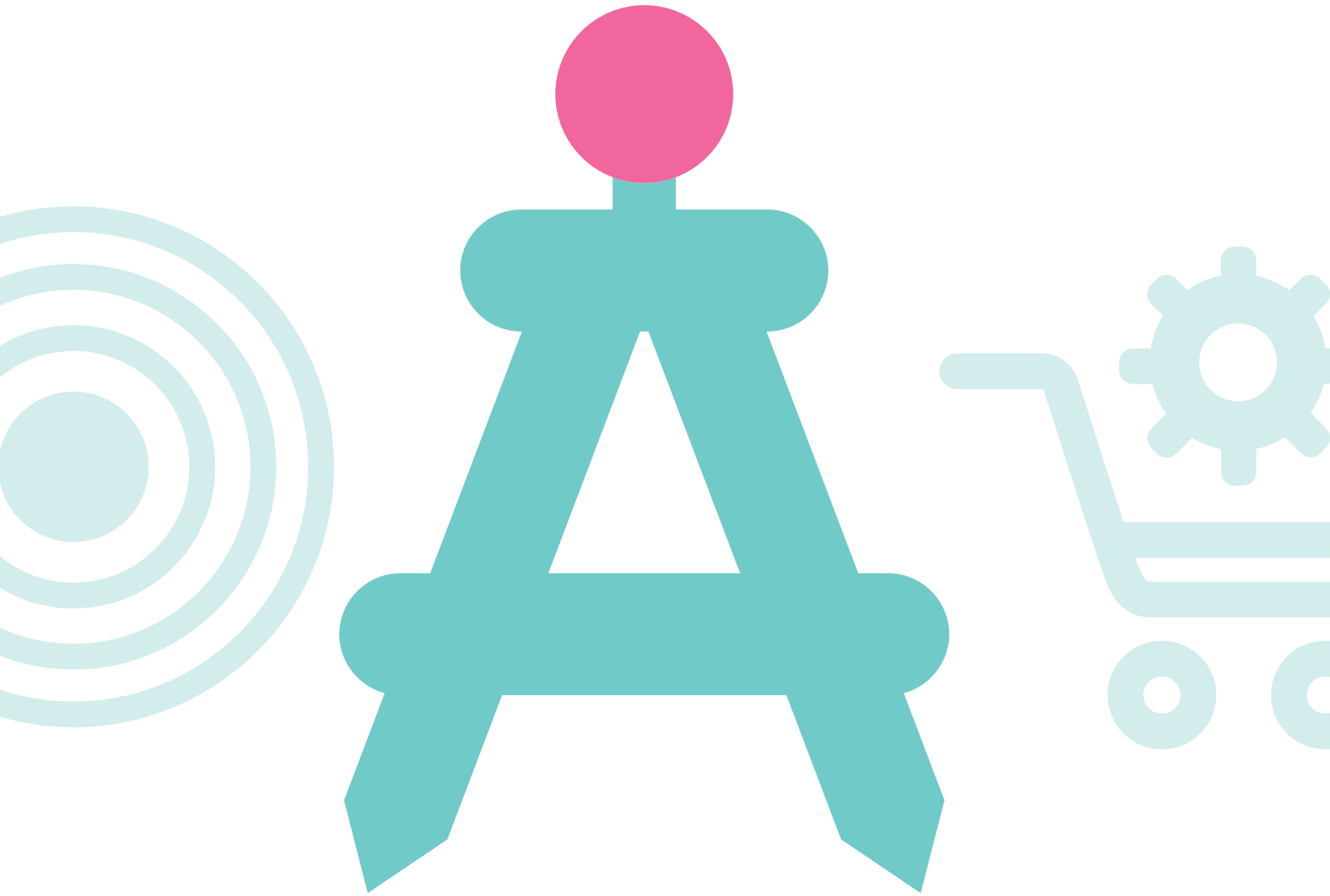
Department for Energy Security & Net Zero

Cabinet Office

Government Property Function

CATAPULT Energy Systems

Theme 2 - Feasibility and design



Public Sector Decarbonisation Guidance

Disclaimer:

Contents

What is the purpose of this guide?

As part of a programme funded by The Department for Energy Security and Net Zero (DESNZ) and working with the Government Property Function (GPF), Energy Systems Catapult (ESC) has produced guidance to support the public sector to decarbonise their built estate.

These guides cover seven themes and give an overview of all the activities required to successfully develop and deliver a decarbonisation programme. They are designed to be used as a set, but also stand alone as a guide to each theme area. It should be noted that decarbonisation is not a linear process, and all themes will be relevant as you progress your strategy and implementation.

The table below sets out the seven themes, with a summary. This is the Theme 2 guide, covering feasibility and design.

As part of your strategy development, covered in the Theme 1 guide, you should have a clear picture of your estate, emissions and the prioritised projects you wish to take forward. This guide covers the development and design of a project to a point where it becomes investible, including by receiving funding from the **Low Carbon Skills Fund (LCSF)** or the **Public Sector Decarbonisation Scheme (PSDS)**.

Each of the seven guides will also signpost to:

- Other guides, tools and templates developed by ESC
- Useful external resources

We welcome your feedback on these resources, please email ESC at PSDecarbGuidance@es.catapult.org.uk

1

Developing and delivering your strategy

Setting an organisational strategy to decarbonise heating. Gaining decision maker and stakeholder buy-in. Setting emissions reduction targets. Selecting projects and planning delivery, developing project briefs.

2

Feasibility and design

Developing a detailed feasibility study for one or a suite of investible decarbonisation measures. Securing budgets and determining project timescales.

3

Procurement

Running a procurement process and ensuring value for money is achieved through a competitive process. Accessing framework agreements and designing contracts.

4

Funding

Securing external or internal funding for at scale decarbonisation projects. Writing robust business cases.

5

Installation

Project management of installation and implementation of a decarbonisation project. Monitoring progress against a programme of works and implementing quality assurance processes.

6

Commissioning and handover

Handing over a completed decarbonisation project including staff training, correct setup and commissioning of equipment and ensuring all handover documentation is in place.

7

Monitoring and evaluation

Understanding the benefits being delivered by an energy efficiency and/or decarbonisation measure through metering and analysis. Ensuring benefits are reported.

What are the Public Sector Decarbonisation Scheme and the Low Carbon Skills Fund?

These are grants for the public sector funded by DESNZ and distributed by Salix Finance (Salix).

Public Sector Decarbonisation Scheme

The Public Sector Decarbonisation Scheme (PSDS) supports the aim of reducing emissions from public sector buildings by 75% by 2037, compared to a 2017 baseline, as set out in the 2021 Net Zero and Heat and Buildings strategies.

PSDS provides grants for public sector bodies to fund heat decarbonisation and energy efficiency measures. The scheme is designed to help upgrade heating systems in public buildings, to ones powered by cleaner, cheaper and renewable energy.

Phase 3 of the Public Sector Decarbonisation Scheme will provide £1.425 billion of grant funding over the financial years 2022-2023 to 2024-2025, through multiple application windows.

If you have any further questions, please contact Salix's dedicated support team at info@salixfinance.co.uk

Low Carbon Skills Fund

The Low Carbon Skills Fund (LCSF) was launched alongside the first phase of the PSDS in 2021 to provide complementary funding, by providing grants to public sector organisations so that they could access the specialist skills and expertise needed to identify and develop heat decarbonisation projects.

To date it has operated through annual funding cycles, with a new phase launched each financial year. The most recent phases have provided grant funding for public sector organisations to develop heat decarbonisation plans.

For the latest information on the LCSF you should visit the Salix website.

What types of studies might be undertaken within design and feasibility?

Within this suite of guidance we refer to ‘studies’ when we are talking about feasibility and design, with ‘projects’ meaning the installation of actual decarbonisation measures on a site. Sometimes other guidance uses ‘feasibility and design project’ as terminology instead, so you might encounter slightly different language depending on who produced the guidance.

Progressing a study to the point where it becomes an investable project may require a number of different studies to be completed. All of which are equally valid and fit specific purposes. The study types in the table below are the same as those listed in the LCSF scheme criteria.

Type of study	What is it?	Why would you choose it?
1. Desktop analysis	This is where analysis is carried out of the energy consumption of a building or series of buildings. It could include benchmarking of the estate against itself, or against published best practice benchmarks, for example CIBSE and the Building Energy Efficiency Survey (BEES). ESC also has benchmarks based on the Modern Energy Partners work.	This should be part of a heat decarbonisation strategy which is developed for a whole estate and used to help select buildings or assets to be taken forward for decarbonisation.
2. Building audit or site survey	This is where a building or buildings are surveyed for energy efficiency opportunities. It requires access to all parts of the building and focuses on how energy efficiency can be improved.	This provides a good understanding of operational improvements that can be made to a building to reduce energy use. It can also indicate other technical solutions that might be feasible such as heating system replacements or renewables. It could feed into a more detailed feasibility study looking at a particular subject matter, or a detailed design study.
3. Specialist technical site survey	A specialist survey provides support for investigating specific areas, for example building fabric improvements.	This can be used to develop a more detailed understanding of a particular element of the building or site which will help to confirm what the solution will be. Expanding on the building fabric example, a survey could be delivered using thermographic images and show where cold bridging or lack of insulation is allowing excess heat to be emitted. Then the solution can be developed to mitigate or resolve those issues.
4.Feasibility studies	A study that looks at how feasible a series of intervention options are. It typically highlights the most feasible options and their benefits. For example it could look at the different types of renewable energy suitable for a site, it could include multi generation technologies and also consider different locations or sizes of installation.	This type of activity helps when a problem is known, and a solution is sought from a long list of options. It enables all solutions to be considered and then one or more to be selected based on agreed criteria.
5. Detailed design	Detailed design is where a technical solution is designed, with detailed drawings and a specification being produced.	This would be chosen when a solution has been selected through a feasibility study and will provide high levels of detail and accuracy on the project costs. To give clarity on the differences between detailed design and IGPs see the table below.
6. Investment grade proposals (IGP)	IGPs are similar to detailed designs, however they focus on the technicalities of delivering the project and providing an accurately costed solution.	This might be used when engaging with an end-to-end provider or an installer who is providing a quote. To give clarity on the differences between detailed design and IGPs see the table below.

What is the difference between detailed design and an IGP?

	Detailed design	IGP
Who	Typically, a design engineer house of differing discipline.	Typically, a contractor who is putting together plans and a quote for the installation of a technology/technologies.
Advantages	Independent and unbiased proposals with detailed design drawings which will help optimised the solution.	Seamless from concept to delivery. Costs should be fixed for the installation.
Disadvantages	Can take longer for the project to be delivered as two different organisations may be involved and be procured. Costs after detailed design may still change when works tendered	Lack of alignment between the selected solutions. Potential for each technology solution to be developed independently by each technology provider rather than as a designed whole system. For example a lighting system developed by a lighting contractor, renewable by a renewable contractor and heating by heating contractor.
Outcome	Design drawings and specification which can be used for tendering to get a detailed quote for installation by another contractor. A budget estimate should also be included.	Typically, a costed quote for the delivering of the tasks by a contractor, who, with approval, will carry out the work.

Which one would you choose and why?

A detailed design will provide an independent unbiased solution not aligned to an installation type, it will enable the solution to be designed to match the needs of the site, and then acquire a provider who is familiar with the chosen installation solution. This may take longer but it will provide a more detailed and crucially an independent project specification, with independently assessed costs and benefits assessments. Should work be paused at the design stage for any reason, it contains all of the information necessary for the project delivery phase to be restarted.

An investment grade proposal is often offered by an installer, as part of an end-to-end solution. This means that your choice of the solution provider will often dictate the solution that is then installed. This may limit the solution selected and mean that you receive a more standard product offer, however it can be delivered over potentially a shorter timeline. The time saving is often through the reduction of a second procurement process, but it also means that there isn't a competitive tender point after the final solution is developed to check actual costs. The costs or budgets are often set before the final solution is known.

The following table provides links to useful resources when developing your design and feasibility study:

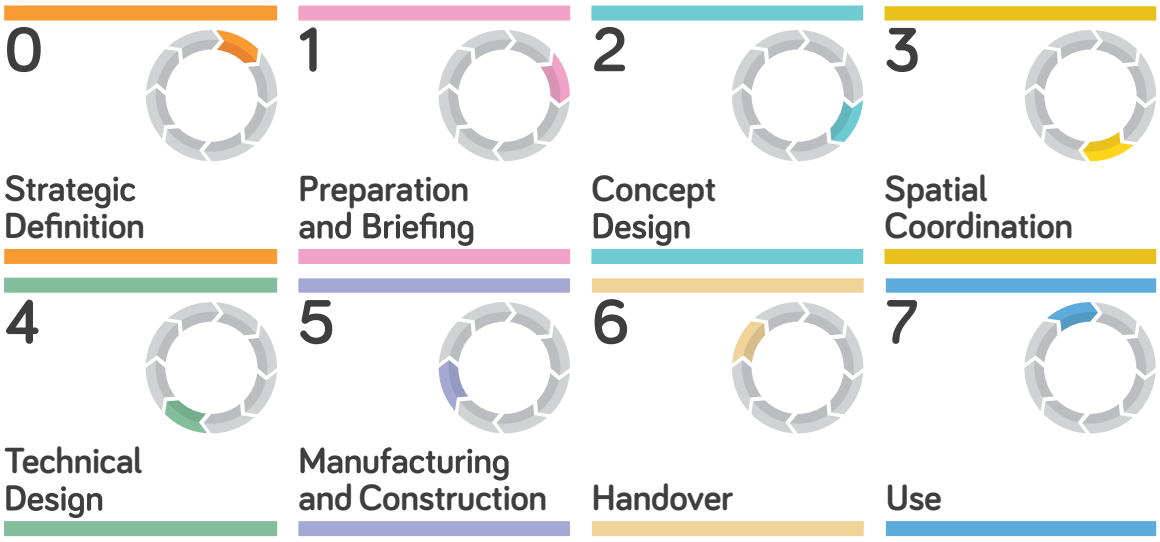
Resource	What does it provide you with?
Theme 1 – Developing and delivering your strategy	How to put together your decarbonisation strategy, including initial prioritisation of areas to undertake feasibility and design work.
Theme 3 - Procurement	How to select a procurement route or way to deliver the study or consider if by expanding the internal team that some of this activity could be delivered in house with the right skills and training.
The Construction Wiki	A number of professional bodies have come together to provide a "Construction Wiki" which gives a good understanding of what could be included in different stages.

How do design and feasibility studies fit with the RIBA stages?

The RIBA process is an industry known process which covers the eight stages applied to a construction project (from a refurbishment to a build). These steps cover the flow of activities that might be undertaken. It should be noted that often these steps (to differing degrees) would be undertaken by a range of different people.

This guide covers elements which ought to be considered within a decarbonisation project across 0 - Strategic Definition, to 4 - Technical Design.

It should be noted that under the RIBA process Strategic Definition is considered the definition of a project, whereas within our seven Public Sector Decarbonisation Guidance documents, the Strategic Definition, Briefing and Planning is about the development of an overall decarbonisation strategy and programme for an organisation.



Source: The RIBA Plan of Work

Under each of these RIBA stages there are expected activities or tasks which should be considered. They comprehensively cover all the activities from health and safety to fire safety.

Resource	What does it provide you with?
RIBA Plan of Work	The RIBA Plan of Work organises the process of briefing, designing, constructing and operating building projects into eight stages and explains the stage outcomes, core tasks and information exchanges required at each stage. Guidance in the Plan of Work is based on nearly seven years of industry feedback.

What does my organisation need to be ready for a PSDS application?

Each of these design and feasibility projects provide a different output and can either lead onto a PSDS application or onto another type of project. There isn't one predefined pathway which should be adopted, you will need to select based on your particular circumstances.

Type of project	Typical output	Accuracy of budget costs	Ready for PSDS application	Rationale and next steps to get ready for PSDS
1.Desktop analysis	Based on energy data and benchmarking, and an understanding of where the energy hot spots are.	Against industry benchmarks or previous estimates	Unlikely	You now have a good understanding of the energy consumption and where it can be improved but need to scope out what the project could look like. Next step would be any one of the 5 other feasibility or design projects.
2. Building audit or site survey	Simple recommendations based on energy data and observations, with energy carbon and cost reduction estimates.	Against industry benchmarks or previous estimates tailored to building use	Less likely	You have some energy efficiency measure recommendations and Next step to develop them into 3. Specialist technical site survey, 5. Detailed designs or 6. Investment grade proposals
3. Specialist technical site survey	Recommendations for specific activities based on energy data and observations, with energy carbon and cost reduction estimates.	Estimates, which can have varying accuracy dependent upon who has done the survey for you.	Potentially	You have recommendations for a specific technical area which can be taken forward to PSDS or can be fed in to support a wider design under 4 or 5. Or get a quote under 6.
4. Feasibility studies	Recommended solution options, with energy carbon and cost reduction estimates.	Estimates, which can have varying accuracy dependent upon the level of detail the study has been completed to.	Potentially	You have carried out a feasibility study and have recommendations on what you need to take forward. Dependent on the level of detail of outputs and quotes you may be able to directly apply for PSDS. However, if the outputs are higher level you might need installer quotes or to complete 5 or 6 before applying.
5.Detailed design	Technical detailed design drawings and specification, with confirmed energy carbon cost reductions.	Estimates from detailed designers and cost consultants	Yes	You have installation ready designs and a relatively good estimate. You need to tender for the work before you can install.
6. Investment grade proposals	Technical detailed design drawings and quote, with confirmed energy carbon cost reductions.	Installer quotes	Yes	You have installation ready plans for your project and should be ready to go.

Progressing your feasibility and design studies

Actions

The following actions will help you progress your studies.

1: Action – Establish if your organisation can do the work

Depending on the skills and capacity within your organisation, individuals and/or teams may be able to deliver the studies or parts of them, with the exception of Investment grade proposals.

Irrelevant of the type of study being commissioned, having as much information available at the start to support the activity will speed up the process.

What skills would be required?

The following table will help you consider the skills needed to deliver the different studies. You can then consider what could be done internally, or what type of organisation you could procure to deliver or support the work.

Type of activity	Typical skills
1. Desktop analysis	Someone with good analytical skills, an understanding of energy consumption and decarbonisation is also useful. This could be driven by someone with CIBSE, Energy Institute, Energy Managers Association or IEMA training or be a member of another professional body.
2. Building audit or site survey	Someone with a good understanding of buildings and energy efficiency opportunities, for example an accredited Energy Savings Opportunity Scheme (ESOS) lead assessor. The register of professional bodies who approve lead assessors can be found here.
3. Specialist technical site survey	Someone who has the same qualification as 2, or someone who has experience in a specific technical area, such as building fabric or heating. Their qualifications may be from a professional body, or they may not have any qualifications but will have specialised in that area for many years.

Actions

4. Feasibility studies	They may have CIBSE, or other training linked to the technical subject matter. They should have knowledge and experience from doing similar studies. They may have and operate energy simulation software so they can develop scenarios and adapt them dependent upon combinations of solutions.
5. Detailed design	They may have CIBSE, or other training linked to the technical subject matter. They should have experience of doing similar detailed designs and be able to reflect on similar examples of projects where solutions have been put together and energy, carbon and cost estimates made.
6. Investment grade proposals	The team may include a surveyor (RICS) or cost consultant who has experience of putting together whole solutions or be someone with similar qualifications to those delivering 3, 4 or 5.

The following table provides links to useful resources around skills:

Resource	What does it provide you with?
Theme 3 guide - Procurement	Theme 3 contains more information on procurement including the skills that you will need to successfully deliver your procurements.
Skills and capabilities guide	This guide covers the skills and capabilities that might be required for each of the activities you and your team need to undertake to deliver a decarbonisation programme, including a short section on procurement.
Relevant Professional Bodies	Association of Energy Engineers CIBSE Energy Institute Energy Managers Association Institute of Engineering and Technology Institute of Environmental Management and Assessment
DESNZ/ESOS	DESNZ has a register of ESOS approved lead assessor bodies. Each of those bodies have a register of Lead Assessors. The register of professional bodies who approve lead assessors can be found here.

2: Action – Consider the budget and timeframe for any study

Actions

The cost of a study is likely to depend on the type of work that is being undertaken, and the size of the building or asset that it is being considered. As a rule of thumb the cost will relate to the size of the estate being reviewed and the level of detail of the study. Therefore working through the different activities, the price is likely to increase from Desktop analysis to Investment grade proposals.

Before commissioning the work, you should have a maximum budget estimate in mind. You can estimate this budget in a number of ways:

- Building up an estimate from your scope, thinking about how long it would take for someone to do the task, and then applying an average day rate cost
- Taking previous studies that have been tendered or costed and building up a view from them and the type and size of project you are looking to do
- Talking to others in your organisation or similar organisations in the local area who have done similar studies

When assuming a day rate an average rate could vary from between £500 per day to £1200 per day depending on the skills and experience of the individual.

Type of activity	Budgeting	Timelines for delivery
1. Desktop analysis	Very low cost	1-2 weeks if all data is available (data availability is likely to be the main challenge)
2. Building audit or site survey	Medium cost	2-4 weeks dependent on data being available and access to sites arranged
3. Specialist technical site survey	Medium cost	8-10 weeks
4. Feasibility studies	Higher cost	2-3 months
5. Detailed design	Higher cost	3-4 months
6. Investment grade proposals	Higher cost	3-4 months

Some attention ought to also be paid to how the project is being funded and if there are any particular deadlines. Consideration must be given to making sure that you can achieve the project within the timeline. If not then amendments may need to be made to the scope or the way in which it is delivered.

Actions

The following table provides links to useful resources for budget and timescale considerations:

Resource	What does it provide you with?
Understanding your timelines - template and guide	A tool that can help you make a realistic plan for your decarbonisation projects and programme.

3: Action – Specify the requirements of the study clearly

Making sure that the specification is clear will lead to optimum results. A poorly defined scope and requirements which do not give enough detail means that there is potential for the supplier to misinterpret the service or price to cover unknowns, leading to a higher cost.

Considerations:

1. **Are you clear on what you want as an output?**

   a. Being clear on the purpose of the output and what you plan to do with it will help define the level of detail and depth required.
   b. A specific output may require a particular level of skill and knowledge which should be defined to ensure the delivery organisation have and use the right level of expertise.
   c. A technical solution might require consideration both from a functional and operational perspective as well as the type of energy or net zero benefits. It will mean that you will need to cover both in your requirements.

2. **Are you clear about what timeline you would like the work to be delivered by, and when you would like to get updates?**

   a. Providing milestone target dates and a clear description of the deliverables expected at each point is vital.
   b. Be clear at the outset about how you will sign off deliverables.

4: Action - Procure your study

Actions

The studies that you choose to develop at this stage could influence the way in which you deliver your whole decarbonisation programme.

Therefore, before commissioning any of the later studies (Detailed design or Investment grade proposals) it would be worthwhile considering how your whole programme is going to be delivered, what type of contractor you will use and which procurement route you will take e.g.

- When using a facilities manager (FM) or end to end contractor and internal delivery system, there may be a requirement to ensure that the study confirming the potential benefits of the project will be delivered by them. If not, they may not stand by any numbers given or commit to deliver the savings

The following table provides links to useful resources for procurement:

Resource	What does it provide you with?
Theme 3 guide - Procurement	Main guide providing insights into procurement activity.
Understanding procurement event processes	Guidance to help you expand your knowledge of procurement and the procurement process.
Procurement routes and frameworks	Provides context including pros and cons for some of the contracts that are under a type of framework agreement that may be open for use by all public sector bodies.
Sample specifications for technology deployment	This guide helps you include the right information in procurement specifications for particular technologies.

5: Action – Aim to achieve the best result

There are a number of ways to ensure that a feasibility and design study is optimally managed. This is the same if it is being delivered internally or by an external contractor. These include:

Actions

Activity	Further detail	Risk mitigated
Clear and specific instructions for delivery that are detailed in the tender specification	Full description of what is required and what the outputs/outcomes are (important to realise that outcomes and outputs are different) Suggest that approaches are aligned to best practice	Poor quality work or the contractor not delivering what was expected
Having information ready to support a speedy kick off into the project	Information to be provided: Site and asset information Energy consumption data Energy costs	Delays eating into budgets and timescales
Quick responses to questions or queries and of any outputs that are supplied from the contractor or internal team	Set agreed timelines and make sure that they are met	Work is poor quality or not to scope. Work may not be picked up Delays eating into budgets and timescales
Access to sites and introductions to relevant stakeholders	Access to all areas including plantrooms with escorts if required Engagement with key operational stakeholders to make sure you gain an understanding of how energy is managed on a day-to-day basis Allow photos etc.	Poor quality work due to key information not being gathered due to access issues Outputs or outcomes not meeting stakeholder requirements due to a lack of engagemen Delays eating into budgets and timescales
Setting up regular check in calls	Good communications with key stakeholders will help the project remain on track and identify delivery risks	Poor quality work not addressed, scope creep, delays eating into budgets and timescales, risks and issues not appropriately managed

Setting interim milestones and outputs to see work as it progresses	Being able to check the quality of the outputs and ensure that they are structured as required	Failure to identify poor quality work and/or scope creep in time to rectify Delays eating into budgets and timescales
Understanding what the team will deliver compared with what is needed for the next study or funding application		Poor quality funding applications due to missing information, or risk of missing application deadlines as further work needs to be completed Next study being poorer quality as information missing

Actions

6: Action – Make the outputs proceedable, including PSDS ready

It is vital to ensure that the outputs from the study are either fit to feed into a second study, or into a business case and if applicable a PSDS application. For any business case the following is likely to be needed:

- An understanding and description of the proposed project, including:
  - design parameters
  - cost (CAPEX and OPEX) and energy and carbon saving estimates
  - a procurement route or planned delivery route
  - timeline for delivery
  - governance and management of delivery of the contract

For more information on business case writing see the **Theme 4 guide – Funding**, and the **The Green Book: appraisal and evaluation in central government**.

For PSDS, Salix publish extensive guidance. The guidance for Phase 3b can be found **here** but this is likely to be updated for future rounds. The list below in the Box is part of the Phase 3b guidance and gives a flavour of what is likely to be needed for any PSDS application.

Actions

1. Applicants must provide the following information and are using a fossil-fueled heating system:	Energy consumption data for the last three years such as energy bills, Display Energy Certificate (DEC)
	Energy Performance Certificate (EPC) and energy benchmark estimated appropriate to the building type
2. Heating system must be coming to the end of its useful life:	Condition survey and/or forward works plan/ registered engineers report
	Asset Register or Life Cycle Register
	Commissioning test certificate
	Service records recording boiler efficiency
	Photographic evidence
3. Incremental upfront cost of installing a low carbon heat source:	Evidence of costs for the full conventional fossil fuel plant replacement including all associated works.
	Evidence of costs for the new low carbon heating solution
4. Applications must include a measure to contribute to decarbonise the heating with a low carbon heating system:	Supporting calculations which explain the kilowatt hour savings figures provided (e.g., energy saving models, heat loss calculation and heat pump size calculation)
	Technology specifications (e.g., product brochure)
	Design specification (e.g., of flow/return temperatures for the existing fossil fuel heating plant
	O&M manuals and heating system schematic for the existing fossil fuel heating plant
5. Applicants can include energy efficiency measures and other enabling works where they support a whole building approach to decarbonisation:	Energy audit report or feasibility study
	Summary of the process you went through to pick the measures in your application, demonstrating why a chosen approach to decarbonisation is preferable to other options available A whole building approach should combine heat decarbonisation with energy efficiency measures

Actions

6. Evidence that all costs are necessary:	Details of supply and installation costs for each measure and any associated enabling works. Specific consideration may need to be given to the electrical infrastructure and any new additional demands that may be required.
7. Biomass:	Reasonable evidence for Biomass is covered in Section. 4.6.
8. Project management:	Project delivery plan (Gantt chart or similar)
	Risk register

The following table provides links to other resources to help prepare your PSDS application:

Resource	What does it provide you with?
Theme 4 guide – Funding	The Theme 4 guide provides more information on funding and writing business cases.
Business as usual estimator and guide	An estimator that allows input of building, site or portfolio level energy consumption data. It will provide a baseline of energy use over time from which decarbonisation interventions can be assessed. It also allows for known future changes to the site to be captured and incorporated into the future assessments.
Decarbonisation intervention estimator and guide	An **estimator** that provides a range of key decarbonisation options, including heat, renewables and energy efficiency, which can be applied to a building/site/portfolio. This allows for quick assessment of potential benefits of implementing these interventions. This estimator uses the baseline data from the **Business as usual estimator**.
Salix PSDS guidance	This is the Phase 3b Guidance, it is likely to be updated for future phases but gives a good indication of what is required.
Salix PSDS tips and FAQs	Tips and FAQs to help organisations apply for Phase 3b.
The Green Book: appraisal and evaluation in central government	The Green Book is guidance issued by HM Treasury on how to appraise policies, programmes and projects. It also provides guidance on the design and use of monitoring and evaluation before, during and after implementation.

Useful resources for progressing each of the different studies

This section provides signposts to tools and templates developed as part of the Modern Energy Partners programme and which have been shared by others. They are useful either to use directly or to check the quality of the outputs from contractors.

1. Desktop analysis

This is where analysis is carried out of the energy consumption of a building or series of buildings. It could include benchmarking of estate against itself, or against published best practice benchmarks

The following table provides links to useful resources for benchmarking:

Resource	What does it provide you with?
Understanding your energy data	Gives guidance on how to analyse energy data and how to develop carbon predictions.
Business as usual estimator and guide	An estimator that allows input of building, site or portfolio level energy consumption data. It will provide a baseline of energy use over time from which decarbonisation interventions can be assessed. It also allows for known future changes to the site to be captured and incorporated into the future assessments.
Decarbonisation intervention estimator and guide	An **estimator** that provides a range of key decarbonisation options, including heat, renewables and energy efficiency, which can be applied to a building/site/portfolio. This allows for quick assessment of potential benefits of implementing these interventions. This estimator uses the baseline data from the **Business as usual estimator**.
Half-hourly energy consumption benchmarks	These benchmarks have been created for different building use types on campus style sites. They provide a standard set of benchmarks that can be used to split aggregated site energy consumption into a building-by-building profile. Whilst the benchmarks reflect energy use for MOD, MOJ and NHS buildings they are categorised against different activity uses and therefore could be adapted for other purposes or uses.

What could decarbonisation look like for you?	This guide provides information on what an overall decarbonisation solution could look like, what the technologies could be and how they could combine.
Office of Government Property Tools	The OGP has a range of helpful tools available from the Government Property Portal including one called the Net Zero Trajectory tool which enables a cost estimate to be developed based on the size, energy consumption, and type of estate.
CIBSE Energy Benchmarking Tool	CIBSE's Energy Benchmarking Tool is an online platform which uses energy data as it becomes available to provide relevant and reliable benchmarks that represent the current trends of energy use in buildings.

In addition, if you are looking for this type of work to be carried out then you can ask for it to meet the below standards (amongst others).

Standards that the work should meet	Relevance
ISO 50001	The ISO standard provides a way to manage energy. It details some of the approaches that can be adopted to analyse energy.
BS ISO 50005	BS have a similar standard which can be accessed for free.

2. Building audit or site survey

This is where a building or buildings are surveyed for energy efficiency opportunities. It requires access to all parts of the building and focuses on how energy efficiency can be improved. It is likely that some of the tools covered in 1. Desktop analysis will also be necessary.

The following table provides links to useful resources when conducting a building audit or site survey:

Resource	What does it provide you with?
Site surveys and building audits guide	This provides a description of how to carry out a site survey along with a helpful checklist.
Site information gathering template	This template is an example of a ways to collate relevant site data as part of information gathering. It contains all the useful information that could be gathered and has colour coding to show the importance of some information against others, including must have information, information that should be gathered, and information that is a nice to have if available.
Intervention estimators: ○ **Lighting** ○ **BMS** ○ **Building Fabric** ○ **Heating**	These can be used to check recommendations or specified for a consultant to use.
Local DNO capacity guidance	This guide gives directions on how to assess network capacity for your local DNO.
Net Zero Hub guide - Energy audits	This guide is intended to assist anyone wishing to undertake an energy audit of a building or site. It explains the process and rationale for an audit, including what data to gather and how, in order to inform recommendations for energy-saving measures.
Net Zero Hub guide - Grid constraints	This Hub guide is an introduction to assist anyone dealing with a grid constrained site. The guide covers some background to how the network operates, why grid constraint occurs, some potential solutions and what steps you can take.

In addition, if you are looking for this type of work to be carried out then you can ask for it to meet the below standards (amongst others).

Standards that the work should meet	Relevance
Approaches to ESOS audits	This guide is intended to help provide supportive 'best-practice' advice on delivering ESOS compliance. It is seen as useful whilst recognising that the public sector is not captured by the ESOS scheme as the rear sections offer guidance on how to deliver best practice energy audits.
Energy Audits – General Requirements BS EN 16247-1	This standard specifies the requirements, common methodology and deliverables for energy audits It is applicable to all forms of establishments and organisations, as well as all forms of energy and energy uses. This document covers the general requirements common to all energy audits. Specific energy audit requirements complete the general requirements in separate parts dedicated to energy audits for buildings, industrial processes and transport.
Energy audits – Requirements with guidance for use ISO 50002:2014	ISO 50002:2014 specifies the process requirements for carrying out an energy audit in relation to energy performance. It is applicable to all types of establishments and organisations, and all forms of energy and energy use.

3. Specialist technical site survey

A specialist survey provides support for investigating specific areas, for example thermal surveys to establish if there are possible building fabric improvements.

It is possible that some of the templates available in 2. Building audit or site survey are also applicable here.

The following table provides links to useful resources for carrying out a technical site survey:

Resource	What does it provide you with?
Sample specifications for technology deployment	This guide helps you include the right information in procurement specifications for particular technologies.

In addition, it is likely that there will be relevant specific standards. These should be sought out from a relevant organisation or institution such as:

- Standard houses such as BSI or ISO
- Relevant professional or industry bodies
- Research houses who have look at best practice such as BSRIA or BRE

4. Feasibility studies

A study that looks at how feasible a series of intervention options are. It typically highlights the most feasible options and their benefits.

Understanding the energy use as covered in 1. Desktop analysis and 2. Site survey is likely to be important, therefore the templates may be as applicable here as above.

The following table provides links to useful resources when conducting a feasibility study:

Resource	What does it provide you with?
Understanding your energy data	Gives guidance on how to analyse energy data and how to develop carbon predictions.
How to treat technologies and what to ask for	High level information about decarb technologies and how to treat technologies and what to ask for.
Decarbonisation pathway report	An example of the output of decarbonisation planning activity, providing a carbon reduction pathway for a site using visual and quantitative information to enable decarbonisation planning and detailed design activity to commence.
Local DNO capacity guidance	This guide gives directions on how to assess network capacity for your local DNO.
The Green Book: appraisal and evaluation in central government	The Green Book is guidance issued by HM Treasury on how to appraise policies, programmes and projects. It also provides guidance on generating options and long-list appraisal.

A feasibility study is about understanding what is possible, (for example from a technical, economic or commercial perspective, considering things like planning permission, available procurement routes etc.) therefore standards which would apply should be considered to make sure that future studies would comply with requirements, they should include:

Standards that the work should consider	Relevance
RIBA	RIBA offers details on best practice processes that should be followed.
Planning practice guidance – the National Planning Policy Framework	Planning requirements should be taken into account, including making a check of any future plans which may affect the local area or decision making.
CISBE Guides	Comprehensive technical guidance on key areas in building services engineering.
Building Standards and Regulations - Approved Documents	The Building Regulations set the legal standards that any construction should meet. The Government publishes guidance called 'Approved Documents' on ways to meet building regulations.

5. Detailed design

Detailed design is where a technical solution is designed, with detailed drawings and a specification being produced.

Detailed design should include aspects of all the above activities. A good understanding of energy use and building physics is required, as well as a grasp of the onsite systems through energy audits and more specialist assessments.

It is likely to be carried out by someone with considerable experience and they will use industry standards and potentially industry software to support detailed calculations. At the end of the study, it is likely that a specification and design drawings/schematics will be provided.

The following table provides links to useful resources when producing detailed designs:

Resource	What does it provide you with?
Local DNO capacity guidance	This guide gives directions on how to assess network capacity for your local DNO.

Relevant standards that need to be taken into account when compiling detailed designs:

Standards that the work should meet	Relevance
RIBA	RIBA offers details on best practice processes that should be followed.
CISBE Guides	Comprehensive technical guidance on key areas in building services engineering.
Building Standards and Regulations - Approved Documents	The Building Regulations set the legal standards that any construction should meet. The Government publishes guidance called 'Approved Documents' on ways to meet building regulations.

6. Investment grade proposals

Investment grade proposals (IGPs) are similar to detailed designs, however focus on the technicalities of delivering the project and providing more accurate costs. As the IGP looks at the installation as a whole, more detailed assessments on areas such as health and safety and asbestos are likely to be required to provide an accurate overall cost.

The following table provides links to useful resources when writing an IGP:

Resource	What does it provide you with?
Theme 3 guide – Procurement	Main guide providing insights into procurement activity.
Understanding procurement event processes	Guidance to help you expand your knowledge of procurement and the procurement process.
Sample specifications for technology deployment	This guide helps you include the right information in procurement specifications for particular technologies.
Local DNO capacity guidance	Checking out DNO network capacity where relevant.

Department for Energy Security & Net Zero

Cabinet Office

Government Property Function

CATAPULT Energy Systems

Energy Systems Catapult
7th Floor
Cannon House
The Priory Queensway
Birmingham B4 6BS
Email: PSDecarbGuidance@es.catapult.org.uk
Switchboard: 0121 203 3700