding will only be available for measures that meet the application criteria, relevant to the application window to which they are applying.

For more information about Phase 3 of the Public Sector Decarbonisation Scheme, please see the Salix Finance website.

Phase 3 LCSF enables public sector organisations to access grant funding to help them produce a heat decarbonisation plan.

Guidance on writing a heat decarbonisation plan

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Guidance on writing a heat decarbonisation plan

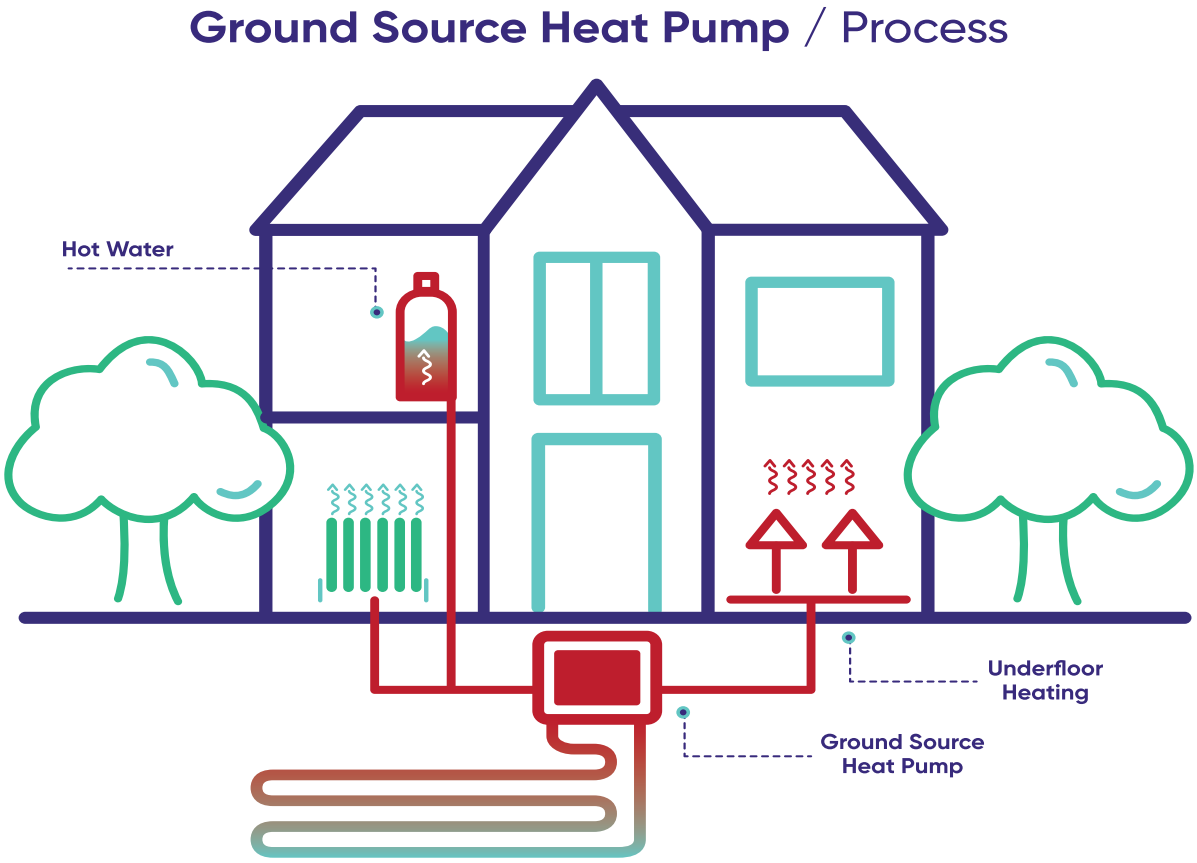
It is useful to set out the purpose of your heat decarbonisation plan, and why are you proposing it. How is this plan going to contribute to the goals of your organisation and the UK?

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.

It would therefore be reasonable to think that this plan will be endorsed and signed off by an accountable officer (e.g., the authorising official for the grant) in the organisation.

It is also useful to set out your overall vision of how net zero is going to be achieved. This should be described in a whole system context (whole building approach), taking into account the interactions between the different elements of a building.



It should reflect on the benefit of improving building fabric, requiring a lower cost heat solution, and enabling a low-carbon heating system to be installed that is sized for a reduced heat demand.

It needs to recognise that changing your heat load to an electric source will increase the local network demands, and that there could be some local constraints that could be managed by the implementation of other measures.

It should recognise where you are on the journey – just beginning or getting ready for delivery and think about what the next steps are, and how you are going to achieve them with budget costs.

It may well be that you don't intend to complete all the elements through one project or with one contractor, so should also provide an explanation of how it is going to be delivered, so that the delivery of, individual projects as well as the whole programme can be understood.

These plans will support your organisation to access future funding pots for decarbonisations and benefit from a range of heat decarbonisation and energy efficiency measures

a. 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 buildings.

The following checklist provides as outline of what should be included as a minimum in the Executive Summary.

Summary description of heat decarbonisation measures undertaken	✓
Number of buildings involved in surveys and plan	
Issues within buildings: listed or heritage, in conservation area	
Average age of buildings in years	
Existing technologies and summary of condition, heat / light systems and insulation on site	
Current energy usage and total base line carbon emissions from buildings	

Proposed technologies / systems to be implemented	✓
Ideal technologies and measures to be implemented at site to decarbonise the building	
Carbon savings achieved	
Indicative cost of equipment / materials to be potentially installed at the building at today's prices	
Time-scales to implement plan	

b. Introduction

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

This includes what the organisation's estate looks like and setting out a summary of what is included within the scope of this heat 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, and also existing systems, with their age and performance.

You should include your energy consumption and costs, your emissions, what you have already done, its impact and where you currently are in the decarbonisation journey. This will enable you to set a baseline to measure future interventions against.

You should also look at what that will look like in the future, what with any other plans (e.g., new buildings/disposals) will your energy consumption, emissions and energy costs look like? That way you will be able to track how you are doing against it.

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

Are you just starting or has your organisation already undertaken a lot of work to decarbonise its buildings?

A local authority will have schools in its area, do these schools or other individual organisations have heat decarbonisation plans?

A local authority will have many non-domestic properties that would benefit from having a heat decarbonisation plan of their own. It is worth considering that the decarbonisation of heat is one of the later steps in the journey and any plan must include reducing 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.

c. Buildings

A section in your heat decarbonisation plan needs to be about your buildings. This section aims to provide background information on your organisation's existing non-domestic buildings and to provide background on the condition and energy consumption of these buildings:

Portfolio	✓
How many buildings are included as part of 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 (m2)?	
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?	

d. Energy consumption and carbon emissions

You should provide a section on your current energy consumption which allows you to reflect on what your current energy consumption is, the level of the quality of the data, how you collect it and could do so in the future to track change.

You should also think about what that looks like in terms of carbon emissions and do a forward 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/m2), including floor area of the buildings?	
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)?	

e. Heating and hot water systems

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

What is the age and condition of the heating systems? How are they controlled and how should they be controlled?

Current state of your building's heating and hot water systems	✓
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?	
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 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?	
If it is a heat network what is the source of the heat?	

Current state of your building's heating and hot water systems	✓
What is the current seasonal efficiency of your system?	
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?	

A section in your heat decarbonisation plan needs to be about the current state of your buildings heating and hot water systems.

f. Determining the whole solution

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

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	

Dependent upon 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 ideas. 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 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?	

g. 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.

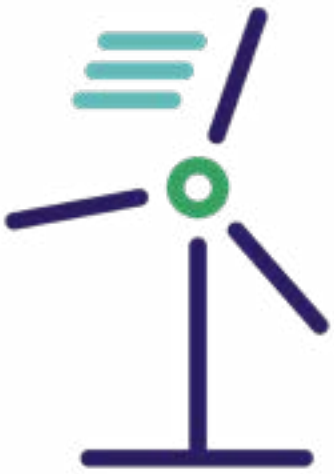
Have any energy efficiency works been completed in the buildings previously? If so what and did they deliver?

Are there more projects that are planned?

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?



h. Heating networks and opportunities on site

This section aims to understand whether you have any local heat resources 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.

If this is the case, a short-term delay in order to wait for a heat network to be available to the organisation is an important consideration. Large public sector buildings or campuses with a high heat demand can provide a baseload for a district heating network which will have benefits for the wider community.

This section aims to understand whether you have any local heat resources available that could facilitate the transition to low carbon heat.	✓
Are there any existing or planned heat network developments located close to the sites that your buildings could connect to?	
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	

i. 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 DNO 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)?	

j. 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.

As a check you should ask yourself these questions?	✓
Have you 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.	
You 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.

k. Delivery plan

You will need to think about how you are going to deliver the work the plan will recommend. You might wish to consider how you are going to get the plan through internal sign off and deliver it with consultants or contracts.

How will you deliver the work?	✓
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 is it going to cost? (See estimating cost)	
How are you going to commission the work/what procurement route?	
How long will it take?	
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:	✓
What the overall budget costs and benefits are expected to be?	
What will the time-line for delivery will be?	
What project could be complete in one year and what projects will require multi-year time-line?	
What the delivery model is likely to look like?	
How it is going to be managed (linked to resource)	

I. 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 section delivery for more details) it is essential to make sure that there is enough resource to be able to coordinate it.

Things you would need to know in advance of considering resources are:	✓
How many projects you plan to undertake across the portfolio?	
Over what time period?	
What the delivery route would be (who would undertake what roles and what would you outsource and what would remain within the organisation)	
What is the governance for the investment and delivery?	

With those in mind then 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 plan? Would they be the same person? Would they have time to do everything?	
Are the individuals overseeing any project 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 this require additional human resource?	
Will it require additional financial resources?	
What is the resource plan which would support delivery?	

m. 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	
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	
Floor plans	
Images of the systems and building fabric	
Heating system/building fabric condition reports	
Heating and electrical schematics and data sheet	
Heat loss calculation for the buildings	

n. Plans for the site

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)?	
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?	

o. 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/on-site risks?	

Information about the Phase 3 Public Sector Low Carbon Skills Funds

5

Dates for submissions of the heat decarbonisation plan

Heat decarbonisation plans which have been funded by the Phase 3 Low Carbon Skills Fund must be completed by the **31 March 2023.**

Completed heat decarbonisation plans should be submitted to Phase3LCSFgrants@salixfinance.co.uk

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

All applicants awarded funding must complete their heat decarbonisation plans before Friday 31 March 2023.

Heat decarbonisation plan supplementary building information tool

The heat decarbonisation plan supplementary building information tool is an excel file that can be downloaded from here.

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 an essential part of the application and must be uploaded within the application, when prompted. 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.

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.

The supplementary building information tool is an essential part of the application and must be uploaded within the application, when prompted. Therefore, it is vital to complete this tool before you are ready to apply.

Heat decarbonisation plan examples

We have provided example heat decarbonisation plans, produced in Phase 2 LCSF, covering a range of organisation, including a school, NHS trust, Local Authority and a museum.

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.

For this reason, we recommend referring to the heat decarbonisation plan guidance alongside the examples provided.

Collingtree Church of England Primary School - heat decarbonisation plan example

Kingston NHS Foundation Trust - heat decarbonisation plan example

London Borough of Hounslow - heat decarbonisation plan example

Science Museum Group - heat decarbonisation plan example

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 Phase3LCSFgrants@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 website.

Contact us

In order that we can support you as quickly as possible, we kindly request that any enquiries are sent by email in the first instance and we will be in touch with you as soon as possible.

Phase 3 Public Sector Low Carbon Skills Fund Enquiries
For further information, support or guidance relating to the Phase 3 Low Carbon Skills Fund, please contact the dedicated team at Phase3LCSFgrants@salixfinance.co.uk

Website Enquiries
For support or guidance on website issues please contact communications@salixfinance.co.uk

Media and Communication Enquiries
For any media and communication enquiries, please contact communications@salixfinance.co.uk

Glossary of Terms

6

Glossary of terms

Term (Abbreviation)	Description
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	It is where heating for several buildings in a local area is provided from an external plant room (energy centres). The heating is typically transmitted to each building via a network of highly insulated underground hot water or steam pipes. It is also known as heat networks. The heat is often obtained from a cogeneration plant burning fossil fuels or biomass, heat-only generation, geothermal heating, heat pumps and central solar heating are also used, as well as heat from waste energy plant and heat waste from nuclear power electricity generation. The energy centre gives flexibility to change the heat generation technology as future innovation allows.
Distribution Network Operator (DNO)	Electricity grid operator, there are fourteen across the UK.
Direct Carbon	It means 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 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.)
Indirect Carbon	It means 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.)

Electrical Loading	Is 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 transfer is the transfer of heat energy due to a difference in temperature across two points. A heat loss calculation allows for the assessment of the heat flow in a building and the overall heat demand needed to meet the desired room temperature. This assessment requires knowledge of the building size, fabric condition and internal/external temperatures.
Indirect Carbon	It means 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	Is 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	It is one where little or no carbon is emitted 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 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	Is 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	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 System Context	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.
'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. 'Whole building' approach - It is where all 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.

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