



Department for  
Energy Security  
& Net Zero

# Evaluation of the Modern Energy Partners programme

Annex A: Methods



Department for  
Energy Security  
& Net Zero



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# Contents

1. Introduction	2
Aims and methods of the evaluation	2
2. MEP Theory of Change	4
Introduction	4
Programme-level Theory of Change (April 2021)	4
Mapping the repeatable process	19
3. Evaluation Framework	20
4. Process Evaluation	27
Overview of processes for delivery	27
Longitudinal Case studies	29
Analysis and synthesis of data	31
5. Action Research	32
Introduction	32
Methods	32
Scope selection	33
6. Economic Evaluation	36
Value for money ‘three Es’ assessment	36
Economy and Efficiency	37
Effectiveness	37
Overview	37
Model Parameters	37
Emissions Reductions	38
Economic Evaluation Model	39

# 1. Introduction

The Department of Energy Security & Net Zero (DESNZ) (then The Department of Business, Energy & Industrial Strategy (BEIS)) commissioned Technopolis, the Carbon Trust and Matthew Baumann Associates to conduct an evaluation of Phase 2 of the Modern Energy Partners (MEP) programme. This Annex provides an overview of the methods that were followed for the delivery of this evaluation. In summary, the evaluation aimed to:

- Determine how well the programme benefits, as described in the MEP Business Case (Phase II), have been delivered, taking into account the agreed rescoping.
- Identify barriers to delivery and/or things that could have been done better in the programme to deliver benefits (in order to understand how benefits in this area can be best realised going forward); and
- Understand the experience of sites participating in the MEP programme and understand what the facilitators of success are.

## Aims and methods of the evaluation

The evaluation aimed to address a suite of six High-Level Questions (HLQs). Each HLQ is accompanied by a series of more detailed sub-questions. As part of the project scoping stage, the series of sub-questions were refined to develop a draft evaluation framework, setting out the data sources that were used to gather information to address each question. This framework is provided in Chapter 2. The HLQs outlined in the ITT that were addressed are:

- EQ1: To what extent and how has the programme created sustainable processes, tools and templates to support sites to design, implement and prove integrated energy system business models at adequate scale in the real world?
- EQ2: To what extent, and how, is the programme on track to deliver intended future impacts, considering the assumptions, current situation, market barriers and failures as set out in the Theory of Change?
- EQ3: To what extent and how have the programme's governance and processes enabled it to deliver its objectives?
- EQ4: How effectively has telemetry and data (T&D) been deployed and how are sites and users engaging with the data?
- EQ5: What were the barriers to delivery of the programme, what has been learned about how these might be overcome going forward, and/or what could have been done better throughout the programme to deliver benefits?
- EQ6: What are the wider learnings for effective investments, policies and regulations to enhance integrated energy solutions and carbon reduction across the public sector?

### Summary of Methods

The evaluation was theory-based, centred around developing, testing and refining the programme Theory of Change, using a mix of: process evaluation, Action Research, longitudinal case studies and economic value for money assessment. Phase 1 of the evaluation commenced on 8<sup>th</sup> February 2021 and primarily focused on providing an initial process evaluation, whilst scoping requirements for the Action Research element and the economic evaluation, which were carried out in Phase 2 of the evaluation (from November 2021 to February 2022).

The Phase 1 process evaluation was primarily based upon: a) a review of programme documentation (such as the programme business case, the existing programme Theory of Change and MEP Programme Board papers providing an overview of progress to date); and b) a series of qualitative semi-structured interviews carried out over a four-week period between February to March 2021 with: DESNZ/ESC MEP programme managers, representatives of central government departments, engineering consultancy contractors that were commissioned to deliver MEP tasks and representatives of public sector sites involved in its implementation (pathfinder and test-bed sites).

Phase 2 of the evaluation was similarly based upon a review of programme documentation and qualitative semi-structured interviews. Phase 2 documents reviewed included: the ESC final report and 'rule book' process maps/diagrams produced, PSDS application results, OGDs' recently published Net Zero and sustainability policies and strategies, and finally, sites' Concept Design plans. The second round of interviews conducted as part of Phase 2 were carried out between November 2021 and January 2022. Chapter 4 provides an overview of the number of representatives of each stakeholder group interviewed as part of the process evaluation. Chapter 5 provides an overview of interviews and workshops carried out as part of Action Research.

The remainder of this Technical Annex focuses on Phase 2 of the evaluation and is structured as follows:

- **Chapter 2 – MEP Theory of Change (ToC)**
- **Chapter 3 – Evaluation Framework:** Evaluation Questions to be addressed, links to testing the ToC and data sources/ strands of research to be used.
- **Chapter 4 – Process Evaluation:** Overview of programme of interviews and case studies in Phase 2
- **Chapter 5 – Action Research:** Suggested themes to cover and approach to grouping participants.
- **Chapter 6 – Economic Evaluation:** overview of proposed approach to economic Value for Money assessment in Phase 2.

# 2. MEP Theory of Change

## Introduction

Phase 2 of the MEP programme began in March 2019 and ran until September 2021. It involved continued work with the Phase 1 pathfinder sites to ensure progress with development of Concept Design plans, implementation of initial measures and the installation of telemetry solutions. It also involved the development of a systematic approach to delivering the core elements of MEP across a further 36 “test-bed” sites. The MEP Programme focused on “on-site” delivery to create and refine a repeatable process for designing and implementing low-carbon solutions across a range of settings. The intention was for the process to be transferrable to and usable in other settings outside the MEP programme in future.

For this evaluation we used two main elements of programme theory:

- The intended Programme-level Theory of Change
- A map of the intended Mapping the ‘repeatable process’ – highlighting how this may vary by differences in context for each Department.

## Programme-level Theory of Change (April 2021)

Development of the Theory of Change for MEP Phase 2 was based on learning and evidence generated in the first month of the Phase 2 evaluation (April 2021). This evidence was generated through a review of programme documentation, interviews with DESNZ and Energy Systems Catapult staff, and a sample of site representatives. This provides a record of what the programme aimed to achieve, prior to fieldwork research carried in Phase 2 of the evaluation. The evaluation was designed to assess whether and how the programme’s intended outputs and outcomes were delivered as expected and explain how delivery may vary according to differences in public sector contexts.

The ToC sets out causal pathways to outcomes in both the short-term (what was expected to be delivered by end of the programme, i.e. September 2021) and longer-term (how it was expected to contribute towards longer-term outcomes/impacts). We represented the ToC pictorially (Figure 1) and narratively (Table 1).

The ToC represents our understanding of how the programme was intended to work, along with assumptions and risks that we identified at the time. The ToC (as set out in Figure 1 and Table 1) has not been updated to represent changes in the way the programme was actually delivered, due to the different experiences and progress through the ToC of different sites and departments. It retains the pre-fieldwork understanding of the ToC as a representation of the ‘intended’ journey at that time and the uncertainties and assumptions / risks that were present then (April 2021). This has subsequently been a basis for comparisons which are made in the main report with the actual experiences and journeys of different stakeholders. In the main report we confirm/disconfirm the extent to which the pre-fieldwork programme’s intended ToC was achieved and explain why.

## 2. MEP Theory of Change

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The ToC was linked to the evaluation questions using the 'codes' that can be seen for each item in the ToC to ensure that the Evaluation Questions (around which the methodology was built) reflected the data requirements needed to 'test' the Theory of Change. The ToC provided a framework for gathering, analysing and reporting the evidence during Phase 2, supporting an analysis of what happened, and why. The ToC was used to underpin analysis of the overall MEP programme, as well as distinguishing the different experiences of sites linked to different Departments and those in different strands of MEP support (such as Telemetry & Data only or Telemetry and Data plus development of Concept Design plans).

The findings in the final evaluation were used to confirm/disconfirm the extent to which the activities and outputs of the programme ToC were delivered as planned and the extent to which intended outcomes were achieved and why.

It should be noted that some of the expected longer-term benefits of the MEP programme will, if at all, only be observable well beyond the timeframes of the evaluation (fieldwork ended in January 2022). Our ability to confirm or disconfirm many of the longer-term benefits was therefore limited by the duration of the contract.

## 2. MEP Theory of Change

Figure 1. Programme Theory of Change (April 2021)<sup>1</sup>

### Modern Energy Partners Intended Theory of Change (Phase 2)



Source: Technopolis, Carbon Trust and Matthew Baumann Associates

<sup>1</sup> BEIS is a predecessor to DESNZ.



## 2. MEP Theory of Change

**Table 1 Components of MEP Theory of Change (developed April 2021)**

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
01 DESNZ (then BEIS) funding and programme management	<p>£20m in funding allocated to MEP. £14m was ring-fenced within DESNZ for site-level integrated energy solutions in the business case for the programme. £6m was held and administered by DESNZ for technical support to sites, and the development of a repeatable methodology and process evaluation.</p>	<p>These figures on funding allocated were based on the original business case document for MEP. It was assumed this money would be spent. A risk was that sites and Departments might misunderstand the purpose of the MEP programme and view it as a source of funding for the installation of low carbon solutions, rather than funding for innovation and the development of a repeatable process to develop low carbon plans and then inform business cases for funding from other sources.</p>
02 OGD inputs (incl 50% funding for pathfinders)	<p>The estate-owning departments involved in the programme include Ministry of Justice (MoJ), Ministry of Defence (MoD), National Health Service (NHS) and Her Majesty's Revenue and Customs (HMRC).</p> <p>Departments needed to provide 50% funding for pathfinders but did not have to contribute to "test-bed" sites . This funding was used for the installation of no-regret measures on the pathfinders including LED lighting.</p>	
03 MEP governance	<p>At central government level, management of the MEP programme was overseen by two main governance groups 1) the Programme Board and 2) a Steering Committee (also referred to as Steerco). Members of the Programme Board include DESNZ, the estate owning departments, ESC and the Office of Government Property (Cabinet Office). Steerco was made up of DESNZ (then BEIS), Cabinet Office, HMT and ESC.</p>	<p>It was assumed that all stakeholders would actively participate in the Programme Board and Steerco and fulfil their roles as outlined in the Terms of Reference for each group.</p>

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
<p>04 ESC manages multiple delivery processes designed to support sites to overcome barriers to public sector deployment</p>	<p>DESNZ (then BEIS) delivered the programme in partnership with Energy Systems Catapult (ESC). ESC was responsible for: on-boarding sites; recruiting and managing a range of consultancies undertaking site analysis (exploring existing data, feasibility of telemetry, initial energy efficiency options, engineering assessments and data analysis); overseeing contractors installing telemetry; setting up and managing the programme's governance; managing the day-to-day delivery of the programme; bringing together the range of inputs from consultancies into a single report (including pathway modelling); providing support to sites to develop business cases; managing the relationships with sites.</p>	<p>It was assumed that site participants would have resources and the capability to actively participate in the programme including, for example, the collation of required information for ESC and their contractors, facilitation of site visits including to install sub-metering, and the provision of inputs and comment on draft Concept Design plans.</p>
<p>05 Site selection and ongoing input at sites level</p>	<p>The process for selecting the 36 test-bed sites to participate in MEP was conducted through a mix of top-down selection and bottom-up voluntary participation. MoD, MoJ and NHS were suggested by the MEP team as these departments manage a large portfolio of campus style estates, with scope for carbon reduction. One large HMRC site was also selected by the Office of Government Property (OGP) as it was one of the 50 largest building estates (an office complex), and also because they had begun work to identify energy efficiency improvements. Within MoD, MoJ and NHS, a mix of sites was selected based on a number of criteria to ensure MEP covered estates with variation in the size of the site, energy consumption patterns, locations across Great Britain and types of heating systems.</p>	

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
06 Governance drives progress and addresses issues	One of the Programme Board’s main functions was to support, challenge, scrutinise and drive forward programme progress and to provide an escalation route for delivery challenges. Steerco was accountable for programme delivery and risk management and determined and monitored strategic direction.	It was assumed that all stakeholders would actively participate in the Programme Board and Steerco and fulfil their roles as outlined in the ToR for each group.
07 Process Evaluation and Action Research	The process evaluation commenced in March 2021 and was completed in March 2022. It aimed to a) determine how well the programme activities and benefits had been delivered, taking into account the agreed rescoping; and to b) identify barriers that the programme had been unable to overcome and/or things that could have been done better in the programme to deliver benefits (in order to understand how benefits in this area can be best achieved in the future ) and c) understand the experience of the range of actors participating in the MEP programme - and in particular programme sites and Departments - , and understand what the facilitators of success were or would be.	
08 ESC determines deployment potential, costs and benefits for sites & develops tools and processes with support from external consultancies	<p>ESC delivered the detailed work with sites in partnership with a range of consultants. This phase of work included a <b>Discovery Phase</b> (information gathering to baseline energy management systems, estate building characteristics and initial identification of the scope for adopting low carbon solutions and initial ideas), <b>Engineering Feasibility Assessments</b> (more detailed technical assessment and modelling of the costs and benefits of low carbon solutions) and the <b>development of detailed Concept Design plans</b> (presenting detailed plans for measures that could be delivered in the short, medium and longer term against a business as usual case).</p> <p>These activities were intended to overcome many of the barriers to implementing integrated energy solutions in public sector estates due to a lack of capability. Based on DESNZ documentation, the following barriers were considered key:</p>	Known risks to Discovery Phase success included travel and access restrictions associated with Covid-19 and challenges with obtaining the required data or the required granularity of data.

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
	<ul style="list-style-type: none"> <li>• Potential customers for integrated energy solutions lack understanding of the financial benefits available and how to realise them in complex energy markets,</li> <li>• There is a paucity of design capability and confidence which means that customers cannot engage effectively with the supply chain, resulting in limited demand</li> </ul>	
09 Telemetry installed	<p>One of the aims of the Telemetry and Data monitoring (T&amp;D) workstream was to enable a more robust measurement of energy usage at each site to (a) fully understand the energy requirements of each site, (b) support concept design work (c) provide a good basis for the measurement before and after the implementation of energy upgrades.</p> <p>As defined in the business case, T&amp;D activities were expected to be Collection of data at 36 identified sites; Surveying of the 36 sites to develop metering approaches that are consistent with the developing Concept Design; and the expansion of the MEP digital architecture to allow data from 40 sites to be captured on a common platform.</p> <p>ESC managed the contractors who installed additional sub-metering and established systems. The systems were expected to be capable of “scooping-up” buildings and sites’ data and bringing it together into an online portal, where both ESC and site managers could access data on each site’s energy consumption. It was anticipated that users would not only have access to the data for their own sites but also to those of other sites and departments (in anonymised aggregate form) allowing them to compare sites’ usage and the effects of different energy efficiency measures and decarbonisation strategies. T&amp;D was installed at the Pathfinder sites during Phase 1.</p>	<p>Identified risks to successful installation of telemetry were site access and logistics – including coordinating and communication between site staff and ESC sub-contractors, obtaining the permissions needed from the central government (participating Departments) for sub-contractors to access the sites, and share data. Covid-19 was also expected to continue to be a risk to delivery.</p> <p>In the business case for T&amp;D a key assumption in managing risks associated with Departmental permissions, was that senior DESNZ stakeholder support would be available to support escalation of issues to specific departments where process/decision making constraints negatively impacted the plan.</p> <p>It was also understood that limited time frames for delivery of T&amp;D linked to the financial year / budget allocations might increase the risks to successful completion of installation of T&amp;D for some sites due to the access and logistical challenges outlined above).</p> <p>Installation in time to inform concept design was not possible – by end of March 2021, telemetry had been completed in only 4 sites and was underway in 5. Therefore, it was unclear how many will access and use the Ecodriver portal.</p> <p>Whilst data and sub-metering was undertaken in many sites, the completion of telemetry and its use in cross site analysis /</p>

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
	<p>According to the business case, in the short term the telemetry and data workstream was expected to be able to identify and enable opportunities for reductions and savings to meet legislative targets and deploy equipment on 40 sites.</p>	<p>access by ESC and sites was uncertain due to its not being installed until late in the programme. Also, at the time of writing, there was some uncertainty over how analysis of telemetry would be supported and sustained at site level after MEP had finished.</p>
<p>10 Sites supported to develop business cases for deployment projects</p>	<p>With the introduction of the Public Sector Decarbonisation Scheme (PSDS), ESC provided support to the test bed sites to apply for funding from this scheme - rather than supporting them to develop a 'generic' business case for measures set out in the Concept Design plans as was originally planned. See 16 &amp; 17.</p>	<p>It was noted that the extent to which this input would contribute towards longer-term outcomes and impacts depended on the extent to which site applicants were successful in their PSDS applications.</p>
<p>11 Detailed plans for energy efficiency, demand management &amp; low carbon power &amp; heat technologies in 24 sites &amp; 4 pathfinders</p>	<p>As of April 2021, it was intended that detailed Concept Design plans would be produced for 24 sites &amp; four pathfinders by ESC and consultancies. This activity was expected to be informed by site discovery. T&amp;D was expected to inform an assessment of opportunities and feasibility of different design plans.</p> <p>It was anticipated in the business case that the baselining of sites through T&amp;D would be important in monitoring and verifying cost savings, costs avoided following implementation of any elements of design plans, as well as enabling them to compare the performance of supplier contracts. Feeding back insights from data analysis into the wider MEP programme was expected to truncate the design stages of Concept Designs.</p>	<p>The extent to which Concept Designs would contribute towards longer-term decarbonisation outcomes depended on the extent to which sites possessed the resources and had the capacity to procure and manage the implementation of technologies proposed in the Concept Design plans.</p>
<p>12 Learning &amp; evidence (challenges, streamlining of processes, costs)</p>	<p>At the time of phase 1 research, MEP was expected to generate a significant amount of learning about how to assess the requirements for low-carbon improvements and to make progress with developing clear plans for short, medium and longer-term changes.</p> <p>It was anticipated that through this learning, the process would be "debugged" to a certain degree, allowing easier replication of MEP processes at other sites in the future.</p>	<p>It was noted that this learning depended upon the success of ESC in applying a "do-learn-do" approach, and capturing learning and the generation of evidence in the process evaluation / action research.</p>

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
13 Repeatable process for developing credible decarbonisation pathways in public sector sites tested	This repeatable process included a <b>Discovery Phase</b> (information gathering to baseline energy management systems, estate building characteristics and initial identification of the scope for adopting low-carbon solutions and initial ideas), <b>Engineering Feasibility Assessments</b> (more detailed technical assessment and modelling of the costs and benefits of low-carbon solutions) and the development of detailed <b>Concept Design plans</b> (presenting detailed plans for measures that could be delivered in the short, medium and longer term against a business as usual case).	The achievement of this outcome was based on the following assumptions: the process developed is efficient and affordable; the building types chosen to represent a good spread of archetypes; and that differences between public sector organisations, sites and building types are not so great that a different approach is required in each to achieve the same outcome.
14 Establish new dataset on public sector buildings – accessible to other public sector organisations	<p>Data capture through the T&amp;D strand was anticipated across all pathfinder and test-bed sites and this was expected to be stored and visualised on the MEP platform.</p> <p>It was anticipated that the T&amp;D Data Portal would potentially offer a source of data about public sector buildings that could be accessed by both MEP and possibly other sites. It was anticipated that this data could be used by sites with similar characteristics to model potential improvements.</p> <p>Developing an end-to-end telemetric offering was also expected to provide visibility of energy consumption across the public sector.</p>	<p>A key assumption was that the telemetry would be kept in place in sites for a long enough period of time and the portal then made available (see component 20).</p> <p>It was also acknowledged that a final destination and repository within Government for the data collected through the programme would be needed if this benefit was to be sustained.</p>
15 Some sites (Pathfinders) funded by MEP for improvements	MEP offered match funding to the four pathfinder sites to deliver low carbon solutions identified in the Concept Design plans.	The assumption here was that business cases would be adequately defined and offer VFM.

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
16 Sites secure funding for improvements	<p>As noted for component 10, ESC provided support to the test-bed sites to apply for funding from PSDS – a scheme run by DESNZ but not a part of MEP. Sites in Scotland and Wales were offered support to develop business cases for funding from their respective public sector bodies.</p>	<p>Prior to the announcement of PSDS (see 17) there was no predefined MEP logic for the funding of projects - it was assumed that sites would be able to access funding from other funding programmes or their parent departments.</p> <p>In general, at the time of writing it was noted that access to funding for improvements was variable. NHS sites appeared to have more access to funding through their regional NHS Trusts or wider Clinical Commissioning Groups, the MoD and, in particular MoJ sites, appeared more constrained in their capacity to access funding for implementation of energy decarbonisation measures.</p>
17 PSDS funding becomes available (not part of MEP)	<p>The introduction of the Public Sector Decarbonisation Scheme (PSDS) provided a new and significant opportunity for test-bed sites that had progressed through the early Concept Design Phase. The PSDS Phase 1 scheme was managed by Salix finance and provided grants for public sector bodies to fund heat decarbonisation and energy efficiency measures.</p> <p>The MEP programme encouraged sites to apply for funding to support implementation of their plans.</p> <p>PSDS Phase 1 allocated up to £1 billion for grants that were awarded in March 2021.</p>	<p>PSDS was not part of the MEP programme at the outset but its introduction in 2020 provided a new and significant opportunity for sites which have progressed through the early Concept Design phase to submit bids and obtain funding to support implementation of their plans.</p> <p>PSDS covers sites in England only (the scheme was not open to the sites that were based in Scotland and Wales).</p> <p>A risk is that sites are not successful in their funding applications and/or that not sufficient money is made available through PSDS. At the time of the first evaluation research phase (late April / early May 2021) just two sites had been informed that they had been awarded funds. Fourteen test bed sites had been unsuccessful in their application.</p>

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
18 Learning and tools feed into DESNZ and Cabinet Office (Office of Government Property) policy and R&D	<p>The learning generated from the programme was expected to be taken up by DESNZ and Cabinet Office and used in future projects.</p> <p>In relation to T&amp;D it was anticipated that this pilot would inform opportunities for wider roll-out of T&amp;D across the public sector.</p>	<p>It was assumed that the process evaluation and ESC learning outputs would be produced, disseminated effectively, and used by DESNZ policy teams and OGDs.</p>
19 Learning and tools widely disseminated	<p>Details of how learning and tools would be disseminated to other sites was unclear at the time of writing (April 2021). It was anticipated that recommendations for telemetry across the whole Government estate would emerge from the project and lessons learned during the process of delivering it.</p>	<p>If tools and templates, a “repeatable process” and some “debugging” of the process is achieved, this learning is likely to be of interest to sites and OGDs interested in design and delivery of low carbon upgrades and medium / longer term solutions.</p>
20 MEP and other sites are able to use data to support analysis of own similar buildings and identify opportunities	<p>It was anticipated that MEP and other sites would be able to use site-level telemetry and other MEP data to analyse the energy requirements of similar sites / buildings and use this to begin to consider the feasibility, costs and benefits of measures, and design an integrated energy action plan for their current and future site energy needs, emissions and costs. It would also provide a good comparison for benchmarking costs / benefits of energy upgrades.</p>	<p>Achieving this assumed that telemetry is installed, that data would be collected for a sufficient period of time and that made available in an accessible way to MEP and wider populations (see 14).</p>



## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
<p>21 Short-term improvements are delivered, and benefits realised (and measured)</p>	<p>Installation of <i>metering and telemetry</i> was expected to contribute in the short term to more effective energy management (data driven identification of energy saving measures) – resulting in financial savings and comfort gains.</p> <p>It was anticipated that sharing the collected data with the supply chain and in an intelligent way with site energy managers would support the identification of “quick wins” to deliver immediate short-term impact. In the R&amp;D stage of the programme several opportunities have been identified and communicated to sites, including:</p> <ul style="list-style-type: none"> <li>• Improved scheduling control to reduce gas consumption</li> <li>• Heat system issues</li> <li>• Flow temperatures set too high</li> <li>• Potential for heat recovery from chillers</li> <li>• PV panels providing zero output</li> <li>• Broken sensors on main plant room systems</li> <li>• Total Energy Centre thermal output not being measured</li> </ul> <p>It was also assumed that the impact of quick wins would be more easily measured if T &amp; D was installed enabling both baseline and follow up measurements to be taken</p> <p>Installations of <i>energy efficiency measures</i> (in sites where this happens) was expected to contribute to:</p> <ul style="list-style-type: none"> <li>• Cost savings</li> <li>• CO2e reductions</li> <li>• Improvements in air quality</li> <li>• Gains in comfort of staff working in buildings</li> </ul> <p>It was anticipated in the business case that the development of an independent measurement and verification service to demonstrate through data that savings are being made as a</p>	<p>At the time of writing, it is uncertain how many sites will, in the end, benefit from telemetry and / or be able to access the data portal.</p> <p>For installations in the test bed sites, this delivery and associated benefits will only be achieved if funding is available to cover costs of measures proposed in the Concept Design plans (either through PSDS scheme or through other sources).</p> <p>It was noted in the business case for T&amp;D that usage of T&amp;D was dependent in part on department and site commitment to engaging in and using the data and its analysis.</p> <p>The lack of a clear source of funding is a significant risk – as noted earlier only 2 of the 16 sites that applied to PSDS have been funded by late April/early May.</p>

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
	<p>result of various interventions would be an outcome of the T&amp;D strand. Measurement of the outcomes was considered to be a critical step in demonstrating to other departments and other sites that changes are beneficial and represent good value for money. This outcome was also expected to feed into components 21 and 23 (informing MEP and other public sector sites respectively of benefits) and component 24 and 25 (more ambitious projects, and take up of the 'repeatable process' in other sites).</p>	

## 2. MEP Theory of Change

Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
22 Policy response (capacity, capability, procurement, funding)	As of April 2021, the programme was expected to contribute significant evidence and learning for policy makers in DESNZ and OGDs about the challenges and opportunities for making energy efficiency upgrades in public sector buildings. With this evidence and learning comes the opportunity to make significant policy decisions that could support future site level action. Policy responses might address capacity, capability, procurement, funding.	This outcome was assumed to be dependent upon learning and evidence being effectively disseminated to relevant departments, effective engagement with these departments and a supportive wider policy environment.
23 Other sites aware of benefits and become interested	Through the dissemination of evidence and learning from MEP other sites were expected to be able to see how they could use the MEP process to identify potential pathways towards decarbonisation.	It was noted that interest would naturally be greater if PSDS or other sources of funding were available to cover costs.
24 MEP sites and Departments consider more ambitious projects, building on successes and new capabilities	It was anticipated that MEP sites and departments could build on the learning, and successes of being involved in MEP, planning even more ambitious projects.	This would be a reasonable expectation dependent upon learning and evidence being disseminated effectively, and availability of funding.
25 Other sites use repeatable processes to develop low-carbon plans	It was anticipated that other sites would progress from initial interest to actually using the process, evidence and learning from MEP to develop low carbon plans.	This would be dependent on capacity and capabilities being available in other sites, and the availability of funding.
26 MEP sites and Departments plan and initiate more ambitious projects	It was anticipated that MEP sites and departments would progress from planning to initiation of more ambitious projects.	<p>It was noted that planning and initiation of more ambitious projects would depend on the availability of funding.</p> <p>It was noted by some that more ambitious projects would likely be harder to fund using current government guidance on economic appraisal (Green Book methodologies) – due to long payback timeframes.</p>

## 2. MEP Theory of Change

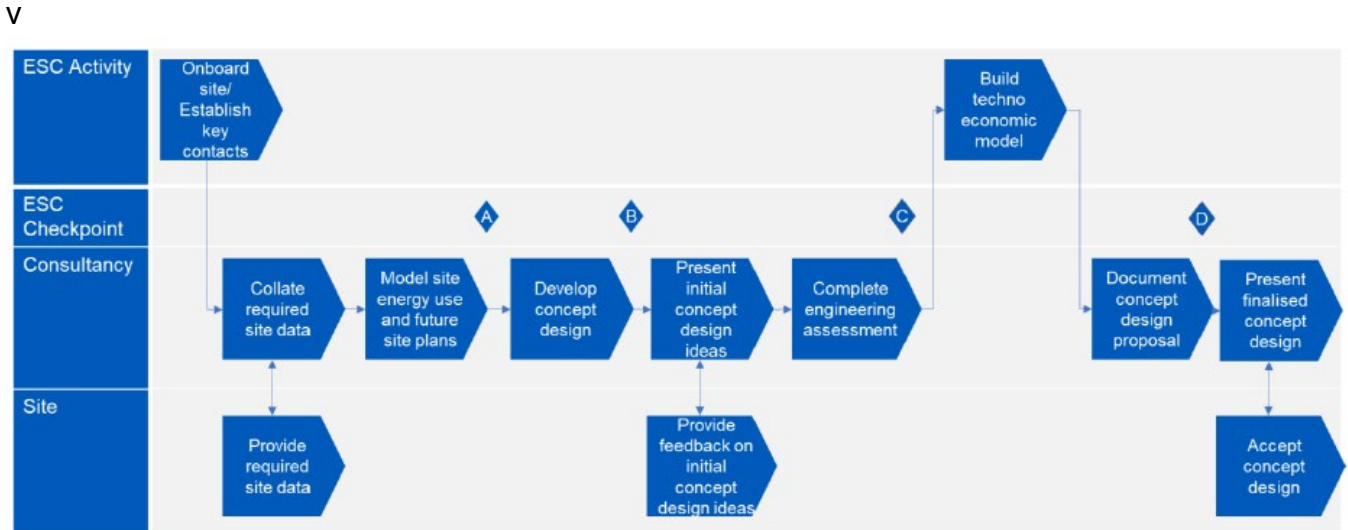
Component	Further details identified in April 2021	Assumptions & risks identified in April 2021
27 Other sites implement projects to improve energy efficiency, demand management, and low carbon power and heat	It is anticipated that other sites would move from planning to implementing projects.	<p>This assumed applications for funding were successful.</p> <p>It was noted by some that more ambitious projects would likely be harder to fund using current government guidance on economic appraisal (Green Book methodologies) – due to long payback timeframes.</p>
28 Accelerate deployment of integrated energy efficiency solutions in large number of public sector sites	It was anticipated that MEP activities would accelerate deployment of integrated energy efficiency solutions.	This assumed a supportive policy and funding environment enabling other sites to make use of MEP tools and processes
29 Contribute to the objective of reducing CO2e emissions across the public sector estate by 50% by 2032	If high levels of more ambitious projects were delivered as a result of MEP, then MEP will have contributed to the longer-term objective of reducing emissions across the public sector	This outcome was dependent on delivery success plus the supportive policy and funding environment enabling other sites to deploy the MEP tools and processes.

## 2. MEP Theory of Change

### Mapping the repeatable process

At the heart of MEP is the development of a ‘repeatable process’ for the public sector to use in assessing, designing, planning and implementing low carbon solutions. ESC has mapped out in detail what the process is and has set out the roles of key actors in the process the MEP ‘rule book’ report – the “Process and Methodology for Development of Concept Designs”<sup>2</sup>. A high-level summary of the process is shown in Figure 2 below.

**Figure 2. repeatable delivery process (ESC perspective)**



Whilst the rule book report summarises, at a high level, the responsibilities of sites and Departments, it does not map the steps they (sites and Departments) actually had to take internally to be able to perform the responsibilities. This evaluation was used to gain insight into the activities and steps sites and Departments took to enact the responsibilities set out in the rule book. Insights from Phase 1 of the evaluation showed there were significant ‘behind the scenes’ requirements which were assessed in Phase 2 of the evaluation.

The topic guides used in both phase 1 and phase 2 of this process evaluation closely mirrored the elements of the repeatable process enabling detailed analysis of each element, as well as referencing and addressing research questions that relate to the broader ToC.

The evaluation explored some of the differences in context which affects the implementation of MEP across the main public sector organisations (NHS, MoJ and Mo), such as differences in organisational decarbonisation strategies, the skills and resources of site level staff on energy management and security arrangements for accessing sites. This provided the basis for deliberative (multi-stakeholder) evaluative analysis of the extent to which the process that has emerged from MEP is ‘repeatable’, ‘practical’, and valuable in each Departmental context.

<sup>2</sup> Internal MEP programme document.

## 3. Evaluation Framework

Table 2 below shows the primary and secondary data sources that were used during Phase 1 and Phase 2 to address the range of Evaluation Questions, including:

<b>Interviews with:</b>	<b>Documentary and other data sources:</b>
<ul style="list-style-type: none"><li>• Site representatives</li><li>• Participating OGDs</li><li>• Cabinet Office (Office of Government Property)</li><li>• MEP delivery team including ESC and DESNZ staff</li><li>• Delivery contractors</li></ul>	<ul style="list-style-type: none"><li>A. ESC final report and ‘rule book’ process maps/diagrams produced</li><li>B. PSDS application results</li><li>C. OGDs policies and strategies</li><li>D. Site concept design plans<sup>3</sup></li><li>E. ESC data / models of the costs and benefits of concept designs for each site.</li></ul>

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<sup>3</sup> Concept Design plans were reviewed for NHS and MoJ. However, due to security constraints, it was not possible to gain access to the Concept Design plans for MoD sites.

### 3. Evaluation Framework

**Table 2. Evaluation Framework (Drafted April 2021)**

Revised EQ	Revised Sub questions	Relevant EQs from the ITT	ToC reference	Phase 1 data sources	Phase 2 primary data sources					
					Site reps	Participating OGDs	DESNZ & ESC & Contractors	Cabinet Office	Documentary and other evidence	Action Research
<p><b>1. To what extent and how has the programme achieved key outcomes for MEP sites? Why / why not?</b></p> <p><b>How do these outcomes and perceptions of them vary across different types of sites / settings and why?</b></p>	1.1 To what extent has the programme stimulated / enhanced ambition in sites or otherwise changed behaviours relating to decarbonisation?	EQ1.2	24	Site interviews	*	*			C	
	1.2 Has the programme developed capabilities for implementation of energy efficiency projects – including tools and templates for future use (for sites)?	EQ1.1	24 and 26	Site & ESC Interviews  Consultancy interviews	*	*			A	
	1.3 Has the programme provided telemetry and data capabilities that unlocks ability to better manage energy? How are sites using it - e.g. to make informed decisions around installation of energy efficiency measures, or to influence behaviour change towards more efficient energy management?	EQ4.2	14 & 20	Site interviews  DESNZ & ESC interviews	*	*			A	*
	1.4 Has the programme created feasible concept design plans for sites that if implemented would ensure they achieved 50% reduction in emissions by 2030?	EQ1.3	11	Site interviews  DESNZ & ESC interviews	*	*	*		D, E	*
	1.5 What are these concept designs? How feasible are they? what energy savings would they achieve? How far have they been / will they be adopted?			Consultancy interviews						
	1.6 Has the programme supported sites to develop fundable business cases or applications (for low hanging / quick win options) at scale? what is the level of ambition of these business cases / applications?	EQ1.2, EQ3.2	10	Site interviews  DESNZ & ESC interviews	*	*			C	
	1.7 Have the sites with Concept Design plans secured follow-on funding from other government schemes such as Salix or Public Sector Decarbonisation Scheme? Which MEP sites / measures were funded and which were not and why? Which non-MEP sites were successful and for what kinds of measures? To what extent are public sector decarbonisation schemes designed to support deployment of integrated energy solutions?	EQ2.7		OGD interviews  Consultancy interviews						
	1.8 Has the programme part funded and secured installations at scale in sites (Pathfinders);			15	Site interviews (pathfinders)	*	*			

### 3. Evaluation Framework

Revised EQ	Revised Sub questions	Relevant EQs from the ITT	ToC reference	Phase 1 data sources	Phase 2 primary data sources					Action Research
					Site reps	Participating OGDs	DESNZ & ESC & Contractors	Cabinet Office	Documentary and other evidence	
	1.9 Have sites that were supported to apply for PSDS by ESC progressed / delivered their measures (potentially by September 2021?)	EQ2.7	21	DESNZ & ESC interviews						
	1.10 What installations have been delivered?			OGD interviews						
	1.11 What challenges / why?	EQ1.4, EQ4.1	21	Consultancy interviews						
	1.12 Has the programme supported sites to achieve energy, cost and carbon savings (where installations have been implemented)?	EQ1.5, EQ2.3	21	Site interviews DESNZ & ESC interviews Consultancy interviews	*	*				*
	1.13 What other project level benefits, positive or negative, intended or unintended have been achieved? E.g. what happens to sites supported only to install telemetry (not supported to undertake concept design?)	EQ2.9	N/A	Site interviews DESNZ &/ ESC interviews	*	*			A	*
<b>2. To what extent and how has the programme achieved key outcomes at a programme / national level? Why / why not?</b>  <b>How do experiences and perceptions of outcomes vary across different Government Departments and National</b>	2.1 Has the programme stimulated / enhanced ambition amongst participating and other Departments / OGP or other site managers, or otherwise changed behaviours relating to decarbonisation?	EQ6.2	24, 23	DESNZ & ESC interviews Site Interviews OGD interviews	*	*		*		
	2.2 Has the use of pathfinder and testbed sites generated interest in the wider public sector?									
	2.3 Has the programme created learning from programme implementation that helps with understanding how to address key barriers and implement EE projects in the public sector? What is this learning?	EQ5.2, EQ6.3	12, 13	DESNZ & ESC Interviews OGD interviews	*	*	*	*	A	*
	2.4 Has the programme created processes, tools and templates that could be used by departments / other sites wishing to embark on scoping and planning 2030 scenarios and initiate actions? How replicable is the process? How affordable / efficient is it?	EQ5.2	12	DESNZ & ESC Interviews	*	*	*	*	A	*



### 3. Evaluation Framework

Revised EQ	Revised Sub questions	Relevant EQs from the ITT	ToC reference	Phase 1 data sources	Phase 2 primary data sources					Action Research
					Site reps	Participating OGDs	DESNZ & ESC & Contractors	Cabinet Office	Documentary and other evidence	
<b>Services (NHS) and why?</b>	2.5 Who is using them and how useful are they?		25							
	2.6 Has the programme secured a clear legacy and dissemination plan that has supported wider uptake and use of learning, tools and methodology in the public sector?  2.7 What has been the policy response?		18, 19  22	DESNZ & ESC interviews		*	*	*	A	
	2.8 Created telemetry data set that could be used to underpin EE projects in other public sector sites		14, 20	ESC & DESNZ interviews	*	*		*	A, F	*
	2.9 Any other programme level benefits, positive or negative, intended or unintended?	EQ5.1		Site interviews  DESNZ & ESC interviews		*			A	
	<b>3. How suitable, deliverable, timely, efficient, and effective, have the core programme processes been? why?</b>  <b>Do experiences and perceptions of core processes vary according to setting / department context?</b>	3.1 How effective was the set-up process? <ul style="list-style-type: none"> <li>What was the rationale and approach to site selection?</li> <li>Looking back over Phase 2, how well aligned have programme objectives been to sites / departments objectives?</li> <li>How easy / burdensome was the process of setting up the project with MEP?</li> <li>How did sites and departments agree project scope?</li> </ul>	EQ3.1, EQ3.2, EQ2.4, EQ2.5	05	OGDs Interview; DESNZ & ESC interviews  Site interview; OGD interviews  OGD interviews and Site interviews	*				A
3.2 How effective was the onboarding process?			05	DESNZ & ESC interviews	*				A	
3.3 How effective were the 'discovery' processes?  <ul style="list-style-type: none"> <li>processes of obtaining / providing data, undertaking and using analyses to support concept design?</li> </ul>				Site interviews  Consultancy interviews	*				A	
3.4 How effective were the telemetry installations processes		EQ4.1	09	Site interviews	*				A	*

### 3. Evaluation Framework

Revised EQ	Revised Sub questions	Relevant EQs from the ITT	ToC reference	Phase 1 data sources	Phase 2 primary data sources					Action Research
					Site reps	Participating OGDs	DESNZ & ESC & Contractors	Cabinet Office	Documentary and other evidence	
	<ul style="list-style-type: none"> <li>securing approvals for T&amp;D, process and experiences of installation of telemetry; accessing data and using it; making decisions / actions as a result and expectations for future use.</li> </ul>	EQ4.2		DESNZ & ESC interviews OGD interviews						
	<p>3.5 How effective was the Concept Design planning process?</p> <ul style="list-style-type: none"> <li>process and experiences of developing and presenting concept designs / facilitating access to and being presented with resulting concept design plans; clarity and performance of roles of different actors; actual content; rating of concept design process and potential improvements;)</li> <li>why some were selected not others for concept design?</li> </ul>	EQ1.3	04	Site interviews  DESNZ & ESC interviews (including contractors) OGD interviews	*		*		A	*
	<p>3.6 How effective was the business case development / funding applications support?</p> <ul style="list-style-type: none"> <li>process and experiences of supporting / being supported to develop and submit PSDS scheme applications; whether sites would have applied for PSDS funding if not involved in MEP; other financing options; roles of different staff / agencies; usefulness of data / concept design in this; key challenges; which sites succeeded and which did not? Why?</li> </ul>	EQ2.7	10	Site interviews  ESC & DESNZ interviews (including contractors)  OGD interviews	*		*			
	<p>3.7 What have been the key challenges, barriers, delays or other issues relating to the above core processes that have been addressed by sites, ESC or Departments? How have these been overcome?</p>	EQ3.3		Site interviews  ESC & DESNZ interviews (including contractors)  OGD interviews	*				A	*
	<p>3.8 How effective were the arrangements for incremental learning – the ‘do – learn – do’ and shared learning approaches?  What was the key learning from these processes?</p>	EQ3.1	04	Site interviews  DESNZ & ESC interviews	*				A	

### 3. Evaluation Framework

Revised EQ	Revised Sub questions	Relevant EQs from the ITT	ToC reference	Phase 1 data sources	Phase 2 primary data sources					Action Research
					Site reps	Participating OGDs	DESNZ & ESC & Contractors	Cabinet Office	Documentary and other evidence	
			12	(including contractors)						
	3.9 How effective have communications between different actors been? (e.g., between sub-contractors and sites; between sites themselves)	EQ3.1	n/a	Site interviews DESNZ & ESC interviews	*				A	*
	3.10 Does the current model of decision-making in sites / between sites and departments allow for effective implementation of energy upgrades on public sector sites?  <ul style="list-style-type: none"> <li>How is energy use usually managed? How are decisions normally made? What are the roles of different staff and decision-making processes? What EE improvements have been undertaken previously? How has the MEP programme process been different, compared to 'normal' upgrades process?</li> </ul>	EQ3.1	n/a	OGD interviews Site interviews	*				A	
	3.11 Which elements of the programme processes were least and most important in driving progress?		n/a	Site interviews	*				A	
<b>4. To what extent and how have the programme's governance processes effectively supported achievement of programme objectives?</b>	4.1 What was the rationale for changes to Phase 2? What implications did these have for programme ambition?		n/a	ESC & DESNZ interviews Programme documentation					A	
	4.2 How effective have the established programme governance processes been? How have issues arising through governance processes been addressed?	EQ3.1, EQ3.3	03, 06	ESC & DESNZ interviews OGD interviews					A	
	4.3 Over and above the processes outlined in Q3, how else have sites been supported during development and deployment by the programme?	EQ3.2	n/a	Site interviews	*				A	*
<b>5. what are the implications for future programmes and wider public</b>	5.1 What learning from programme implementation can tell us about how to address barriers? To what extent were these barriers present in the MEP sites? To what extent does wider evidence suggest they are still present in wider public sector? (see also 6.4)	EQ5.2	12	DESNZ & ESC interviews OGD interviews	*	*	*	*	A	

### 3. Evaluation Framework

Revised EQ	Revised Sub questions	Relevant EQs from the ITT	ToC reference	Phase 1 data sources	Phase 2 primary data sources					Action Research
					Site reps	Participating OGDs	DESNZ & ESC & Contractors	Cabinet Office	Documentary and other evidence	
sector decarbonisation	5.2 What other public sector decarbonisation schemes are active and what are they achieving? How has MEP interacted with other Public Sector Energy Efficiency schemes? Which market barriers are they addressing and how might MEP processes dovetail with these?	EQ6.1	n/a	ESC & DESNZ interviews  OGD interviews	*	*	*	*	A, B, C	
	5.3 What strategies deployed as part of this programme were successful in engaging public sector sites in decarbonisation?	EQ6.2	12			*	*	*	A	
	5.4 How transferable / applicable are the materials and tools developed through the programme to different types of public sector sites / departments? To what extent are the tools 'repeatable', 'practical', valuable and affordable (amongst other things)?	EQ1.1	25, 27		*	*		*	A	
	5.5 What is the learning for future policy development?	EQ2.8	18, 22	Site, ESC & DESNZ interviews	*	*	*	*	A	
6. Economic evaluation	6.1 Does the MEP programme represent value for money?	EQ2.9	n/a	n/a	*	*		*	A, D, E	
	6.2 Does the (net) present value of expected future benefits outweigh the costs?									
	6.3 Has MEP unlocked any routes to public sector decarbonisation that might not otherwise not have been possible?									
	6.4 How does the programme address specific market barriers faced by the public sector sites?									
7 Additionality of the programme	7.1 To what extent would each of the outcomes / benefits have been observed in the absence of the programme?	n/a	n/a	n/a	*	*		*	B, E	
	<ul style="list-style-type: none"> <li>• Site level outcomes</li> <li>• Programme level outcomes</li> </ul> 7.2 How and in what ways has the programme contributed to the achievement of the benefits? <ul style="list-style-type: none"> <li>• Site level outcomes</li> <li>• Programme level outcomes</li> </ul>									

# 4. Process Evaluation

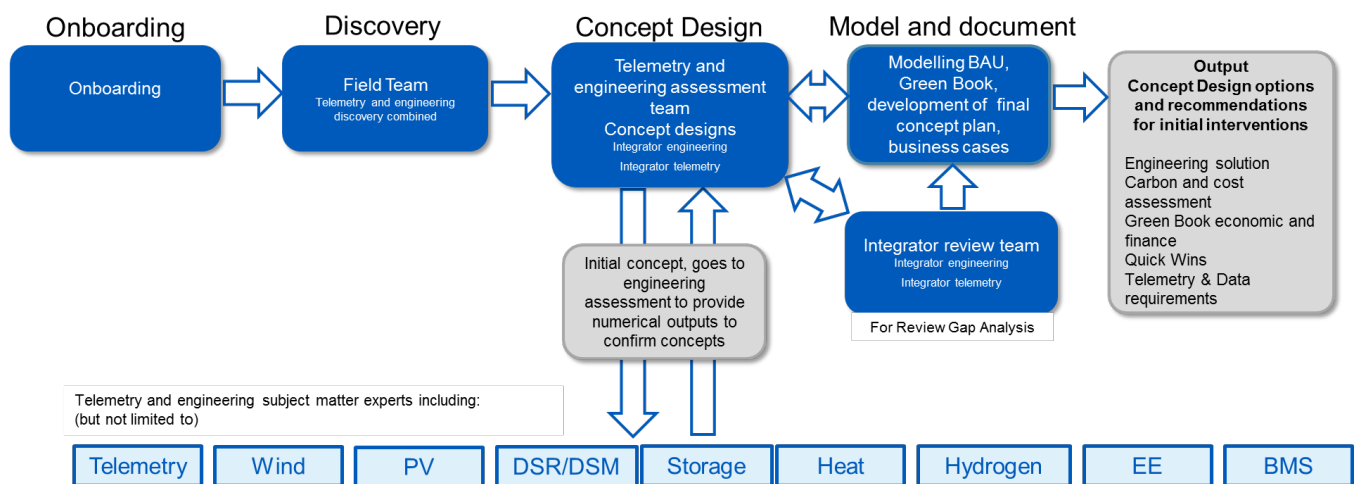
The process evaluation assessed the appropriateness, efficiency and effectiveness of the processes deployed to deliver each key output of MEP. This section provides an overview of the main strands of research and data collection that were undertaken to address the process evaluation questions listed in the Evaluation Framework table in Chapter 2.

## Overview of processes for delivery

As outlined in the Introduction, MEP aimed to accelerate deployment of integrated energy efficiency solutions on large campus style public estate sites. It involved continued work with the 4 pathfinder sites to ensure progress with the development of Concept Design plans, implementation of initial measures and the installation of Telemetry solutions to enable better understanding of energy consumption patterns. It also involved delivering a similar process in 36 “test-bed” sites which would enable the process and tools to be tested and improved over time in a variety of settings. The intention was that the process would be transferrable to and usable in other settings outside the MEP programme in future. Phase 2 aimed to install Telemetry in all sites, deliver Concept Design plans for 24 of the sites and support the development of actionable business cases for the implementation of the initial stages of these low-carbon plans in 12 sites. Because a new opportunity to bid for Public Sector Decarbonisation Scheme (PSDS) funding arose, it was agreed that support on business cases could be in the form of supporting sites in applications to PSDS.

Figure 2 below provides more detail on ESC’s process for working with the 42 sites. The processes below are framed from the perspective of ESC. It represents the activities ESC sought to deliver, who would deliver them, what the outputs of the project would be and how they would be used.

**Figure 3. MEP Process.**



**Source: ESC**

The key stages of processes for management and delivery of MEP that were assessed include:

1. **Overall MEP Programme Governance arrangements** - to gather views from Programme Board and Steerco members on the extent to which the governance

## 4. Process Evaluation

arrangements are working well and fulfilling their purpose or whether there are any lessons learned for improvement.

2. **The Onboarding stage** - to understand how sites were selected and agreed aims of their participation in the programme.
3. **The Discovery Phase** – the process of gathering baseline information from sites on the characteristics of their estate and energy use requirements.
4. **Public sector and site-level energy project management arrangements** – to understand the ways in which sites have engaged with MEP, coordinated input from site level staff and FM contractors to manage delivery.
5. **Development of Concept Design plans** – to explore how they are used by sites to inform decision making on implementation of low carbon solutions.
6. **Planning and implementation of Telemetry systems** - to support energy usage data analysis.
7. **Support to sites on business case development (or PSDS applications)** - to explore how sites obtained approvals for funding measures recommended in the Concept Design plans.
8. **How lessons learned from delivery of MEP have been captured by stakeholder groups (at site level, by ESC, OGDs and OGP)** - to inform development of plans for public sector decarbonisation after MEP closes.

Topics 1, 2 and 3 were explored and discussed during Phase 1 interviews. Phase 2 of the evaluation was focused more on the latter stages of processes for delivery of the programme. Topics 4 to 8 were prioritised during Phase 2.

Phase 2 drew upon mainly on a review of programme documentation and decarbonisation policies, qualitative semi-structured interviews, and case studies. Qualitative interviews were conducted with stakeholders including programme managers, central government departments, their delivery agencies and representatives of public sector sites that have participated in delivery, between November 2021 and January 2022. The table below provides a breakdown of the number of target and achieved interviews with representatives of each stakeholder group, across both Phase 1 and Phase 2 of the evaluation.

**Table 3. Phase 2: interviews achieved against targets**

Stakeholder Group	Target no. of interviews Phase 1	Achieved no. of Interviews Phase 1	Target no. of interviews Phase 2	Achieved no. of interviews Phase 2	Total no. of achieved interviews
DESNZ programme managers and policy leads	5	5	2	2	7
ESC Programme Managers	4	4	2	2	6
Central government departments and NHS	3	3	5	4	7
MEP low-carbon consultancies	5	5	0	0	5

## 4. Process Evaluation

Public Sector sites (pathfinders and test-beds)	14	13	32	21	34
<b>Total</b>	<b>29</b>	<b>30</b>	<b>41</b>	<b>29</b>	<b>59</b>

Contact details for all stakeholder groups were provided by ESC. For interviews with public sector sites, representatives were based on the main point of contact at each site for liaising with ESC to deliver MEP. All interviews were carried out via video conference (MS Teams) and lasted around 1 hour on average.

### Limitations with achieved interviews

In Phase 2, all 41 public sector sites which were actively engaged in delivering the MEP programme were invited to participate in interviews as part of the evaluation<sup>4</sup>. Eleven site representatives did not respond or declined the request (largely due to time constraints). There is some scope for unknown bias if non-responding sites had different experiences of participating in the programme than the sample interviewed. However, the sample of 30 sites interviewed (across Phase 1 or Phase 2 of the evaluation) provide a good representation of: the different types of public sector sites involved (hospitals, prisons, armed forces estates and one HMRC office estate), the range of low-carbon solutions identified, different building characteristics and a spread of sites across different locations in Great Britain. The data gathered is considered sufficient for answering the core evaluation questions.

### Longitudinal Case studies

Data was collected from some of the same sites a number of times during the course of the evaluation, through Phase 1 and Phase 2 interviews, Action Research interviews and workshops. The information gathered was used to underpin the development of six case studies (three site-level case studies and three sector-level case studies) to illustrate the journey from their initial motivation to participating in MEP, to the benefits achieved and lessons learned. Other sources of evidence used to gain an overall picture of the experience of each site in engaging with MEP included; programme documentation, T&D installation data, a review of public sector / department decarbonisation policy and strategies, insights from Action Research workshops, and a review of the Concept Design plans developed for each site.

### Site-level case studies

Three individual case studies (Table 4) were developed at the site level, one per department involved in MEP (NHS, MoD and MoJ). The sites selected for this case studies were chosen based on the following parameters:

- Sites participating in the two key strands of the programme, Concept Design and T&D workstream
- Sites with access to Ecodriver platform
- Sites that had been part of Phase 1 and Phase 2 round of interviews and in Action Research

### Table 4. Site-level Case studies

<sup>4</sup> One university which was involved in Phase 1 of MEP but subsequently withdrew from the programme was not invited to take part in interviews, as the evaluation focused on Phase 2 of MEP.

#### 4. Process Evaluation

Department	Site Name	
NHS	Royal Marines Base at Chivenor (RMB Chivenor)	Used by the Royal Navy, Royal Marines and Royal Air Force for accommodation and training purposes
MoD	Royal Hampshire County Hospital	District General Hospital
MoJ	HMP Usk and HMP Prescoed	Category D and C prisons

Each site-level case study included:

- **Introduction to the site and role in MEP** - background information on the profile of the site; its purpose, location, the number and basic characteristics of buildings within the site; the types of heating systems in use and any information on overall levels of gas and electricity consumption. The introduction also included a summary of the sites' motivation for participating in MEP (drawing upon interviews) and what benefits they aim to achieve.
- **Project timeline** - the timeline for their participation in MEP including Onboarding, Discovery, installation of sub-metering, access to Telemetry, and development of their Low Carbon Plan.
- **Site stakeholders involved in project coordination and management** - the roles of key stakeholders in coordinating the sites engagement with MEP and managing delivery, including the roles of site-level estate managers and FM contractors, and oversight by central departments and their delivery agencies. This included a summary of key points on what has worked well/lessons learned from these management arrangements.
- **Key Benefits (achieved and potential future benefits)** - Drawing on the Concept Design plans, interviews and any insights from Telemetry data, this section provided an overview of the extent of sub-metering installed and a summary of low carbon solutions proposed in the Concept Design plans, implementation of energy efficiency measures so far and their expected benefits and an overview of what measures could be implemented by when, post-completion of MEP.
- **Lessons learned** - Summary of challenges faced in delivery and how these were overcome e.g., gaining approvals for site access, escorting arrangements, coordinating implementation of sub-metering and gaining approvals for funding to implement measures. Additionally, any insights on what transferable learning has arisen for other sites was captured.



## 4. Process Evaluation

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### Sector-level case studies

Three sector-level case studies were developed, one for each department involved in the MEP programme (NHS, MoJ and MoD). Sector case studies followed a similar structure as the site-level case studies:

- **Introduction** – Outlining the involvement of the department in MEP, how sites were selected and motivation of the department to be part of MEP. It also includes a description of key decarbonisation strategies and targets of the departments and how these are aligned with MEP programme.
- **Governance arrangements (part of introduction)** – Describing the processes in place for: monitoring energy consumption, identifying opportunities for efficiency improvements, and decision-making processes for obtaining approval to commission upgrades to energy systems or building infrastructure.
- **Programme-level achievements** – Presenting an overview of what T&D is and what the CDPs are and their intended benefits as well as an overview of sub-metering installed, CDPs designed, support received for business cases and for the application of energy efficiency measures at pathfinder sites. It also includes a description of achieved benefits to date at the departmental level.
- **Lessons learned and future plans** – Finally, this section described the main barriers or setbacks to achieving programme-level goals, wider benefits / learning for the department arising from participating in MEP and future opportunities for further progress in implementing low carbon solutions in public sector sites.

### Analysis and synthesis of data

The EQs, ToC and process mapping provided the basic structure for the analysis and synthesis of data.

All interviews were audio recorded (with respondent's consent) and then transcribed into individual Word documents. The software package *Trint* was used to provide an automated first draft of each transcription, which then was cross-checked by interviewers for any inaccuracies. An Excel based analysis framework was developed, where all excerpts from transcripts were stored, to categorise interview data against themes relevant to each evaluation question. The data was then analysed to explore the range of sub-themes emerging in relation to each question and provide an assessment of findings. One member of the evaluation team provided an initial assessment of findings for each topic, and then a second evaluator reviewed the data to check for completeness and validate the findings. Interview findings were also triangulated with other secondary resources where relevant, including programme T&D data, the Concept Design plan reports and findings from the Action Research.

# 5. Action Research

## Introduction

Action Research is a participative research approach that helps us to understand how interventions and programmes work in practice and aids in testing and refining the evidence base to support future programmes and policy. Action Research relies on continued interaction and collaboration between the researcher and participant, improving the quality of research outputs and creating a live learning environment for both researchers and participants.

Whereas in traditional research approaches, there is a relatively unbridged division between researcher and subject, in Action Research the subject collaborates with both the researcher and other subjects to shape and participate in the research activity. It also includes an element of implementation and feedback that is not normally part of a traditional research or evaluation approach.

This report summarises the Action Research approach taken by Carbon Trust and presents insights and learnings from engagement with Ministry of Defence (MoD), Ministry of Justice (MoJ) and National Health Service (NHS) site-level and departmental representatives involved in the MEP programme to support evidence strengthening for wider public sector decarbonisation and future programmes.

The key benefits of Action Research to this evaluation include:

- Action Research enables participants to influence the design of the research, ensuring it is optimised to both the research questions and participant needs or characteristics.
- The participative nature of Action Research means that it better represents stakeholder perspectives and therefore creates a stronger evidence base around barriers and solutions to accelerating public sector decarbonisation, which can inform upcoming policy decisions on public sector decarbonisation.
- Using an Action research approach created a live learning environment for participants. Alongside participating in 1-1 interviews, site-level representatives attended workshops to unpack key findings from similar MEP sites and to collaborate on further barrier identification and problem solving. Knowledge sharing between sites aids action plans for progressing outputs from the CDPs.

## Methods

The process for Action Research scope development and site selection was conducted through an assessment of key research themes and prioritisation by different site characteristics. The Action Research approach comprised four key elements:

## 5. Action Research

**Figure 4. Key Stages of Action Research**



### Scope selection

Themes for Action Research were determined through feedback provided in interviews with sites as part of MEP evaluation Phase 1 interviews and from low carbon engineering consultancies who have been involved in the programme. This list was circulated to DESNZ, who provided consolidated feedback that prioritised two key themes:

- (i) Concept Design plans (CDPs)
- (ii) Telemetry and Data.

The research questions were used to prioritise the aims for Action Research and develop questions for site interviews. As part of the Action Research approach, Carbon Trust looked to strengthen evidence of the value of CDPs and T&D to delivering decarbonisation of public sector sites:

**Table 5. Action Research Themes and Key Research Questions**

Theme	Key research questions
CDPs	<p>What is the value of a CDP (linked to the overall decarbonisation process)?</p> <p>At a site level, what are the key benefits of having developed a CDP?</p> <p>What elements of a CDP are most valuable in helping sites take action towards decarbonisation?</p> <p>From a site-level perspective, what are the perceived benefits of adopting a whole-systems approach towards developing CDPs?</p> <p>What skills and capabilities are required to progress the outputs from CDPs?</p> <p>What is the perceived value of completing pilot CDPs for supporting wider organisations action?</p>
T&D	<p>Building on insights from MEP, what are the T&amp;D use cases and what is its perceived value in assisting carbon reduction across individual sites (based on quantitative evidence where possible)?</p> <p>What methodologies have been adopted to analyse T&amp;D datasets?</p> <p>Is there a definition of 'good' data relating to T&amp;D? What is the optimal resolution and scale of data?</p> <p>Who are the users and are there sufficient skills and time available at a site level to use T&amp;D effectively?</p>

## Site selection

An even distribution of sites was selected to participate in interviews for each element of the involvement in the MEP programme: sites participating in T&D (3), sites receiving a CDP only (3) and sites participating in/receiving both (4). To ensure site selection captured the diversity of sites, sites were also selected on the following criteria:

- Site type
- Site size
- Sub-metering coverage including target and actual installations
- Location
- Total consumption and % reduction of energy usage in CDPs (CDPs)
- PSDS<sup>5</sup> Application Submissions and Status (CDPs)
- Ecodriver platform training attendance (T&D)
- Ecodriver platform engagement (T&D)

DESNZ and/or ESC suggested the most relevant representatives for each site or department to invite for Action Research interviews. Carbon Trust then co-ordinated interviews on a site-by-site basis with relevant individuals.

**Table 6. Overview of Site and Site Representatives Interviewed**

Department		Scope	Job Roles
MoD		CDP	Area Utilities Manager
MoD	T&D	Area Utilities Manager	
MoD		CDP	Area Utilities Manager
MoJ	T&D	Service Delivery Manager	
MoJ		T&D + CDP	Service Delivery Manager
NHS	T&D + CDP	Estates Director, Assistant Director of Estates and Facilities	
NHS		CDP	Service Delivery Manager
NHS	T&D + CDP	Energy & Sustainability Manager	

<sup>5</sup> Public Sector Decarbonisation Scheme

## 5. Action Research

NHS		T&D	Energy & Environment Manager
MoJ	CDP	Service Delivery Manager	

In addition to sites, three central department sustainability leads were interviewed - one for each of the main public sector organisations (MoJ, MoD and NHS).

### Participant discussions

Interviews were co-ordinated directly with the relevant site and department representatives suggested by DESNZ and ESC. It must be noted that participants had a varying degree of involvement in the full MEP programme due to changes in role and availability.

The discussion primarily focused on:

- Exploring the perceived value of using T&D to support public sector decarbonisation programmes and policies
- Identifying the overall value the development of CDPs has had on sites' decarbonisation strategies
- Discussing the key skills and capabilities that are required to use T&D datasets effectively and progress CDPs for use beyond the MEP Programme.

### Dissemination of findings

Interview insights were disseminated by:

- Feeding back learning to relevant MEP sites and interview participants to help to address T&D challenges and/or take forward CDPs through a site-level workshop led by the Carbon Trust (January 2022).
- Engaging DESNZ and OGP policy and programme stakeholders in an interactive key findings discussion and problem-solving workshop to support and strengthen wider public sector decarbonisation evidence and strategy.
- Summarising the Action Research methods, findings and learnings to strengthen the evidence base for wider public sector decarbonisation policy and future programmes within the evaluation report, plus provision of a stand-alone full version of findings for internal use by DESNZ, OGP and other government policy and programme stakeholders.

# 6. Economic Evaluation

An economic value for money assessment was undertaken to address the following evaluation questions, as specified in the Invitation to Tender specification:

- Does the MEP programme represent value for money?
- Does the present value of expected future benefits outweigh the costs?

## Value for money ‘three Es’ assessment

The approach taken was to assess value for money following National Audit Office (NAO) guidelines to assessing value for money, using ‘three Es’ criteria<sup>6</sup>:

- **Economy:** minimising the cost of resources used or required (inputs) – “spending less”. For example, the extent to which the MEP approach to commission a consortium of engineering contractors to develop Concept Design plans across 24 sites led to economies of scale compared with each site commissioning their own decarbonisation plan individually (leading to overall reduction in public sector spend).
- **Efficiency:** the relationship between the output from goods or services and the resources to produce them – “spending well”. For example, whether shared learning across MEP contractors to estimate costs and benefits of a wide range of technologies across sites contributed to the production of more robust Concept Design plans.
- **Effectiveness:** the relationship between the intended and potential/ actual results of public spending (outcomes) – “spending wisely”. For example, the extent to which outputs of the programme (such as Concept Design plan reports) are considered to be effective and could lead to intended outcomes being achieved if plans are implemented by sites e.g., meeting the goal of a 50% reduction in emissions at public sector sites by 2032.

A fourth ‘E’ – Equity is also outlined in the NAO guidelines. This considers whether the programme has ‘spent fairly’ by facilitating equal outcomes for eligible participants. This is relevant for programmes where consideration of distributional impacts is important, such as the effects on disadvantaged groups of the population or regional effects and contribution towards ‘levelling-up’ policy aims. This is not considered relevant for MEP. MEP has selected a range of public estates for participation according to pre-defined criteria, including achieving a spread across England, Scotland, Wales, public sectors with campus style sites, and buildings with different physical characteristics and energy systems.

For Economy and Efficiency, analysis was largely based on qualitative data from interviews. For Effectiveness, we used an excel-based model to analyse quantitative data from ESC and the Concept Design plans to calculate both projected costs and benefits of the Concept Design plans at a programme and sector level. The model was also used to assess how effective MEP decarbonisation plans could be in meeting the overall target of a 50% reduction in public sector emissions by 2032 if implemented by sites.

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<sup>6</sup> <https://www.nao.org.uk/successful-commissioning/general-principles/value-for-money/assessing-value-for-money/>

### Economy and Efficiency

Evaluation of Economy and Efficiency were largely based on qualitative data from interviews. Specifically, interviews with MEP programme delivery managers and site representatives.

Interviews from both Phase 1 and Phase 2 of the evaluation were used in this analysis. The Phase 1 interviews were carried out via video conference calls or telephone, over a four-week period from 22 February to 19 March. Phase 2 of the evaluation included a second round of interviews between November 2021 and January 2022. Table 1 in the main report provides an overview of the number of representatives of each stakeholder group interviewed.

Interview transcripts were analysed to identify relevant information regarding minimising costs and ensuring resources are used appropriately to result in sufficient outputs.

### Effectiveness

#### Overview

A quantitative analysis assessing the Effectiveness of the programme (the intended results of public spending (outcomes)) was carried out to model scenarios of implementing the intended outcomes (the implementation of low-carbon solutions), and their potential costs and benefits. This analysis was also used to confirm whether site-level, sector-level, and programme-level plans would result in the anticipated 50% reduction in public sector emissions by 2032 if implemented by sites, and how much public funding would need to be unlocked to implement the recommended measures.

However, it is explicitly noted that the economic success of the Modern Energy Partners programme is not based on whether interventions outlined in the Concept Design plans have been or will be implemented by sites. The purpose of the quantitative analysis is to hypothetically test the effectiveness of the designed plans against the emissions reductions objectives for sites. An assessment of the actual carbon savings that may result from future implementation of decarbonisation interventions is beyond the scope of this project.

Further, as noted in the Final Report, the extent to which sites will implement all measures in their Concept Design plans in future is currently uncertain. In addition, direct benefits of implementing the Concept Plans will not be wholly attributable to MEP.

Most sites have not yet begun implementing measures, therefore have not yet realised benefits of the energy solutions. Ex-ante projections were calculated for costs and benefits from 2022 until 2050. A Cost Benefit Analysis (CBA) was used to quantify the hypothetical costs and benefits, and to demonstrate whether the net present value of expected future benefits outweighs costs (in monetised terms).

#### Model Parameters

Key model parameters included intervention scenarios ('High', 'Mid', and 'Low' level) and intervention implementation dates. Intervention dates were selected from ESC's model pathways ('High', 'Mid' and 'Low') outlined in site Concept Design plans. However, it should be noted that a limitation of this selection process was that we did not have access to the Concept Design plans of any MoD sites and 5 other NHS/MoJ sites. For these sites, a simplifying

## 6. Economic Evaluation

assumption was necessary – all recommended measures were assumed to be implemented in 2022. This is likely to positively skew output metrics for the MoD analysis and analysis of the NHS/MoJ sites.

Asset lifetimes were also used for all interventions. These asset lifetimes were calculated using assumptions from British Energy Efficiency Survey (BEES)<sup>7</sup> where applicable. Where no clear asset life was applicable (12 of 383 interventions), a simplifying assumption of 10 years was used. No asset renewals were assumed in the analysis.

The Technopolis approach used data from ESC<sup>8</sup> to calculate costs that would be needed to implement decarbonisation measures recommended in site Concept Design plans (capital expenditure and increases in operating costs) and the associated benefits (emissions reductions and operating cost reductions) per year if interventions were implemented by sites. These were used to produce monetised discounted annual values for costs and benefits. These results were produced at an intervention level, and then aggregated to site level, in order to compare calculations with site level data from ESC.

An Excel-based survey was also sent to site representatives to gather information on whether or not they had begun implementing each measure listed in their Concept Design plan, whether they were planning to do so in future and, if so, the extent to which implementation may be attributed to their participation in MEP. However, only nine sites completed the survey, and this was considered insufficiently representative data for inclusion in this analysis.

### Emissions Reductions

The emissions reductions for each intervention were calculated for each site, and aggregated to sector-level and programme-level ‘intervention-enabled’ emissions reductions (tCO<sub>2</sub>e).

A worked example of a single site is shown in Table below.

To reflect the ESC methodology for identifying site level emissions reductions, intervention-enabled emissions reductions (Item C) were added to the expected emissions reduction under the 2032 decarbonisation BAU pathway (A-B). Item B relates to ‘business as usual’ decarbonisation of the electricity grid that will occur anyway, in the absence of MEP. The total reductions (D) were then compared with the ‘business as usual’ baseline scenario (A) which does not account for grid decarbonisation to identify a site-level emissions reduction (E).

A limitation here was that Technopolis does not have details of the ESC calculations used to account for grid decarbonisation that relate to site level 2032 decarbonisation BAU pathway.

**Table 7. Site level emissions reductions - worked example**

BAU baseline	BAU 2032	Reductions - interventions only	Total Resultant Reductions 2032	Reductions
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<sup>7</sup> <https://www.gov.uk/government/publications/building-energy-efficiency-survey-bees>

<sup>8</sup> ESC provided an excel spreadsheet with all interventions that were proposed as part of all 24 site CDPs. The data included, per intervention: the resultant increased/decrease in operating cost; required intervention capex; resultant increase/ decrease in traded and non-traded emissions; whether an intervention was on the ‘High’, ‘Mid’, or ‘Low’ pathway; whether the intervention was listed as a primary, secondary, or alternate option. The ESC spreadsheet also provided the total site emissions (existing, BAU baseline for 2032– i.e. emissions levels without any grid decarbonisation in 2032, Pathway emissions 2032 – i.e. the emissions level in 2032 with grid decarbonisation)

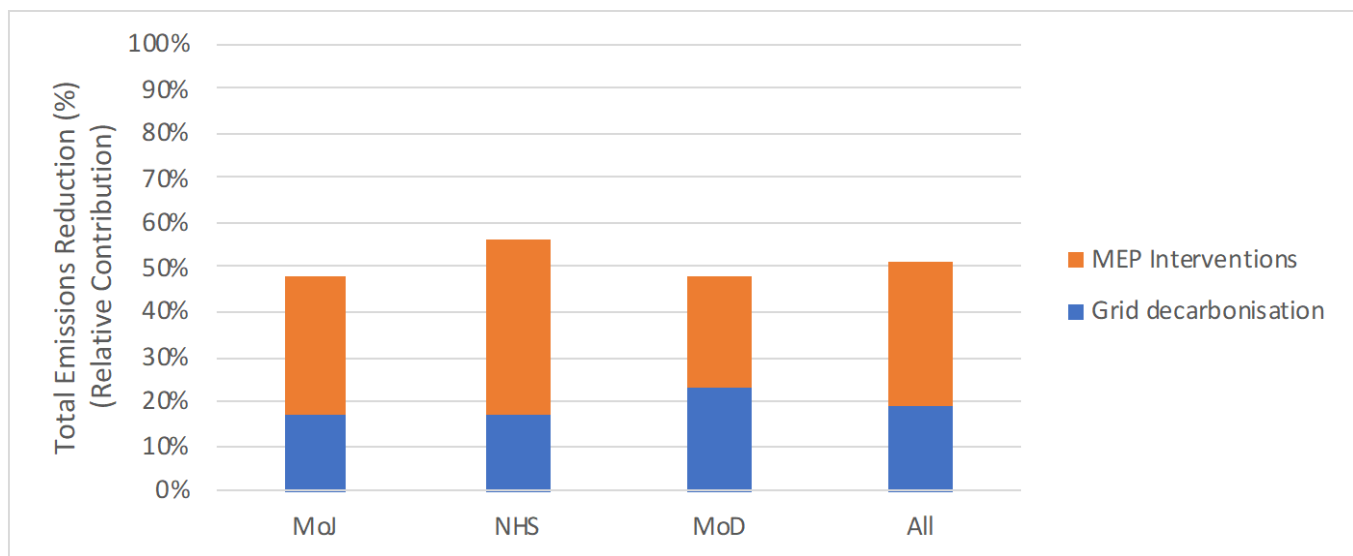


## 6. Economic Evaluation

Unit	tCO2e	tCO2e	tCO2e	tCO2e	%
Item	A	B	C	$D = (A-B)+C$	$E = 1-(D-A)$
Value	1,935.20	1,594.54	1032.30	1,372.96	70.9%

The resulting emissions reductions consider the emissions reductions as a result of the MEP decarbonisation measures, if implemented by sites, in addition to emissions reductions from general grid decarbonisation. Figure below ('Mid' scenario) shows the relative contribution of implicit decarbonisation of the system (blue) and explicit MEP interventions (orange) to overall emissions reductions per sector, and at programme level, until 2032.

**Figure 5. Relative contribution to total emissions reductions**



## Economic Evaluation Model

The economic evaluation model produced the following outputs:

- **Net Present Value (NPV):** The net present value is the sum of the present values of the net benefits (or costs) incurred over the study period. An NPV greater than 0 represents a positive programme investment. To focus on the return on public investment in MEP (at programme level), this could focus on NPV per public £ spent.
- **Benefit-Cost Ratio (BCR):** The benefit-cost estimates identify the quantified monetised value of benefits that will be achieved for a single unit of cost. A programme with a BCR greater than 1 represents a positive programme investment.
- **Evaluation of payback periods:** The period in which the NPV changes from negative to positive is known as the payback period, and measures how long the programme will take to "pay for itself." This is the year that NPV moves above 0, and BCR moves above 1.

The metrics above only used benefits that were attributed to the interventions identified in the Concept Design plans for each site. Whilst the emissions reductions reported included the total

## 6. Economic Evaluation

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of MEP interventions and grid decarbonisation effects, the values for emissions reduction benefits only reflects emissions reductions associated with interventions suggested by MEP.

Therefore, the analysis allows comparison of the expected HMG investment costs to deliver MEP carbon reductions if interventions are implemented by sites, without including any grid decarbonisation benefits that are expected to happen regardless of the MEP programme.

### Data sources

The data used is primarily sourced from the ESC modelling data used to underpin the Concept Design plans, but other data sources were utilised.

- The ESC economic model provides information on recommended site measures, their associated costs and benefits, and their impact on emissions. The ESC model also provides information on intervention pathways, by dictating whether interventions for each site are part of the 'Low', 'Medium', and 'High' pathway.
- The Concept Design plans outline a suggested temporal pathway for intervention implementation, recommending when measures should be implemented in order to meet the emissions reduction goals. These dates were used to specify the intervention implementation dates within our model.
- The social discount rate used to determine the current value of future costs and benefits was sourced from HM Treasury's Social Discount Rate for Cost-Benefit Analysis Report.<sup>9</sup>
- Carbon values in £2020 prices, per tonne of CO<sub>2</sub>, were sourced from BEIS (a predecessor to DESNZ) Policy Paper, 'Valuation of greenhouse gas emissions: for policy appraisal and evaluation'.<sup>10</sup>

### Scenarios

Results were calculated for three main scenarios based on assumptions. These scenarios were based on ESC's defined intervention pathways of 'Low', 'Medium' and 'High' pathways. In the ESC model, each intervention is included in between one and three of these pathways for each site. The 'Low' scenario typically has the lowest associated costs and results in the lowest emissions reduction (benefits) if the interventions are implemented, while the 'High' scenario incorporates more cost intensive technologies (such as solar PV, wind, and heat pumps) and results in higher emissions reductions if interventions are implemented. For each site, not every measure included in the ESC model was present in their Concept Design plan.

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<sup>9</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/935551/Social\\_Discount\\_Rates\\_for\\_Cost-Benefit\\_Analysis\\_A\\_Report\\_for\\_HM\\_Treasury.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/935551/Social_Discount_Rates_for_Cost-Benefit_Analysis_A_Report_for_HM_Treasury.pdf)

<sup>10</sup> <https://www.gov.uk/government/publications/valuing-greenhouse-gas-emissions-in-policy-appraisal/valuation-of-greenhouse-gas-emissions-for-policy-appraisal-and-evaluation>

