The Net Zero Delivery Vehicle Scoping Study

Facilitating flows of private capital for net zero programmes in South East England

Final report

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Project Team & Authorship

This report was produced as a collaboration between EP Consulting, Ibex Earth and the Greater South East Net Zero Hub (formerly the Greater South East Energy Hub), with the support of three local authorities: Essex County Council, Surrey County Council and Brighton and Hove City Council. The team responsible for the wider delivery of this research and innovation project is described below, along with a short description of their background and experience:

Leo Bedford (Partner): Leo is a seasoned financier, with a specialist interest in sustainability and the delivery of social goals alongside financial ones. He manages and operates EP Asset Management, our subsidiary company providing a range of transaction services with a focus on connecting impact driven companies and projects with capital; covering all stages of investment solutions.

Alex Rathmell (Managing Director): Alex is an entrepreneur and manager with extensive experience working with corporate and public sector clients on demand-side energy performance projects and programmes. He is leading the development of EP Connect's ESCO-in-a-box (EIAB) platform. As Project Manager, Alex will manage key team deliverables and ensure quality control.

Connor Enright (Consultant): A graduate from University of East Anglia, where he obtained a Master's degree in Natural Sciences, Connor brings cutting edge environmental economics & socio-technical skills with interdisciplinary expertise ranging from data structures to control systems. Connor works with a multitude of stakeholders on the *CREATORS* project, developing options for community energy systems from technical and financial viability perspectives.

Chris Livermore: Chris is the founder of Ibex Earth, a not-for-profit sustainability consultancy that delivers long-term, sustainable change for our planet. Chris specialises in supporting public and private sector organisations to develop, finance and deliver their strategies for clean and sustainable growth. Chris has made many notable achievements to date, having helped clients secure more than £150 million worth of funding, as well as supporting a growing number of local authorities across the UK and abroad. In addition, Chris has won international awards for his work, including the prestigious Captain Scott 'Spirit of Adventure' Award for 'The Lost World Project'.

Prior Work:
This work built off expertise developed through the construction of EP Group's ESCO-in-a-box (EIAB) ecosystem. This is an end-to-end service which facilitates the delivery of high-quality energy improvement and decarbonisation projects across the UK and globe. This ecosystem utilises a place-based approach similar to the one developed by by this report, and contains many of the de-risking measures we intend to integrate here. The EIAB ecosystem may form part of the final solution proposed below, but this report focuses on how the UK's delivery mechanisms can evolve towards a holistic, wide-reaching net zero delivery vehicle. The report's authors would like to thank all ESCOs within the EIAB family for assisting with the development of best practice and place-based knowledge, as such knowledge is essential for driving forward an effective, equitable solution for the net zero transition across the UK.

Executive Summary

The Net Zero Delivery Vehicle (NZDV) Scoping Study was delivered by EP Consultancy and Ibex Earth for the Greater South East Net Zero Hub. The study was delivered with the assistance of three local authority (LA) partners, Surrey County Council (SCC), Essex County Council (ECC) and Brighton and Hove City Council (BHCC), along with additional supporters found in the "Stakeholder Map" section.

The UK's net zero target looms, but there are a range of barriers to the delivery of local net zero (NZ) targets. This study explores creating a specialised, place-based delivery vehicle to identify & address these barriers in UK localities. This will unlock emissions abatements and infrastructure essential for place-based decarbonisation whilst providing a replicable approach that can be rapidly deployed across UK regions in the 2022-2025 delivery window.

The approaches and analysis on which this summary is based are described in detail in the "Project Methodology" and respective research topic sections. However, these approaches build off of the hypothesis which is at the heart of this research:

> ***To increase the flow of capital into integrated net zero energy projects we need to address the of lack of development and financing capacity to turn economic potential into bankable projects.***

In searching for a **solution to the above hypothesis, a Net Zero Delivery Vehicle was conceptualised which**:

1) Focuses on bridging the development gap
2) Can access a range of Transaction Enablers to increase the volume/rate of development
3) Integrate various de-risking tools, addressing specific risk perceived by institutional capital

By integrating insight from LA partners reviewed literature, objectives were developed in line with LA priorities, ensuring the solution ***measures progress towards net zero (assuring these outcomes; addresses the gaps in skills, capabilities, capacity; and retains control and oversight for Local Authorities.*** Satisfaction of these NZDV objectives must be aligned with consideration of the underlying barriers, five of which were identified (see "Issues and barriers to Local Net Zero investment"):

1) *Lack of internal capacity, resources and skills across LAs*
2) *A general reluctance to adopt new approaches to financing the transition to net zero*
3) *Lack of experience in building large-scale decarbonisation programmes*
4) *Lack of coordination across national, regional and local approaches*
5) *Lack of decision-maker understanding to sign off multi-million-pound investment programmes*

These aspects fed into the design of a NZDV structure wherein LAs play a fundamental role beyond just procuring the solution. LAs will be integrated at both the set-up and operational phases to assure political, financial and technical oversight. LAs will not only help align each regional NZDV's business case with their own project development approach, but are uniquely equipped to provide the place-based insight to design a solution tailored to the needs and barriers of all regional stakeholders.

Each local barrier and challenge will need to be addressed through the NZDV if LAs are to accelerate the scale and pace at which net zero programmes are delivered and financed, leading to an options appraisal considering potential NZDV designs, which are presented at the end of this executive summary.

Although the scale of the challenge above seems large, it is proportional to the scale of the investment required (see "Current Pipelines of Local Net Zero Projects"). This investment will need to be deployed into a wide range of sectors and project types, confounding a "one-size-fits-all" approach. As such, insight was adapted from the UK Cities Climate Investment Commission's recent report on NZ investment, leading to the conceptualisation of Six categories or "taxonomies" of NZ investment were defined, to be applied as non-exclusive "tags" to projects, with each project capable of having multiple tags. These are:

> *Domestic Building Decarbonisation; Non-Domestic Building Decarbonisation; Renewable Electricity Generation; Transport Decarbonisation; Waste Management Decarbonisation; Green Infrastructure (Natural Capital)*

Pipeline and Investment Findings

The six taxonomies of NZ investment defined enabled the team to arrange and analyse projects in taxonomic pipelines, from which a **pipeline of bankable net zero projects was identified** across the Tri-LEP area. The study, described in detail in "Advancing the State of the Art", examined both internal (council-boundary only) and county-wide investment, finding the proportion of internal investment as just 0.84-0.95% of total county-wide investment (equivalent to a council-county-wide leverage ratio of at least ~1:105). This means that **for every pound spent by councils internally, approximately £105 will need to be invested in county-wide decarbonisation over the 2022-2030 period**.

Overall, the level of investment varied little between LAs when normalised per head of population. Variation of +/- £500 (or ~14%) from the SCC's median value of ~£3500 was identified. This investment covers all taxonomic sectors, though with different proportional splits across the three LAs. Of the investments in SCC's case study, the largest tranche (~40% on energy efficiency), is not expected to pay back. Another £12.5 million (17.6%) of SCC's expenditure has uncertain payback, leaving only £27.5 million (~38.7%) for which payback is certain, although the resultant net return has not been investigated. This investment is not distributed evenly across the taxonomic categories, with the majority focusing on the decarbonisation of buildings and energy supply, as shown in the summary table (1) below:

Table 1: A summary of NZ pipelines across all three LAs, based upon SCC's assumptions.

Total across all three LAs based upon SCC's assumptions (doubling 2026-30; leverage rate of 1:55): **Total investment of £28.3-34.8 bn**					
Domestic and Non-Domestic Building Decarbonisation 61.3% of investment or **£17.3 billion**	Renewable Generation 30.7% of investment or **~£8.7 billion**	Transport Decarbonisation 6.6% of investment or **£ 1.9 billion**	Waste Management Decarbonisation Assumed equivalent to 0.2% of investment 2021-30 or **£56.6 million.**	Green Infrastructure (Natural Capital) Assumed equivalent to 0.2% of investment for 2021-30 or **£56.6 million.**	**£28.3 – 34.8 bn**

This split in investment aligns to some degree with the proportional contribution of these sectors to UK emissions, although there are some shortfalls from expected figures if this was the sole driving factor. More likely, any underinvestment for the 2022-2025 period arises from the current immaturity or complexity of approaches within these sectors. When looking at the

complexity of measurement, reporting and verification (MRV) approaches for SCC, it was found that transport and heat decarbonisation had higher MRV complexity, with energy efficiency occupying the middle ground and low complexity technologies such as LED lighting and Solar PV receiving initial large-scale investment. As such, each taxonomic sector was examined to understand what measures may be needed to de-risk projects and boost investment. These prerequisites for success are summarised below:

1. **Permissible technology maturity and complexity** of MRV
2. **Aggregation approaches, which mitigate multiple risks** through probabilistic means (see "Specification of Enablers, Aggregation and De-Risking Measures").
3. A **central structure enabling quality assurance procedures & high-level relationships** to be built and maintained. This will provide political accountability and oversight; the integration of rigorous project management and centralised performance monitoring, which may be supported at low cost through central software.
4. A **NZ procurement framework coupled with expert facilitation and project development services** to ensure both the origination & delivery of project pipelines are fully supported. An attractive solution that LAs could access easily and swiftly could be derived in part from EP's ESCO-in-a-box solution (EIAB), providing advantages around capacity building, impact reporting and performance data collection.
5. **Integration of LAs** to assure political, financial and technical oversight of the NZDV.

These approaches were complemented by 27 de-risking measures addressing all categories of risk. These were mapped onto an ideal project development lifecycle, with an exemplary risk mitigation specification produced for one taxonomy and a place-based process developed for selecting & applying the de-risking measures (Figure 1).

Figure 1: A place-based process developed for selecting & applying the de-risking measures

As stated, LAs will be integrated to assure political, financial and technical oversight. The needs of LAs will be complemented by consideration of financiers, who desire shovel-ready projects at scale, where only the "right" risks remain at appropriate levels. The needs of the two "client" groups can be balanced where the NZDV is deployed into a focused, proven asset class at scale, producing a deep project pipeline with low risk but high environmental impact. The selection of a single asset class allows best practice to be integrated at speed and builds relationships with local contractors and training institutions whilst centralising and standardising LA oversight in a replicable manner. This keeps both LA and financier risk exposure to minimal and quantifiable levels. From here, further project development units or pipelines would be assembled, replicating successes as capacity & technologies develop.

The revolving revenues from profitable "launchpad" asset classes can then subsidise further development and deployment work. Finally, the formation of remaining projects into mixed asset class pipelines will allow the piloting of any other de-risking/aggregation methods whilst stopping financiers from "cherry picking" the projects with greatest potential. The integration of the LA and financiers is shown in Figure 2 overleaf, wherein an arms-length vehicle such as an SPV is created through the procurement of a central NZDV Managing Organisation (MO). This arms-length organisation can then host or support the various project development units, connecting them to coordinating officials and departments within the LA (dark teal box).

These departments shall work alongside the LA S151 officer in overseeing and supporting the NZDV's activities. Meanwhile, the MO will allow for quality assurance at the lowest possible transaction cost, integrating best practice and collateral from systems such as EIAB. The MO also manages other key professional services such as project development specifications, framework access requirements, quality assurance/monitoring & measurement, verification and reporting (MRV) outputs.

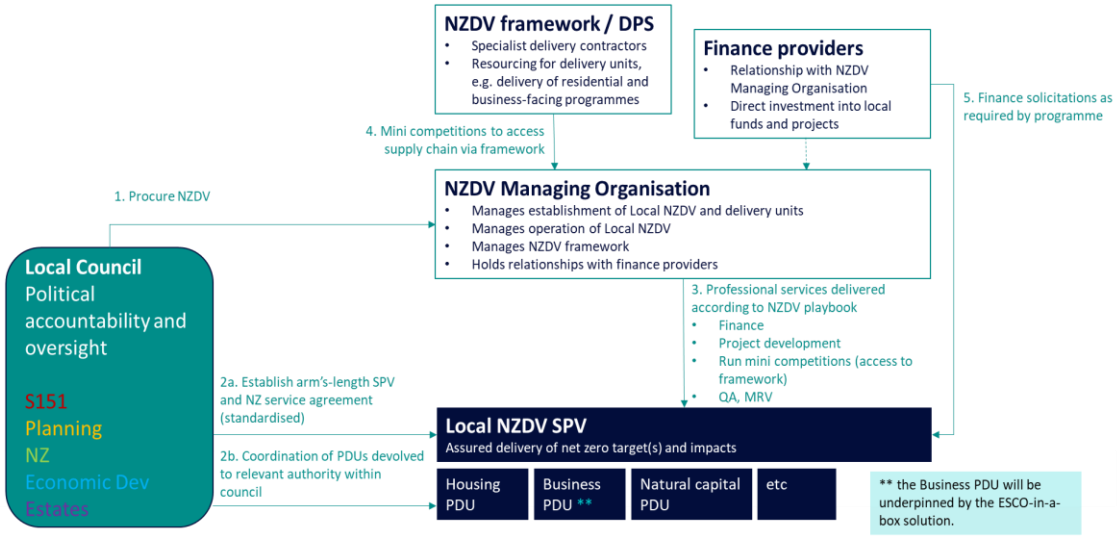


Figure 2: Initial NZDV design that enables LA oversight, centralised best practice and swift deployment

This structure allows LAs to invest & transfer control/risk of delivering NZ programmes via the NZDV. The role of the MO allows LAs to access capital across every domain of net zero, but does not require blending across domains. The diversity of approaches across LAs will not lead to a new asset class (as is the case with Green Bonds). Creation of novel asset classes tailored to provide portfolio effects may come as the NZDV's project pipeline and de-risking becomes more standardised, but initial focus will be on diversity and flexibility to ensure access to finance and to align off-balance-sheet investment with LA strategies.

Additionally, LAs will be able to 'sleeve' and directly matchmake external finance from a range of sources with their project development units (PDUs) and pipelines. These PDUs may contain community groups or other delivery organisations, but must be answerable to a LA, with clear missions to deliver against the authority's net zero target, and operational links to LA departments where their statutory roles affect the net zero transition. The authority's S151 officer and their team are responsible for all decisions regarding the authority's funding and investments via the NZDV, receiving proposals/advice from the NZDV, but will be supported by a finance expertise within the MO.

In return, the NZDV will be provided with an operating budget and development finance facility by the LA, to will be returned over the life of the NZDV through the arrangement of NZ investments and capture of regional externalities. Over time, the proposed development timeline will ensure LAs are able to access a growing range of low-transaction-cost services to deliver net zero whilst administrative burdens are front-loaded through the procurement framework. This ensures development of a NZDV which is responsible to the authority for the impact of net zero investments, adapting to local contexts and ensuring that appropriate quality assurance and MRV are incorporated into each project as the local contexts dictate.

Proposed options for funding NZDV set-up (see "Implementing Change") are shown below:

1) **Direct Investment:** This approach allows resources to be dedicated solely to developing the NZDV, accelerating outcomes and providing maximum abatement impact. This is the best option for helping the UK effectively & efficiently transition to net zero.

2) **Innovation Funding:** 3rd-party innovation grant funding will allow for dedicated resources to develop the NZDV, though likely at a smaller scale than with direct investment. This approach will also accelerate the launch, but scale will be limited to that specified by innovation funding, and the time taken to yield a successful application for innovation funding will further delay the upscaling of the NZDV. This type of funding is intensely competitive in the wake of the UK's exit from the EU and EU-funded R&D programmes.
3) **Public-Private Co-investment:** This approach will not enable great amounts of resource to be dedicated to the development of the NZDV by EP alone. Instead, an "at-risk" partnership would be assembled between EP and a LA partner, where each organisation would informally direct or second resources into the development programme. This approach can be combined with innovation funding, particularly where a public-private partnership is a pre-requisite. This approach would be conditional on the associate LA reaping direct benefit by launching pilots and gaining technical expertise for projects within their area, whilst EP would benefit from the redirection of project fees from the initial pipeline into a working capital seed for future development work and upscaling.

Options 2 and 3 were developed further through the phased deployment plan shown below:

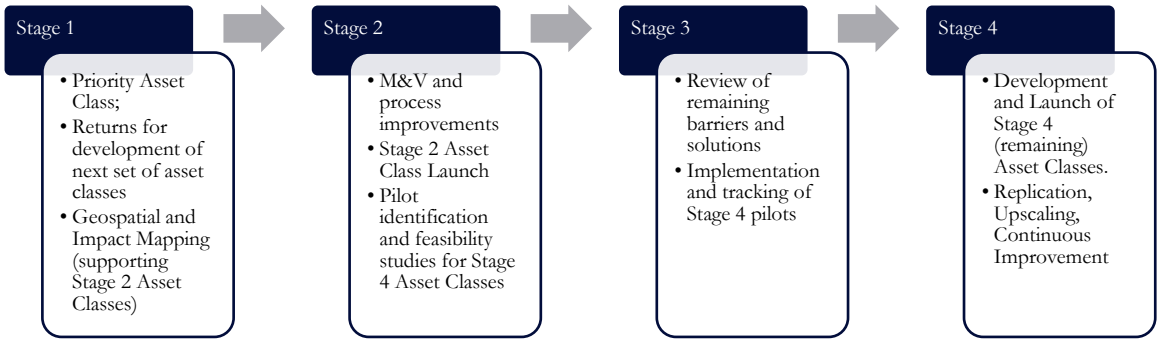


Figure 3: Phased deployment plan with an initial single asset PDU supporting further development.

The deployment plan shown in Figure 3 allows for flexibility and place-based engagement of the specific needs of each LA. Combined with EP expertise, the above approach will enable proven EIAB de-risking measures to be deployed rapidly and complemented by specialised asset-class-specific measures. This approach will address all five barriers faced by LAs, as detailed in the "Implementing Change" section.

Next Steps

Figure 4, below, shows a delivery timeline for the proposed solution. It is essential that the UK begins gathering momentum on the delivery of these net zero solutions, as strong, early action is the most effective way to reduce the impacts of climate change and transition to a green, sustainable economy.

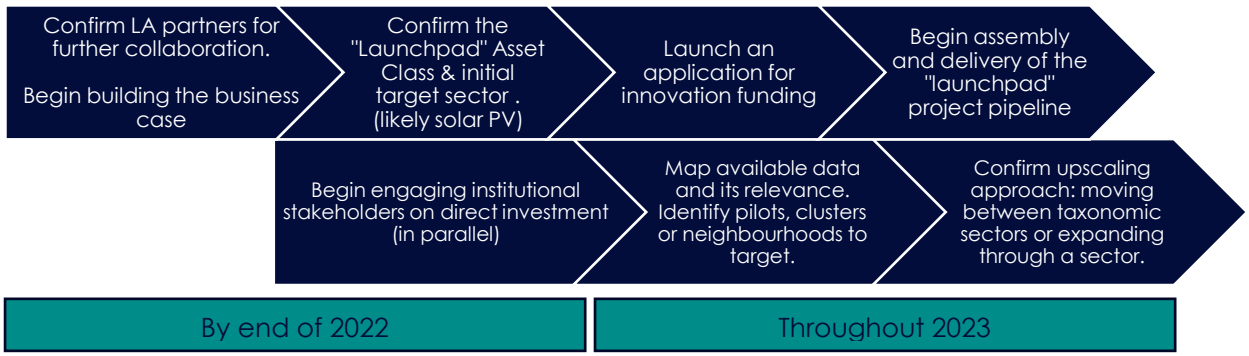


Figure 4: A delivery timeline for the proposed NZDV development approach, launching a solution by 2023.

Project Overview

This project aims to explore and address barriers to the delivery of local net zero targets, with the final aim of creating a specialised delivery vehicle to unlock emissions abatements and essential infrastructure for decarbonisation (the Net Zero Delivery Vehicle, or NZDV). This work begins by engaging with local authorities responsible for delivering these targets, and understanding their challenges. The challenges arise in part due to the complexity of net zero projects and their delivery, which require multiple aspects to be in place and suitably aligned. These aspects are described below (in Figure 5), and form the basis for our investigation and review of existing literature within the field.

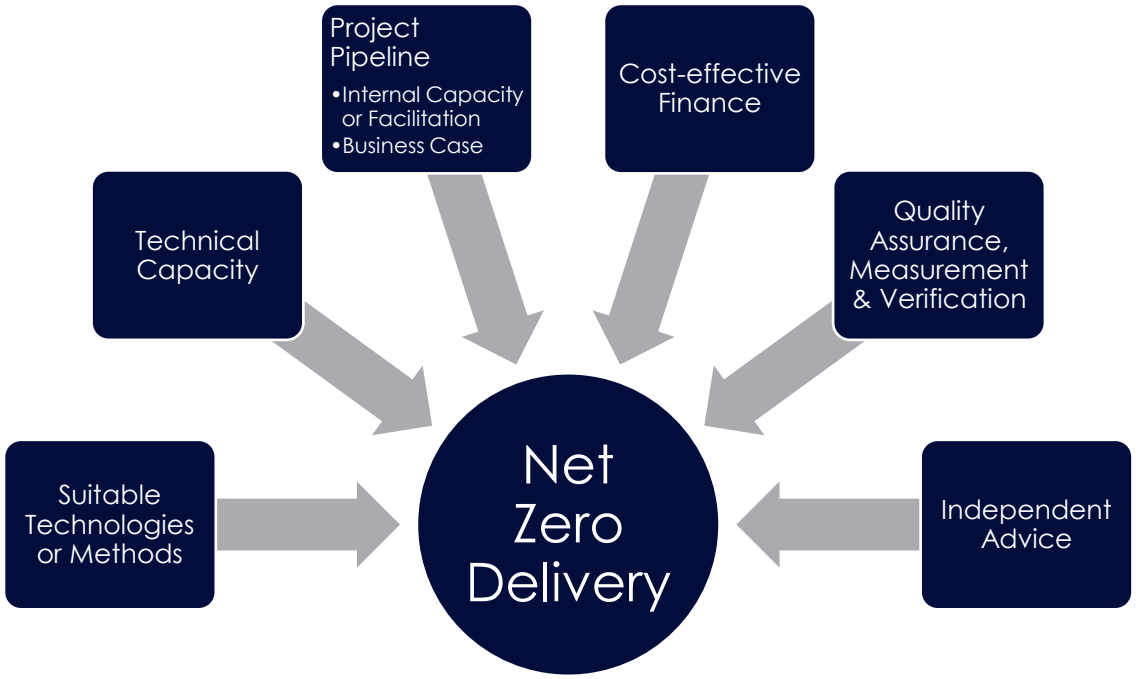


Figure 5: The elements required for effective delivery of the net zero transition

Project Methodology

This report follows a simple methodology, drawing on both local experiences and expertise, and emerging best practice and academic research. Novel investigations have been undertaken to understand the specific challenges within the development, funding and implementation of net zero projects. From here, the report will summarise the synthesis undertaken by the project team, prior to presenting proposed recommendations and conclusions with the aim of improving practical outcomes. The methodology is presented below in Figure 6:

Figure 6: A linear description of the methodology and research timeline.

Stakeholder Map

There are two relevant layers of stakeholders which require mapping and consideration throughout this project: those involved in the decision-making, development and delivery of the NZDV itself, and those who have the capacity to support the above activities from the wider regional landscape, ensuring success at various stages of NZDV delivery.

The Greater South East Net Zero Hub (GSENZH) is a collaboration of 11 LEPs, supported in the delivery of the NZDV by EP Consulting & IbexEarth:

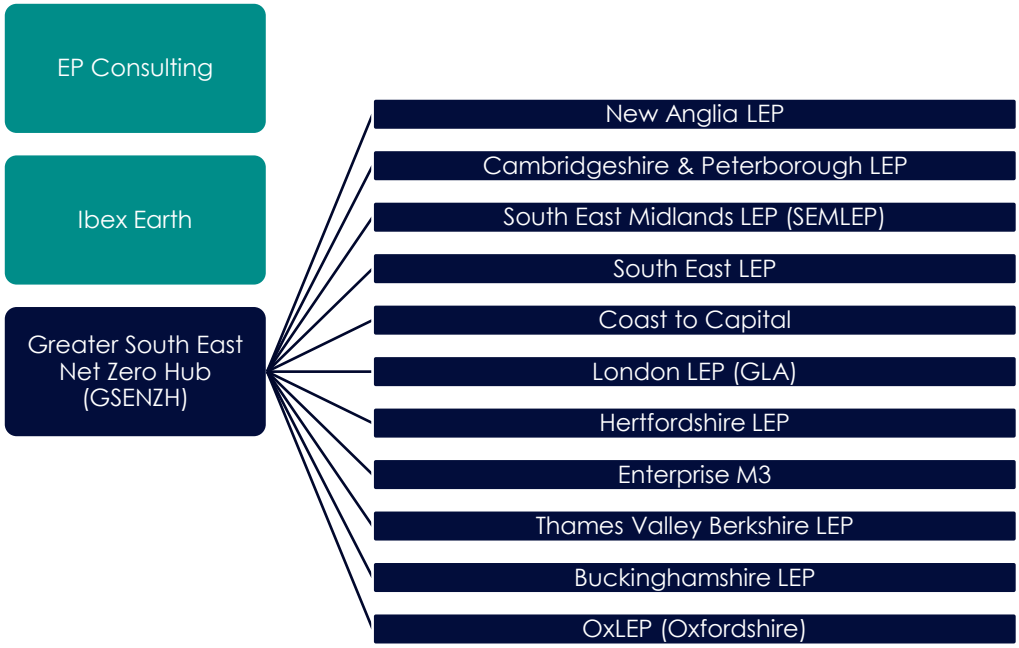


Figure 7: A stakeholder map showing component members of the delivery team and GSENZH.

In addition to the above core stakeholders (Figure 7), a range of supporting stakeholders are required to ensure the success of the NZDV, and its delivered services (Figure 8, Table 2). These supporting stakeholders have been categorised by their centralised/decentralised nature, and their focus on either public or private costs:

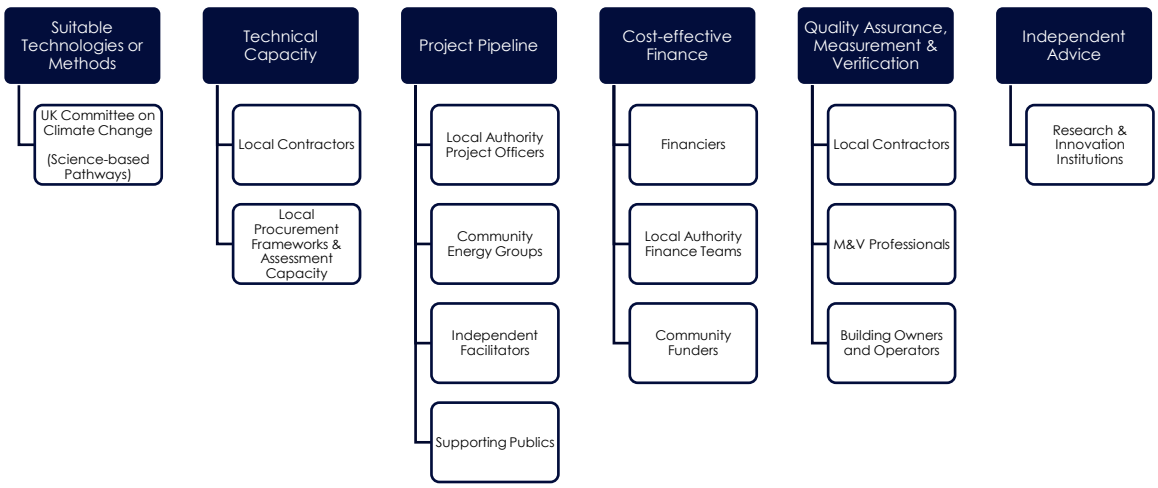
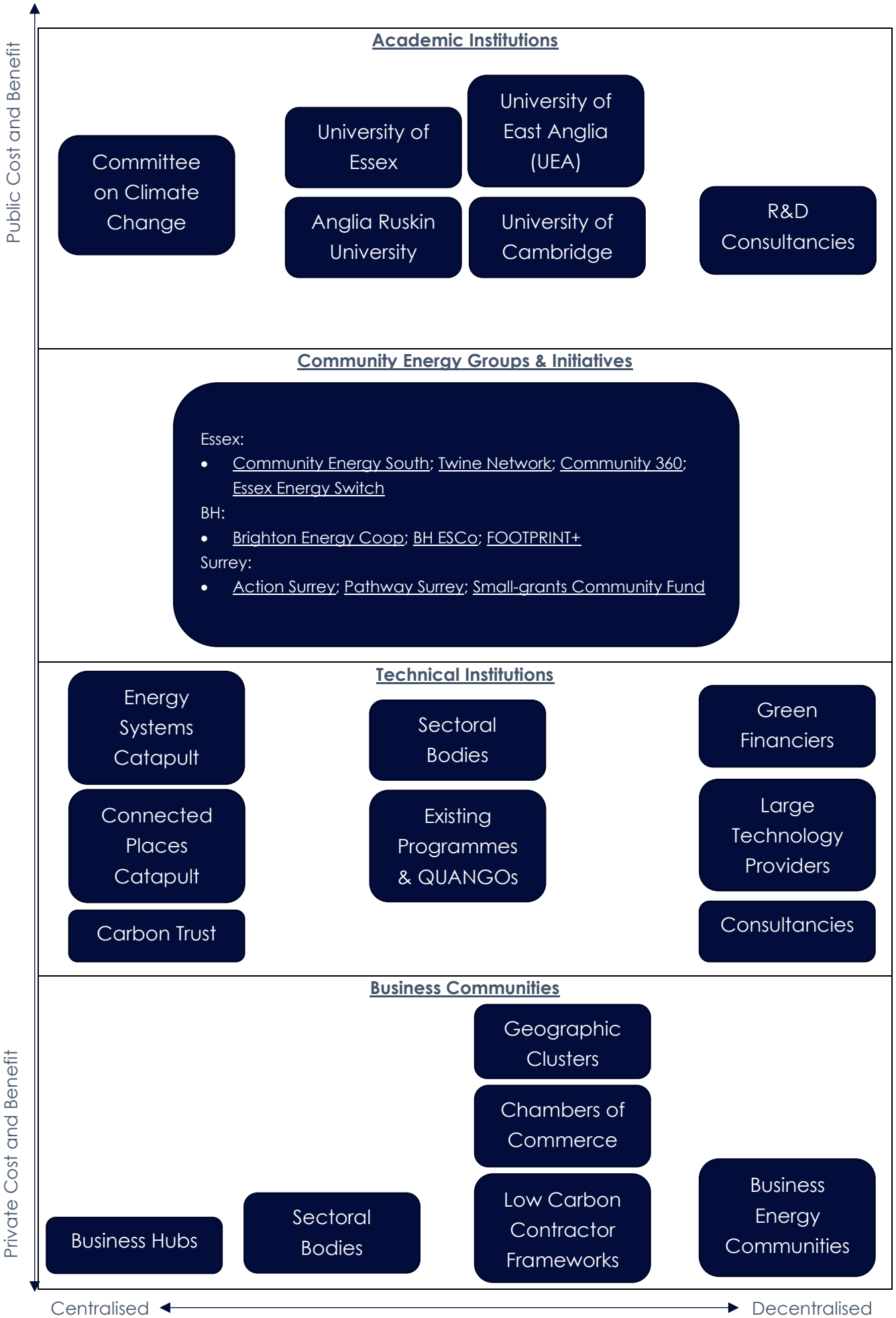


Figure 8: A categorised mapping of supporting stakeholders across the NZ realm.
Table 2 (Overleaf): Supporting stakeholders, categorised centralisation and focus on either public or private costs


Public Cost and Benefit
Academic Institutions
Committee on Climate Change
University of Essex
University of East Anglia (UEA)
Anglia Ruskin University
University of Cambridge
R&D Consultancies
Community Energy Groups & Initiatives
Essex:
Community Energy South; Twine Network; Community 360; Essex Energy Switch
BH:
Brighton Energy Coop; BH ESCo; FOOTPRINT+
Surrey:
Action Surrey; Pathway Surrey; Small-grants Community Fund
Technical Institutions
Energy Systems Catapult
Connected Places Catapult
Carbon Trust
Sectoral Bodies
Existing Programmes & QUANGOs
Green Financiers
Large Technology Providers
Consultancies
Business Communities
Geographic Clusters
Chambers of Commerce
Low Carbon Contractor Frameworks
Business Hubs
Sectoral Bodies
Business Energy Communities
Private Cost and Benefit
Centralised
Decentralised

Literature Review

The decarbonisation of the UK's infrastructure will require wide-ranging and varied elements to be established and aligned in order to successfully deliver our commitments and net-zero (NZ) targets. In order to determine the exact composition of these elements, we must consider the challenges faced by the stakeholders outlined in the prior section. From these challenges, a number of key solution elements will be proposed and considered for integration into the NZDV, drawing upon the latest literature.

This consideration will examine whether a solution element is the most suitable approach, whether it is currently feasible, and how best could the solution be structured to maximise the speed and effectiveness of NZ delivery. Although by no means exhaustive, some elements that may be suitable for inclusion in the NZDV are presented in Figure 9, below:

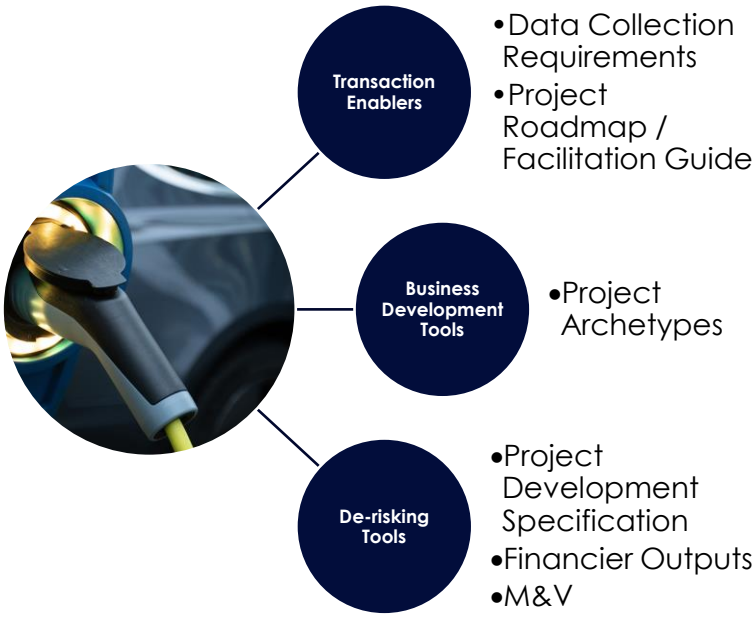


Figure 9: Components of the NZDV solution.

This section aims to utilise the necessary aspects described in Figure 5 as a launchpad to understanding where solution elements (transaction enablers, business development tools & de-risking tools) can be derived, adapted and improved.

Our investigation starts by examining the current best practice and understanding of the NZ delivery challenge, utilising the lens of current programmes and procurement frameworks to investigate the prevailing approach at various levels of government. At the centralised level, the independent Committee for Climate Change is responsible for setting and reviewing progress against centralised targets, including the production of centralised carbon budgets. Although much of the delivery of NZ investments and infrastructure is likely to happen at more localised levels of governance, the UK government has introduced Procurement Policy Notes to ensure that organisations tendering for major government contracts (with a VAT-exclusive value of >£5m) provide a Carbon Reduction Plan confirming and describing the supplier's commitment to achieving Net Zero by 2050 in the UK. Alongside this action, the UK Government is providing a range of centralised guidance, in addition to specific advisory and facilitation functions, including but not limited to the following programmes:

- **Net Zero Strategy: Build Back Greener**
- **Jet Zero: our strategy for net zero aviation**
- **Net Zero Estate Playbook**
- **Net Zero Public Engagement and Participation**, **Net Zero Public Dialogue** & **Net Zero Societal Change Analysis Project**
- **Fact Sheet: Net Zero-aligned Financial Centre**
- **Net Zero Society: Scenarios and Pathways**
- **Net Zero Review: Interim Report**
- **Energy White Paper: Powering Our Net Zero Future**
- **Net Zero Transport Board**
- **Net Zero Innovation Board**
- **Net Zero Buildings Council**

The documentation above reaffirms the value of centralised support functions, however the guidance provided by most of these resources is generalised to be applicable across the UK's varied context. Although this generic approach provides an evidence base on which further specialisation and consideration can be built, alone it cannot assist local authorities to deliver the nuanced and politically charged changes that are required to reach NZ. Here instead, central government relies on the Local Net Zero Programme to build local capacity and NZ capabilities, however the level of funding this has received falls far below what is required, with only £22m invested at the start of 2022. This funding shall enable the creation and continued support of five Local Net Zero Hubs (LNZHs), to promote best practice and support LAs in NZ project development that can attract commercial investment.

These LNZHs will likely need to take a similar, parallel approach to that proposed within this report, assembling and deploying the necessary elements described in Figure 9. This further verifies our approach, but little has been achieved in terms of blazing a trail for local governments to replicate and implement locally. As such, we must instead turn to the work these LAs are currently completing to reveal the best practice to be integrated and improved throughout this project.

Due to the scale and importance of the analysis of local authority NZ programmes (as the input pipeline for the future development of the NZDV), this analysis has been segregated into the section titled "Current Pipelines of Local Net Zero Projects". However, in order to fully understand the success and barriers experienced by these programmes, we must first consider the metrics relevant to defining successful NZ delivery. It should be noted that differing regions and programmes will combine environmental, social and governance objectives differently, and although we are primarily concerned with the long-term greenhouse gas abatement impact of these programmes, this is by no means the only measure of success. However, when focusing on this abatement impact, we can consider the following metrics and indicators:

Metric	Description
Overall Abatement /Drawdown	Total amount of emissions abated or drawn down by the programme
Marginal Abatement Costs, and ranges thereof	The marginal cost of abating one additional unit of CO_2 or GHG

Financial Metrics for the cost-effectiveness of projects	Such as simple payback and net present value (NPV)
Drawdown / Abatement Longevity	The amount of time for which emissions abatements or carbon drawdowns persist. A classic example would be carbon drawn down in a forest, which may be released upon deforestation. For abatements, an example would be non-permanent plugging of GHG leaks, such as those arising from the transport or storage of natural gas).
Robustness of Reporting and Verification	The presence of robust measurement and verification (M&V) procedures for abatements and drawdowns (qualitative).

As well as defining the success metrics for NZ delivery programmes, we must also understand the issues and barriers impacting current NZ delivery and uptake rates, both specific examples affecting individual programmes and those which are relevant to many programmes and interventions. For this report, we will focus on the latter issues, exploring these aspects in detail in the section titled "Issues and barriers to Local Net Zero investment". However, in order to guide this exploration, we have searched the literature to find high level definitions of common barriers and solutions encountered by LAs attempting to deliver NZ. These are presented below in Table 3:

Table 3: High level definitions of common barriers and solutions encountered by LAs during NZ delivery.

Barriers to NZ investment	Exemplar solution
Finance & Funding: • Insufficient Funding: The amount of funding required to meet many LA's net zero commitments far exceeds the capital made available by individual councils. In order to truly deliver net zero, additional funding must come from the private or public sector, though likely a blend of these sources will be required. • Misaligned Finance: Whilst private and public sector finance may be available in some contexts, the finance offers are often misaligned from the projects or project pipelines due to loan terms that are too short, costly or restrictive, or where the finance and project risk profiles are misaligned.	Net Zero Banking Alliance. This intervention addresses financial barriers by: 1. Setting science-based targets that integrate both operational and attributable emissions across their lending and investment portfolios. This means the targets have a holistic scope, addressing the majority of financing activities. 2. Banks must focus on priority sectors, which have the greatest emissions intensities, with specific sector targets set within 36 months. 3. Banks must take a robust approach to offsetting, with iterative review of procedures and outputs. Regular, transparent reporting of absolute emissions and emissions intensities is required, in-line with best practice.
Capacity & Complexity • Pipeline Construction & Evaluation: Producing and evaluating the business cases of individual projects can slow the construction of robust project pipelines. Whilst resources such as marginal abatement cost curves can provide initial insight into the types of project and intervention which are most cost-effective,	Carbon Literacy Project's "Carbon Literacy Toolkits for Local Authorities". Whilst capacity-building can take a range of formats, the advantages of this "centralised toolkit" approach are

individual projects, and even project typologies must be assessed individually and iteratively to ensure the marginal abatement is cost-effective and has an appropriate business case in place. • Uncertain & Varied Scopes: The emissions sources which are in-scope for local authority net zero plans are sometimes unclear or ill-defined. This is particularly true for Scope 3 emissions, which tend to represent 70-80% of LA emissions, particularly where services are outsourced to contractors for waste collection, construction, social services and so forth. • Integrating Adaptation: Targeting and delivering the abatement of carbon emissions is itself a complex and difficult task to complete, however there are additional considerations to be integrated throughout. One such consideration is the adaptation of local infrastructure to deal with the direct effects of climate change, such as increased risk of overheating and flooding. In addition, there are indirect adaptation impacts which must also be considered, such as the culinary education required to support shifts away from meat & dairy-based diets. For both forms of adaptation, the Carbon Trust states that there is "little or no evidence available at the right scale.".	summarised below, helping to address capacity barriers: 1. Centralised Documentation can be more easily updated, and with development costs distributed across commercial partnerships and certification schemes, offered at low- or no-cost. This in turn ensures that the material is being applied and reviewed regularly, highlighting opportunities for improvement or the transfer of learnings. 2. The centralisation of documentation ensures shared understandings across diverse groups and community.
Local & National Politics • Consistent Governance: The constantly evolving political landscape can easily erode support for specific net zero policies or programmes, particularly at the level of local government. As part of this barrier, the Carbon Trust state that "Although we are seeing a shift, more still needs to be done to escalate climate action within council priorities. Unless climate action is mainstreamed at cabinet-level, support can drain away quickly.". • Centralised Support & Coordination: As whole UK is undergoing similar but separate learning experiences with regards to the delivery of Net Zero, it is essential that learnings are shared and integrated at the earliest stage to ensure a holistic approach. As part of this barrier, the Carbon Trust stated that "Support and coordination from national government is needed in order to ensure best practice is	Swindon Borough Council and Public Power Solutions (Swindon Council's arms-length delivery partner) collaborated to launch the UK's first council-backed solar energy bonds. This addressed a number of political barriers by demonstrating: 1. Council-backed private development and investment can unlock large scale changes to energy infrastructure. 2. The support of LAs is key to enabling innovative explorations of new technologies and financing tools, such as compliant dynamic frameworks and large-scale energy storage. 3. Councils can start with the assets that they already have direct control of, whilst still supporting the public-private partnerships to make greater change.

shared, to maximise efficiency savings and to establish an agreed reporting methodology." Information Asymmetry • Target Setting: The Carbon Trust state that there is variance in the degree to which many LA targets are science-based or built upon a robust scoping exercise. This leads to situations where "there is little understanding of what net zero will mean in reality for their council, whether the timeline is realistic and what budget will be required to achieve it." • Procuring & Evaluating Quality Contractors: For technologies which are reaching maturity, such as heat pumps, or where technologies and business models have yet to be deployed at scale in a region, sourcing and evaluating high quality contractors can be difficult for LAs. This is particularly true for smaller councils that may not have their own NZ procurement frameworks, or where a LA wants to recruit local contractors. As many interventions rely on contractors to produce or execute the final design specification, the procurement and ongoing evaluation of high-quality contractors is key to ensuring effective interventions.	4. Redirecting profits into grants for tangible improvements to community resources can increase the visibility and dynamism of large-scale energy infrastructure investments to publics that may have had little oversight or interest otherwise. 5. Supporting arms-length organisations whilst they build capacity and expertise can eventually enable these organisations to support and facilitate the LAs from which they originated, whilst de-risking projects and providing a layer of momentum which is not directly connected to the current political leadership. External expert facilitation can help to address information asymmetry. The "pan-city board" proposed by Mott MacDonald in their report titled "A place-based approach to net zero" would help to address information asymmetry barriers by offering the following solutions: 1. Self-facilitated and Centrally facilitated options exist for collaborative workshops, which could be replicated to negate issues of hierarchical decision making and a lack of consensus. 2. Facilitative services are inherently connected to the structure of the delivery organisation, and should integrate a membership, defined purpose and robust accountability. 3. A multi-authority facilitation board can serve multiple levels of government as well as the wider industry through place-based approaches, validating the purpose of this report.

Now that examples of barriers and the approaches and tools that address them have been introduced, the following sections will focus on the business development and de-risking tools required to expand and implement current pipelines of NZ projects, as well as the transaction enablers and de-risking tools which unlock the finance necessary to upscale these project pipelines.

Current Pipelines of Local Net Zero Projects

In order to de-risk and accelerate the delivery of local NZ commitments, we must first map the various projects and project typologies currently being developed or delivered by LAs. Considering local projects and the pipelines they sit within will reveal not only key gaps in infrastructure improvement and adaptation, but also the appetite various LAs have for various levels of project scale, risk and complexity. This work builds on the monitoring and target setting aspects discussed in above sections, enabling the measurement of progress across various targets and centralised milestones.

The goals, objectives, strategies and tactics involved in the mapping and understanding of these LA project pipelines are described below in Table 4.

Table 4 : Research structure underpinning the investigation of current pipelines of local net zero projects

Goals	1. Develop a framework for identifying, qualifying and integrating the current pipelines of local net zero projects into the envisaged NZDV. 2. Test and implement the above framework by integrating an initial tranche of local net zero projects into the formal NZDV pipeline.
Objectives	1. Codify eligibility criteria for qualifying and integrating local net zero projects into the NZDV. These criteria will include, et alia: Creditworthiness, Technical Viability, Return on Investment, Climate Change Mitigation/Adaptation Impact and Risk Sensitivity. 2. Obtain a register of GSEEH projects at the investment-ready stage, and preliminary stages. 3. From this list apply the eligibility criteria outlined above, with the aim of qualifying ~5 projects for further consideration.
Strategies	1. The method of assessment, and the necessary organisational roles will be defined across the range of eligibility criteria. The breakdown of these criteria will be reviewed and revised as needed with consortium partners. 2. GSEEH and other partners responsible for project development will be contacted to assist in data gathering. 3. EPConsulting will work will consortium partners to apply and adjust the eligibility criteria.
Tactics	1. For each of the relevant eligibility criteria above (plus those added in revision), numerical indicators will be described where available, with minimum/maximum values assigned. Where this is not possible, qualitative approaches can be deployed. These eligibility criteria will be linked with staff/institutions undertaking the assessment, with an outline of the guidance documents to be provided in parallel. 2. GSEEH will outline any data protection requirements for the sharing of project pipeline data. EPConsulting will ensure these requirements are satisfied prior to obtaining the initial project pipeline data. Regular updates for this data will be requested when significant tranches of projects enter pipelines, or on a monthly basis. 3. Data sufficiency will be assessed for application of these project pipeline criteria. Where issues with data sufficiency persist, action may be taken to gather more data or to adjust the eligibility criteria accordingly. A prioritised list of possible projects will be produced, with the top five receiving further consideration within this project.

In order to understand the projects within LA pipelines, we first defined key data points to collect, which along with the data protection and data sufficiency checks, will begin to outline the eligibility criteria needed to qualify one or more projects to be included in the NZDV pipeline. These key data points are described below:

1) Project Typology/Taxonomic Tag (what form of infrastructure/intervention does it target): see section titled "Advancing the State of the Art" for more information on typology and taxonomy tags.
2) Relevant Project Targets and Timelines
    a. Energy Impact; Carbon Impact; Social Impact
3) Estimated Project Cost (Gross)

These data points are fairly narrow, as they are limited by the availability of data across all three LAs. The use of all three LAs did limit this availability, as where data may be present in one LA, it may be entirely lacking in another at a given point in time, such as for project costings. Additional "good to have" data points for the qualification of NZDV project pipelines are presented below:

1) Creditworthiness: the ability of the LA to service debt
2) Technical Viability and Maturity: the quantity and quality of evidence indicating the technology functions as intended and therefore provides adequate returns.
3) Financial Indicators such as Net Present Value, Simple Payback & Return on Investment: the "value" of the project over various timescales, compared to other investments.
4) Climate Change Mitigation/Adaptation Impact: the positive or negative impact of the project on publics' ability to mitigate or adapt to our changing climate
5) Risk Sensitivity: the sensitivity of the project to various internal or external risk factors, such as energy price risk, reputational risk etc.

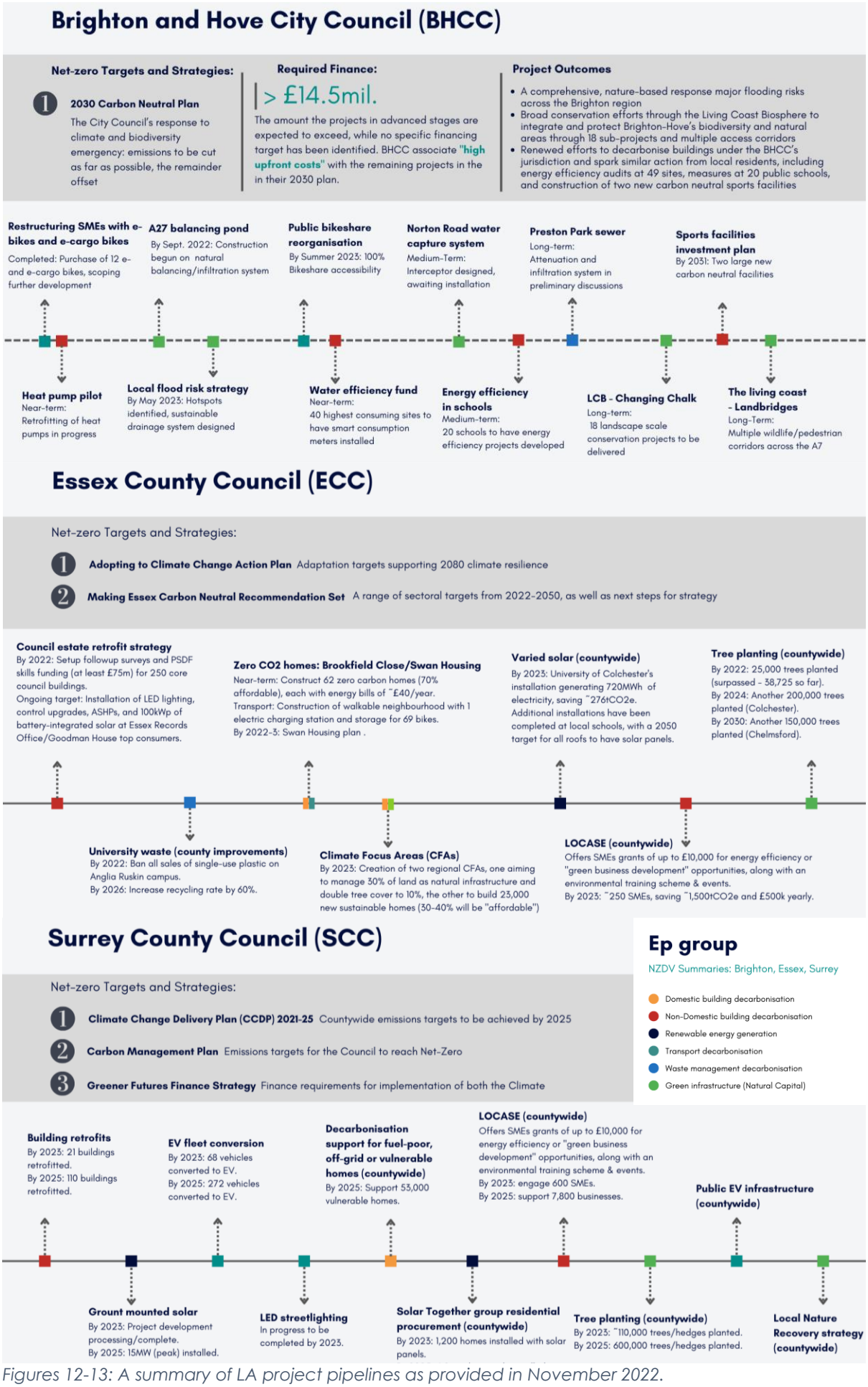
In order to continuously connect data from LAs, it is essential to ensure that sensitive data is protected. Data protection requirements (sourced from the General Data Protection Regulation) will be integrated at all relevant stages. As well as continuously checking that compliance strategies are in-force, data sufficiency checks were carried out to identify where data gaps persist, resulting in the RAG analysis presented below (in Table 5):

Table 5: Qualitative analysis of the sufficiency of data provided by LAs. 1; More data would required for near-term delivery; 2: data quality is sufficient for near-term delivery, but some gaps persist 3: data is sufficient across all requirements

Data Point	Essex County Council	Surrey County Council	Brighton & Hove City Council
Project Typology/ Taxonomic Tag	3	3	3
Relevant Project Targets and Timelines (Energy Impact)	3	3	2: Some data gaps
Relevant Project Targets and Timelines (Carbon Impact)	2	3	2: Some data gaps
Relevant Project Targets and Timelines (Social Impact)	3	2: Some social impacts missing	2: Some data gaps
Estimated Project Cost (Gross)	2: Some project-level costs data missing	3	1: Project-level cost data missing

The analysis in Table 5 shows that cost and carbon implications of projects, along with their social ramifications are the most difficult for generating and validating concrete quantitative data. Flagging data gaps at this stage can be useful to ensure data collection is targeted to fill these gaps, however many data gaps, such as the lack of project cost data for BHCC, relate less to the collection of data, but the ongoing work to synthesis & summarise key datapoints, such as project costs and benefits. Therefore, it can be expected that these data gaps will be resolved by BHCC upon completion of cost-benefit analysis

Alongside revealing data gaps, this research also led to the production of detailed "in-scope" timelines (figures 11 – 13). These timelines summarise each LA's NZ targets and strategies, the required finance identified by the LA, and the expected project outcomes, alongside colour-coded descriptions of the various projects within the pipeline. Figure 15 describes the key for this colour coding as it relates to the taxonomic tags introduced in the "Advancing the State of the Art" section. Long form versions of project pipeline summaries for ECC and SCC are also available in the Appendix (1).



Figures 12-13: A summary of LA project pipelines as provided in November 2022.

Figures 11-13 (underleaf) provide insight into each LA's current decarbonisation pipeline, but additional qualitative insight is presented below:

1) All LAs have pipelines that integrate multiple taxonomic tags, although regional focuses are emerging, as described below:
    a. BHCC has above average focus on nature-based solutions and adaptive infrastructure, particularly targeting landscapes and surface water improvements.
    b. ECC has brought forward a general pipeline with no single focus sector, but does have two multi-sector projects. Particularly, their Climate Focus Areas could act as a powerful pilot approach which could be replicated across other LAs. This pilot approach should be considered as a de-risking tool for wider place-based decarbonisation solutions.
    c. SCC has above average focus on transport decarbonisation, supporting both private and public infrastructure. The combination of infrastructure upgrades with public and private fleet upgrades should be considered a holistic solution which further de-risks this decarbonisation sector by ensuring that use cases for new infrastructure are phased and robust, with the public fleet acting as a "base load" for the new infrastructure and the value it provides.

2) When considering the timescales of the LA project pipelines, it is seen that, where timescales are available, that they fall into two main tranches: ~2022-2025 and ~2025-2030. There are no timescales available that surpass 2031, despite LA targets reaching into the 2050s and beyond (ECC). Therefore, there is a need to define what technologies, business models and delivery approaches will be trialled in the 2022-2025 and 2025-2030 periods. Further gap analysis should be conducted to highlight the technologies, methodologies (e.g., for measurement and verification) and financial instruments that need to be piloted or explored further in order to deliver on these long-term commitments. However, this phased approach does enable further exploration and mitigation of risk, particularly considering the post-2025 timeframe.

3) Most of the projects described are deploying mature technologies, however there are some innovative projects to highlight below, along with projects where innovative approaches to measurement and verification (M&V) will be needed to gather comprehensive data and determine cost-effectiveness moving forward:
    a. Transition e-bike transport for SMEs and bikeshare provision (BHCC): Although biking itself is by no means innovative, the use of e-bikes in commercial settings is not yet mature within UK contexts. Innovative learnings from the Netherlands (where commercial/cargo e-bikes are common) could be gathered and deployed to support any changes to SME practices required to maximise uptake. Mileage inventories and surveys of employees and the public may be required for the M&V of carbon impacts and therefore overall cost-effectiveness of emissions abatement.
    b. Sustainable surface water treatment (BHCC): Surface water treatment approaches have varied over the years, with trends now shifting away from canalisation and combination with sewerage lines. New sustainable drainage approaches are reaching maturity, but additional work may be needed to determine the carbon impact of this work. This work should particularly consider

reduced load at pumping stations and treatment plants, reduced consumption from repairing flood damage and the increased capture of carbon within ecosystems supporting or affected by sustainable drainage.

c. Landscape-scale conservation and wildlife corridors (BHCC): Wide reaching M&V procedures will be needed to determine the carbon baseline for these landscapes and corridors. These should be supported by robust, and likely innovative, M&V plans for the reporting period. Additional surveys of the public and their utilisation of these landscapes/corridors will also be needed to capture the full net benefit (or cost) for BHCC and surrounding regions. New approaches to identify, capture and fairly distribute positive externalities resulting from landscape-scale improvements should also be explored in both contexts.
d. Zero CO_2 homes (ECC): Methods for surveying traffic (foot, car, bike etc) within the development will be needed. These methods should ideally by low-cost but robust, which may necessitate further innovation, particularly if the effort required by residents is to be minimised.
e. Climate Focus Areas (ECC): Innovative methods for establishing and measuring changing carbon baselines will be needed. Therefore, robust M&V plans should be established and regularly reviewed. These M&V plans should sit alongside and integrate additional surveys of local businesses/publics and their utilisation of these Climate Focus Areas, in order to capture the full net benefit (or cost) for ECC and surrounding regions. New approaches to identify, capture and fairly distribute positive externalities resulting from landscape-scale improvements should also be explored in both Climate Focus Areas.
f. Tree planting (ECC and SCC): Wide reaching M&V procedures will be needed to determine the carbon baseline for the tree planting sites, which integrate not only carbon capture but also changes to biodiversity and public utilisation. These should be supported by robust, and likely innovative, M&V plans for the reporting period.
g. Local Nature Recovery Strategy (SCC): Wide reaching M&V procedures will be needed to determine the carbon baseline for the nature recovery sites, which integrate not only carbon capture but also changes to biodiversity and public utilisation. These should be supported by robust, and likely innovative, M&V plans for the reporting period.

Recommendations: Current Pipelines of Local Net Zero Projects

The above insight yielded the following recommendations for further learning:

1) Monitor and share learnings from LAs with sectoral focuses (nature-based solutions and adaptive infrastructure for BHCC; transport decarbonisation for SCC)
2) Monitor and replicate the Climate Focus Area approach and its risk mitigation, measurement and verification approaches to environmental/ecological risk, economic risk and reputational risk from local businesses and publics. This pilot approach should be considered as a de-risking tool for wider place-based decarbonisation solutions.
3) Map and test the replicability of SCC's combination of transport infrastructure upgrades alongside public and private fleet upgrades. Thus, holistic solution should further de-risk decarbonisation of the transport sector by ensuring that use cases for new infrastructure

are phased and robust, with the public fleet acting as a "base load" for the new infrastructure and the value it provides.

4) Define what technologies, business models and delivery approaches will be trialled in the 2022-2025 and 2025-2030 periods, and how the costs of this piloting will be integrated and distributed. Further gap analysis should be conducted to highlight the technologies, methodologies (e.g., for measurement and verification) and financial instruments that need to be piloted or explored further in order to deliver on these long-term commitments. In addition, this report could define how this phased approach enables further exploration and mitigation of risk, particularly considering the post-2025 timeframe.
5) Identify and monitor upcoming project-level innovations for technologies, business models & financial instruments across all relevant LAs. This should focus on technologies, business models, M&V methods & financial instruments approaching maturity.

High-level Pipeline Summaries

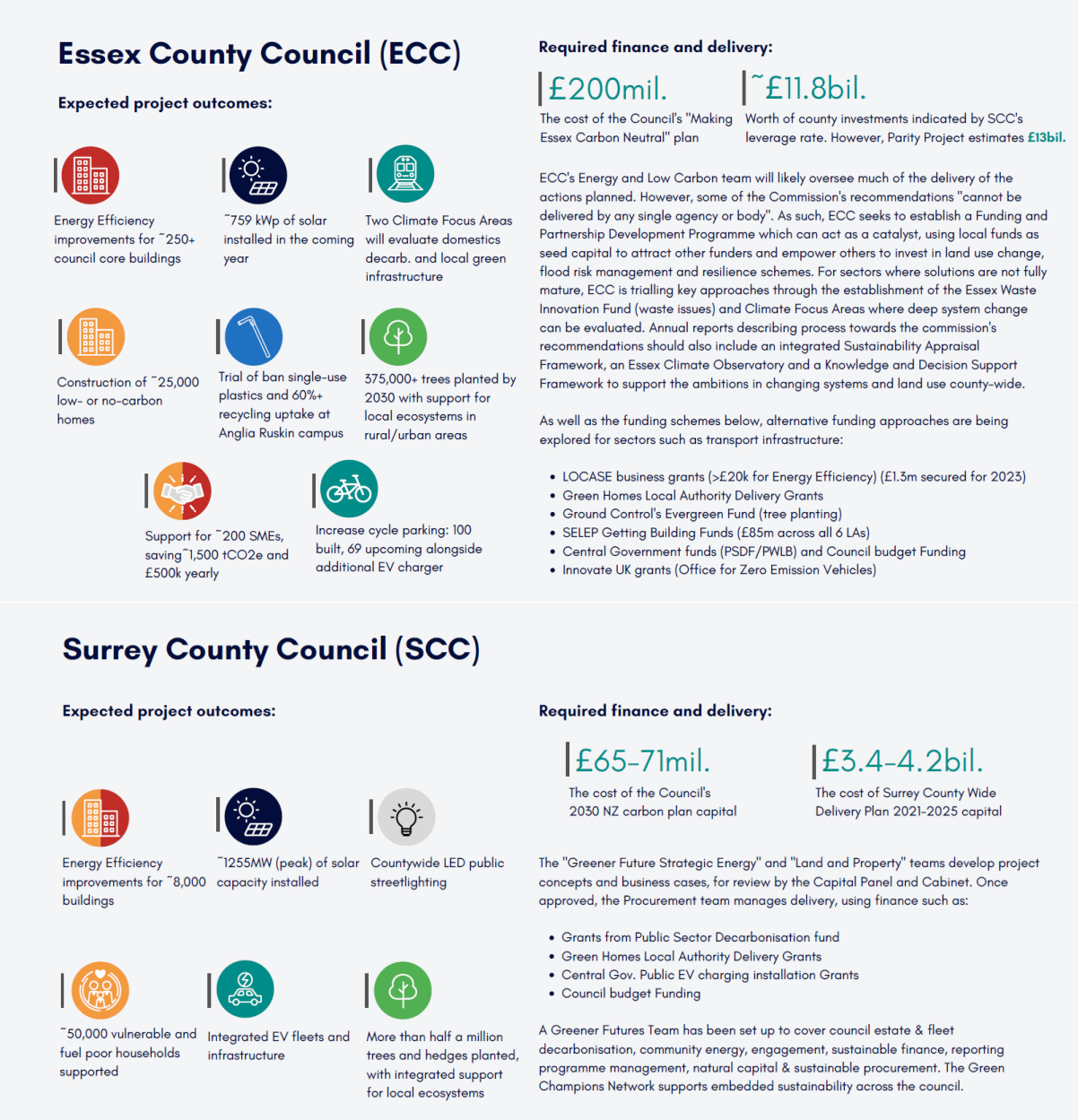


Figure 14 & Figure 13: Summaries of the ECC and SCC NZ project pipelines

Figures 14 and 15 (underleaf) summarise the pipelines of ECC and SCC respectively, showing ranges of expected project outcomes across all taxonomic sectors. Though the prior section focused on the differences between the LAs and their approach to various taxonomic sectors, this section shall focus on the funding and inter-sector leverage present within these project pipelines. This aims to reveal the most appropriate financial instruments and leverage rates to deliver projects, whilst inter-sector leverage is key for considering a "whole system" approach which moves local economies towards net zero in a unified way. This is particularly key as some interactive effects between projects are required to deliver net zero: for example, an electric vehicle is only as emissions intensive as the generation that powers it, therefore investments in renewable generation will be required alongside investment in EVs to ensure transport decarbonisation. The same can be said of charging points, local storage and a range of other infrastructure required for transport decarbonisation.

When examining the overall finance required, both for delivery of the Council's internal Net Zero target and for the decarbonisation of the wider county/region, the best figures have been provided by SCC, which has quantified its required finance for both the Council's 2030 NZ Carbon plan, and that required for Surrey's county-wide net zero delivery plan (2021-2025). SCC plans to spend £65-71 million investing into its own 2030 decarbonisation, which equates to a mid-range figure of £68m, and a confidence range of +/- 4.41%. Comparing this to the investment required for the county to hit its 2025 emissions target, which stands at £3.4 – 4.2 billion, the ratio of internal investment (council operations) to county-wide investment is 1 to 52.3 for the lower estimates, or 1 to 59.2 for the upper figures. Two other aspects should be noted here: that the confidence range for the county-wide investment is much greater at +/- 10.53%; and that this estimate is only for the 2021-2025 period (inclusive, 5 years). If it assumed that the 2026-2030 period requires equivalent (if not higher) expenditure, then the leverage rate for 2021-2030 (inclusive) jumps to between 104.6 and 118.4. This means that every pound spent on internal council decarbonisation equates to 104.6-118.4 pounds spent on county-wide decarbonisation.

If one assumes the councils' activities and assets are approximately equivalent per head of population across all three counties, the county-wide expenditure for Essex and Brighton & Hove can also be estimated. For Essex' £200 million of internal expenditure, the county may require £11.15 billion (+/- 10.53%, ranging £9.98 – £12.46 billion) for the 2021-2026 period, with this figure possibly doubling for the 2030 period. The same estimation can be done for BHCC, which has estimated at least £14.5 million is required for current projects in the advanced stages of development, with a high likelihood that this number will grow as BHCC associates "high upfront costs" with the remaining projects in their 2030 timeline. However, using current figures, this yields a total county-wide investment of £808.4 million (again +/- 10.53%, ranging £723.3 – £903.5 million) for 2021-2025. This figure may likely double again for the 2026-2030 period.

From these figures above, the total value of the tri-county pipelines can be estimated at just over £35 billion, as shown in figure 16 (overleaf):

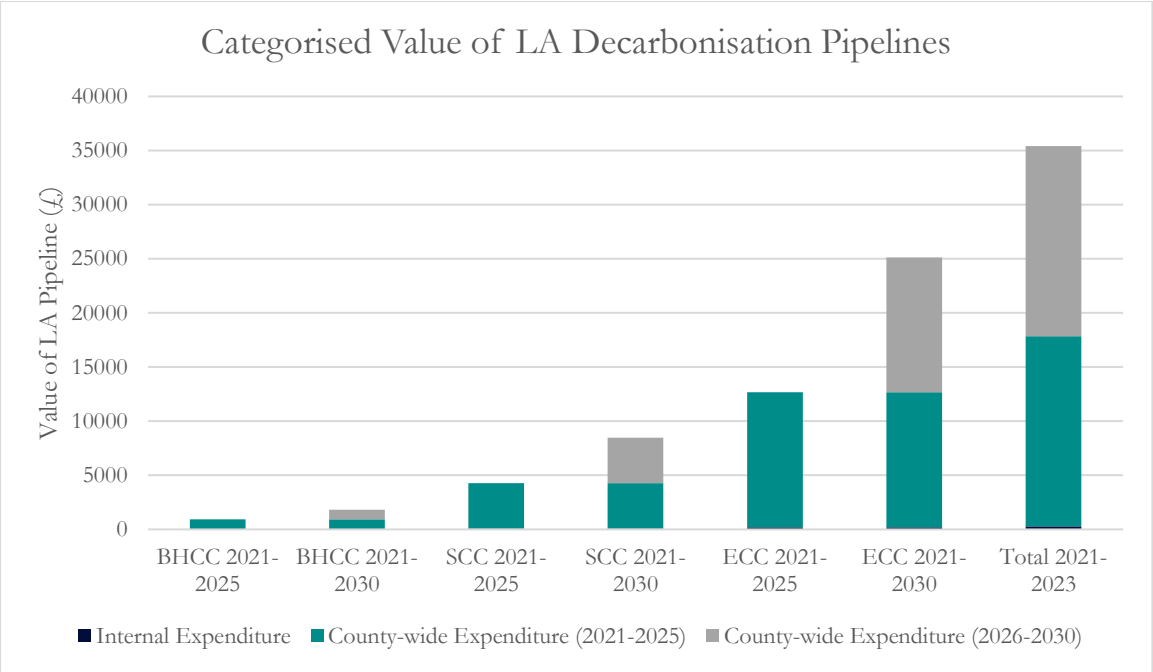


Figure 15: Categorised value of LA decarbonisation pipelines.

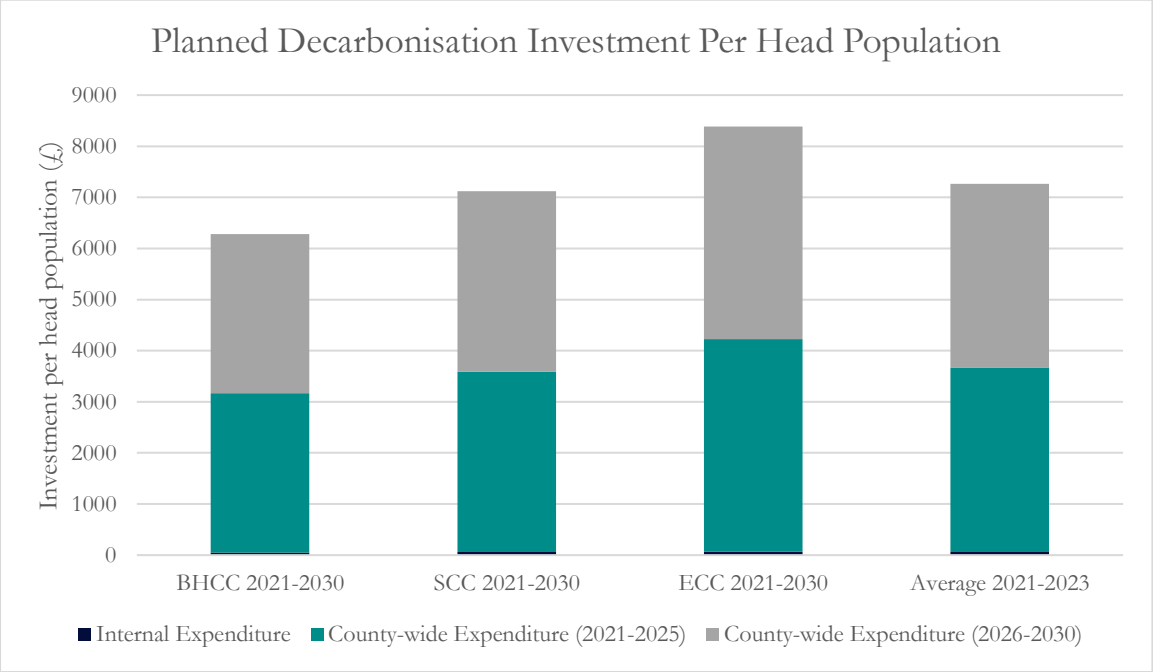


Figure 16: Planned decarbonisation investment per head population for all three partner LAs.

Identifying a Pipeline of Bankable Net Zero Projects across the Tri-LEP area:

The above figures show the variation in county expenditure on decarbonisation projects across the 2021-2030 timeline. These figures reveal the following key takeaways:

- Proportion that is internal to the LA: The leverage ratio of 1:104.6-118.4 equates to an internal expenditure proportion of 0.95% - 0.84% over the 2022-2030 period.
- There is limited data regarding local authority investment and costings post-2025, and so an assumption has been made that the same investment will need to be made again from 2026-2030. This assumption should be reviewed further.
- When normalised per head of population, the range of investment figures is much smaller, with BHCC spending just over £3000 per head of population, whilst ECC will invest just over £4000 per head of population. This still represents variation of +/- £500 (or ~14%) from the SCC's "average" of ~£3500.

However, there is further analysis that can be completed with this pipeline data, particularly that of SCC, which was most complete and from which the following charts were derived. When examining the breakdown of SCC's internal spending (Figure 18), a fairly even distribution is seen, although with greater investment in energy efficiency measures
and ground mounted PV. These technologies are certainly proven and offer significant abatement potential, but further investigations into how LAs consider cost-effectiveness should be conducted.

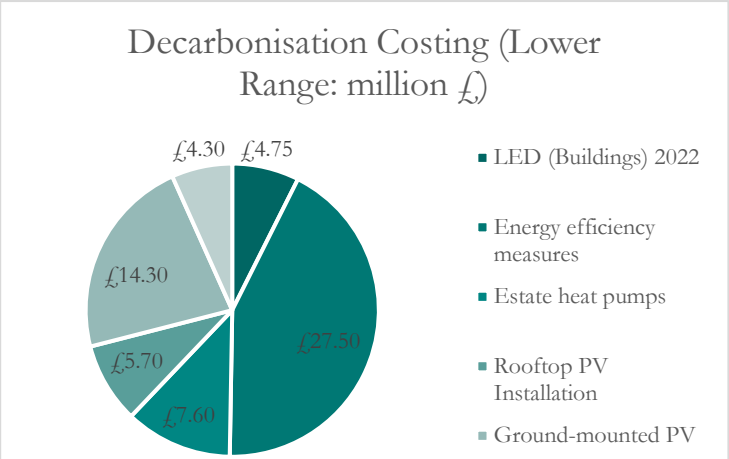


Figure 17: SCC Decarbonisation costings, split by programme

Whilst both these technologies likely offer significant marginal abatement cost-effectiveness, Figure 19 (right) shows that the largest portion of expenditure (~40% on energy efficiency measures) is expected not to pay back. Again, further investigation would be valuable here as the "depth" of these energy efficiency upgrades is unclear. It may be that projects are designed to maximise decarbonisation at the cost of an overall return, for example using the savings from new HVAC to fund double glazing. Furthermore, another £12.5 million (17.6%) of SCC's expenditure has uncertain payback, leaving only £27.5 million (~38.7%) for which payback is certain. Further analysis should also be conducted to examine the magnitude of returns, focusing on the net present value of each programme in order to determine the net total.

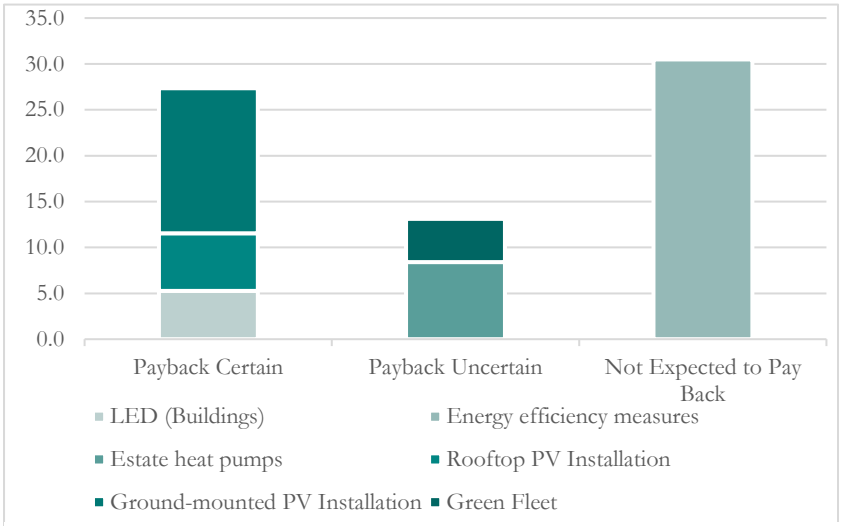


Figure 18: SCC investment categorised by the ability to generate returns.

Unfortunately, this sample is insufficient to determine the relative payback across all the taxonomic sectors. Instead, we can examine these sectors and SCC's proportional investment and extrapolate across the LAs regarding the potential value covered by each tag, as shown in Table 6.

Table 6: Extrapolation of SCC's proportional investment across the NZ taxonomy to all 3 partner LAs.

Local Authority: Programmes and Proportional Costing						**Cumulative Total**
Surrey County Council's Internal Investment: **£65m - £71m**						**£65m - £71m**
LED (buildings): **£4.75 - £5.25m 7.3%**	Energy efficiency measures: **£27.5 - £30.5m 42.3%**	Estate heat pumps: **£7.6m - £8.4m 11.7%**	Rooftop PV Installation: **£5.7m - £6.3m 30.7% combined solar (8.7% alone)**	Ground-mounted PV Installation: **£14.3 - £15.8m 30.7% combined solar (22% alone)**	Green Fleet: **£4.3m - £4.7m 6.6%**	

Surrey County Council's County-wide Investment: **£3.4 – 4.2 bn (2021-2025)** Assumed to double to **£6.8 – 8.4 bn by 2030.** Leverage Rate of **~1:55** (internal: county-wide)					**£6.9 – 8.5 bn**
Domestic and Non-Domestic Building Decarbonisation **61.3% of investment or £4.23 billion**	Renewable Generation **30.7% of investment or £2.12 billion**	Transport Decarbonisation **6.6% of investment or £455 million**	Waste Management Decarbonisation **No data available.** Equivalence to natural capital assumed: **0.2% of investment 2021-30.**	Green Infrastructure (Natural Capital) **£8 – 10 million costed for 2021-26**. Equivalent to **0.2% of investment for 2021-2030**.	
Brighton & Hove City Council's current internal estimate is **£14.5m.** SCC's assumptions (doubling 2026-30; leverage rate of 1:55) yield **total investment of £1.4 – 1.8 bn**					**£8.3 – 9.9 bn**
Domestic and Non-Domestic Building Decarbonisation 61.3% of investment or **£858 million**	Renewable Generation 30.7% of investment or **~£430 million**	Transport Decarbonisation 6.6% of investment or **£92.4 million**	Waste Management Decarbonisation Assumed 0.2% of investment 2021-30 or **£2.8 million.**	Green Infrastructure (Natural Capital) Assumed equivalent to 0.2% of investment for 2021-30: **£2.8 million.**	
Essex County Council's current internal estimate is **£200m.** SCC's assumptions (doubling 2026-30; leverage rate of 1:55) yield **total investment of £20 – £24.9 bn**					**£28.3 – 34.8 bn**
Domestic and Non-Domestic Building Decarbonisation 61.3% of investment or **£12.3 billion**	Renewable Generation 30.7% of investment or **~£6.1 billion**	Transport Decarbonisation 6.6% of investment or **£ 1.3 billion**	Waste Management Decarbonisation Assumed equivalent to 0.2% of investment 2021-30 or **£40 million.**	Green Infrastructure (Natural Capital) Assumed equivalent to 0.2% of investment for 2021-30 or **£40 million.**	
Total across all three LAs based upon SCC's assumptions (doubling 2026-30; leverage rate of 1:55) **Total investment of £28.3-34.8 bn**					**£28.3 – 34.8 bn**
Domestic and Non-Domestic Building Decarbonisation 61.3% of investment or **£17.3 billion**	Renewable Generation 30.7% of investment or **~£8.7 billion**	Transport Decarbonisation 6.6% of investment or **£ 1.9 billion**	Waste Management Decarbonisation Assumed equivalent to 0.2% of investment 2021-30 or **£56.6 million.**	Green Infrastructure (Natural Capital) Assumed equivalent to 0.2% of investment for 2021-30 or **£56.6 million.**	

The focus on buildings is clear, with domestic and non-domestic building decarbonisation representing the lion's share, or 61.3% of investment. When you consider that some of the further 30.7% to be invested in renewable generation will fund roof- or building-mounted PV panels and other related technologies, the focus on buildings becomes even more key. The remaining taxonomic sectors share less than 10% of investment, with just 0.2% dedicated to waste management and green infrastructure decarbonisation. This may be due to the lack of a statistically significant sample, but could also be due to the cross-boundary nature of

these sectors, in particular Transport and Green Infrastructure. It is expected that investment into county-wide transport would be supplemented by national schemes from institutions such as Highways England or Great British Rail (formerly National Rail). Further work should be done to engage these stakeholders and determine the level of parallel planning and crosstalk between LAs and these national public bodies.

Such crosstalk can also assist with the development of best practice, particularly for Measurement, Reporting and Verification (MRV) approaches, which often build on both their unique context but also the track record of prior approaches in such contexts. As projects move increasingly towards novel contexts, the collection and sharing of robust MRV approaches will be key to developing project performance and actuarial datasets which will underpin the next tranche of project development and financing. Table 7 below highlights which projects feature high, medium or low MRV complexity, such that attention can be directed to those taxonomic sectors where high MRV complexity has yet to be resolved. The section titled "Advancing the State of the Art" talks further about the importance of MRV as a de-risking tool.

Table 7: Qualitative rankings of the measurement, reporting and verification complexity of LA projects

	Low MRV Complexity	**Medium MRV Complexity**	**High MRV Complexity**
SCC	• LED Streetlights • Roof-mounted PV • Ground-mounted PV	• Energy Efficiency Measures • Heat Pumps (with disaggregation)	• Green Fleet, • Heat Pumps (without disaggregation)
ECC	• Varied Solar • Council estate retrofit strategy (simple technologies: LEDs & Controls)	• LOCASE • Zero CO2 homes • University Waste • Council estate retrofit strategy (complex technologies: ASHP and battery storage)	• Tree planting • Climate Focus Areas
BHCC	• Sports facilities investment plan	• Heat pump pilot (with disaggregation) • Water efficiency fund • Energy Efficiency in Schools • Norton Road Water Capture • A27 Balancing Pond	• Heat pump pilot (without disaggregation) • Restructuring SMEs with e-bikes • Local flood risk strategy • Public Bikeshare • Preston Park sewer • Changing Chalk • Landbridges

MRV complexity will also be a key factor for selecting 5 projects to be monitored further and act as exemplars for net zero delivery and the processes in development throughout this document. These projects will not be selected at this stage, but will utilise the criteria and analysis developed above, in discussion with LA partners.

Issues and barriers to Local Net Zero investment

In order to de-risk and accelerate the financing of NZ investments, we must first explore the persistent issues and barriers that prevent financial institutions from investing in NZ projects. The exploration of these issues and barriers will enable financial institutions to channel additional funding into the NZ challenge, where it is desperately needed to assist local authorities with the decarbonisations of large and diverse geographies. However, this is not the only benefit, addressing the issues and barriers to local NZ investment will also lower costs

of capital by lowering the risk profile of investments, which will enable a greater proportion of the value of NZ projects to be captured by local authorities and stakeholders. This localised capture of value will enable LAs to direct further reinvestment into NZ projects which may or may not deliver direct financial returns, but provide additional social value (such as energy improvements in social housing), which in turn improves equitable outcomes.

This work builds on the financing and information asymmetry aspects discussed in the literature review, enabling the alignment and upscaling of funding offers, as well as the understanding of financiers in the verification and quality assurance of NZ outcomes.

The goals, objectives, strategies and tactics involved in the mapping and understanding of these investor barriers and issues are described below in Table 8.

Table 8: The research structure for investigating LA issues and barriers

Goals	1. Develop a framework for identifying localised risks, issues and barriers hampering Local Net Zero investment. 2. Develop and prepare for the deployment of a rigorous process for managing and mitigating the localised risks, issues and barriers identified by the above framework.
Objectives	1. Compile a comprehensive set of risks, issues, and barriers to Net Zero investment as well as possible mitigations. 2. Identify where the above risks, issues, and barriers apply within local contexts and ensure all key players are accounted for. 3. Codify criteria that apply to local barriers to identify the 5-10 most pressing issues and best strategies for managing and mitigating said issues.
Strategies	1. Conduct desktop research to provide a literature review of potential risks, issues and barriers, alongside completion of a stakeholder map to identify impacts and mitigation strategies for said risks, issues, and barriers. 2. EPConsulting will categorise those issues, impacts and mitigation strategies into a framework to be tested through a series of stakeholder workshops. 3. Outcomes of stakeholder workshops will be converted into value propositions through group exercises to develop potential strategies for managing and mitigating local issues. This may be the next stage of work, depending on the focus on management structures versus solutioneering approaches.
Tactics	1. EPConsulting will develop a framework with risks, barriers, and issues identified in literature and prioritise those based on criteria set at time of research. This can also include a compilation of potential strategies for mitigation. 2. GSEEH will identify key stakeholder groups and sectors for EPConsulting to integrate into literature review in order to prioritise and categorise barriers. These key stakeholders will be invited to input through group workshops and online review processes. 3. Identified barriers and strategies for management will be tested with local stakeholder groups through in-person (preferred) and/or virtual workshops to gain buy in to strategies and codify framework of barriers.

The above research structure has led to the production of the following section, which is outlined overleaf:

Introduction:

This section of the Report explores the local barriers and challenges that are faced by local authorities (LAs) in delivering net zero programmes locally. These factors will need to be taken into account when developing a future net zero delivery vehicle and enable LAs to overcome these local barriers and accelerate the scale and pace of their net zero programmes, particularly with regards to accessing private capital.

The work included in-depth interviews with Core Partners and other LAs, whilst conducting a literature review into local barriers and challenges. See below for further details:

Core Partners:

- Essex County Council (ECC)
- Surrey County Council (SCC)
- Brighton & Hove City Council (BHCC)

Contributing LAs:

- Cambridgeshire County Council (CCC)
- Kent County Council (KCC)
- Harlow Council (HC)
- Surrey Heath Borough Council (SHBC)

Sources and Literature:

- Accelerating Net Zero Delivery: Unlocking the Benefits Of Climate Action In UK-City Regions (Innovate UK and PWC, 2022)
- Net Zero Strategy; Heat and Buildings Strategy; Decarbonising Transport: A Better, Greener Britain; Green Finance Strategy and Other Recent Strategy Publications
- The Future of Local Area Energy Planning in the UK (Energy Systems Catapult, 2022)
- A Systems Approach to Delivering Net Zero Recommendations (Prime Minister's Council for Science and Technology, 2020)
- Sixth Carbon Budget (Committee on Climate Change, 2020)
- Local Authorities and the Sixth Carbon Budget (Committee on Climate Change, 2020)
- Councillor Workbook: The Local Pathway to Net Zero (Local Government Association, 2021)
- Net Zero Regions Pilot (Innovate UK, KTN, 2022)
- Local Net Zero Delivery Progress Reports (UK: 100, 2022)
- Empowering Climate Action Through Local Authorities (national grid ESO, 2021)
- Financing the Future: Driving Investment for Net Zero Emissions and Nature Restoration (Aldersgate Group, 2021)
- A Place-Based Approach to Net Zero (Mott MacDonald, 2021)
- Mobilising Local Net Zero Investments (Innovate UK, 2021)
- Rising to the Climate Challenge (County Councils Network, 2021)

Background:

The Scoping Study engaged with three core local authority (LA) partners, Essex County Council, Surrey County Council and Brighton & Hove City Council. The LA's were chosen as representatives from three separate Local Enterprise Partnerships (LEPs) that together established the Tri-LEP Energy Strategy in 2019. The LEPs involved in the development of the Energy Strategy were SELEP, Coast to Capital and Enterprise M3.

The initial concept of the Scoping Study wanted to look at how aggregating net zero investments and coordinating activities across a region could accelerate net zero programmes and reduce associated costs e.g., via a Tri-LEP/regional approach. The Energy Strategy recognised the aspirations of the Department for Business, Energy and Industrial Strategy (BEIS) and aimed to set out how the three LEP regions could shift towards a low carbon economy, by delivering a regional / coordinated approach. It listed five priority themes for action:

- Low carbon heating
- Renewable energy generation
- Energy saving and efficiency
- Smart energy systems
- Transport

Since the publication of the Energy Strategy in March 2019, there have been significant changes to national policy and the approach being adopted by local authorities across the Tri-LEP region and beyond, at national, regional and local carbon reduction targets – the shift to net zero. This has seen the scale of investments required to meet new net zero targets increase significantly at both the local and regional level. In addition, target dates set by local authorities require an accelerated delivery of investment programmes to drive forward carbon savings and new sustainable energy generation. However, there are a series of local barriers and challenges that need to be overcome if local authorities are to meet the pace and scale of investments required to achieve net zero.

Local Barriers and Challenges:

There are many local barriers and challenges that are impacting the pace and scale of progress across local authority-led net zero programmes. These can include a lack of internal skills and capacity to go beyond 'business as usual', the high direct costs of investment, a lack of understanding of the technologies that are required to achieve net zero and lack of fully costed programmes for energy efficiency and renewable generation investments.

This section of the Report details the local barriers and challenges that emerged from discussions with local authority core partners and wider audience, together with key findings from a literature review of materials detailing barriers to net zero delivery faced by local authorities in the UK.

The local barriers and challenges explored in this Report are:

- lack of internal capacity, resources and skills across local authorities (NF)
- a general reluctance to adopt new approaches to financing the transition to net zero (F)
- lack of experience in building large-scale decarbonisation programmes (NF)
- lack of coordination across national, regional and local approaches (NF)
- lack of understanding at decision-maker level to commit to signing off multi-million £ investment programmes (F)

Please note that many of the barriers and challenges overlap across the different segments that are detailed below. For this Report, the local barriers and challenges have been split into non-financial (NF) and financial (F) categories.

(1) Non-Financial (lack of internal capacity, resources and skills; lack of experience in building large-scale decarbonisation programmes; and lack of coordination across national, regional and local approaches)

A recent survey conducted by consultancy's Cluttons and AESG assessed the progress to date, future plans and likely challenges to the net zero plans of 50 local authorities. Just ¼ of the local authorities stated that they were 'properly into the delivery phase of their net zero strategy'. This was attributed to a lack of internal capacity, resources and skills, which lead to ¾ of the local authorities stating that they did not have a 'clear' or 'comprehensive' understanding of their local authority's carbon footprint.

Work undertaken in preparation for this Report included a desk-based review of the progress that has been made by local authorities in Essex, Surrey and East Sussex (including county, district, borough, city and unitary councils). It mirrored the assessment made by Cluttons and AESG. The desk-based review highlighted how a lack of skills in key staff and capacity across teams in charge of developing and delivering local net zero strategies is more pressing below county council level, where lack of internal capacity, resources and skills is exacerbated.

One solution is in the form of the Public Sector Low Carbon Skills Fund, which can help local authorities identify low carbon investments, but it only a solution for local authorities that are successful in making an application. In a lot of instances, local authorities have reported that they lack the resources to make an application through this funding channel and are not able to overcome this barrier.

Meeting net zero targets requires a significant shift in approach from local authorities, moving away from an ad hoc, or building-by-building approach that did not have time constraints to rapidly upscaling the deployment of carbon reduction and renewable energy generation programmes. Most local authorities lack the experience in building large-scale decarbonisation programmes. This is often attributable to a lack of project development costs that are available to local authorities – representing a major barrier that needs to be overcome if local authorities are to realise their net zero aspirations.

The lack of experience in building large-scale decarbonisation programmes also has a detrimental impact upon a local authority's ability to benefit from economies of scale and accessing pipelines of projects that would attract private sector investment e.g., via a regional approach, spanning multiple local authorities. The Committee on Climate Change's (CCC) 2020 Report 'Local Authorities and the Sixth Carbon Budget' stated that carbon targets can only be achieved if Government, regional agencies and local authorities work seamlessly together and move away from pursuing a fragmented strategy towards net zero. The CCC called for a framework to enable better coordination between national and local authorities to respond to the complexity of delivering the local net zero implementation challenge. Innovate UK and PWC's 2022 Report, 'Accelerating Net Zero Delivery: Unlocking the benefits of climate action in UK-city regions' calls for a new delivery framework to co-

ordinate local delivery with national policy, taking a whole-systems approach. Such a framework would include: a revised governance model; consistent portfolio design and management approaches; refreshed funding and finance instruments; and targeted development of skills and capacity.

Whilst Innovate UK (2022) suggested that to successfully support regional collaborations around procuring innovative net zero solutions, the following would need to be in place:

- a project partner engaged with, and credible to, regional local authorities to ensure good levels of participation and trust
- an environment of genuine open dialogues between authorities, to ensure that valuable experiences along the journey, rather than just success stories, are shared
- connections and communication with other relevant regional and national stakeholders (including Catapults, Net Zero Hubs, Crown Commercial Services, central government bodies).

These are all elements that the Net Zero Delivery Vehicle would look to provide and deliver.

Innovate UK's Net Zero Pilot (2022), which saw the Knowledge Transfer Network and East of England Local Government Association engage with 50 local authorities around barriers to innovation across the net zero space. The work highlighted 5 main barriers to technology uptake by local authorities:

- a lack of alignment between the challenges prioritised by local authorities and the innovation sector's understanding of those challenges and translation of these challenges into relevant, deployable products and services
- the fragmented nature of the local government net zero innovation marketplace
- the complexity, expense and risk associated with procuring net zero innovations at scale
- a lack of clearly articulated and understood business cases for investment in net zero solutions and associated infrastructure
- an underutilisation of dedicated options for procuring innovation.

In addition, the Net Zero Pilot convened several workshops with local authority attendees who listed additional local barriers and challenges as:

- Confidence in decision-making
- Understanding what support is available (and who is offering it and how to access)
- Understanding the journey others have taken (not just the outcome)
- Creating an evidence base for a business case
- Difference in language used by different stakeholders
- Getting more people in the discussion from different roles/teams
- Opportunities to learn from others (mistakes/difficulties)
- Understanding technologies

The proposed Net Zero Delivery Vehicle will need to factor in each of these local barriers and challenges to create a holistic solution to accelerating the scale and pace of net zero programmes across the Greater South East Net Zero Hub region.

(2) Financial (a general reluctance to adopt new approaches to financing the transition to net zero; and lack of understanding at decision-maker level to commit to signing off multi-million £ investment programmes)

Roundtables with and research alongside local authorities in 2022, conducted by Innovate UK and Green Finance Initiative, highlighted three core challenges that local authorities face on their net zero journeys:

1. **Financing gaps** – The investment needed to finance the UK's nationwide net zero transformation is estimated at £1.4 trillion by the Climate Change Committee and will require the mobilization of private capital alongside public finance. To close the investment gap there is a need to consider new and innovative private finance sources – with a particular focus on long-term capital providers such as institutional investors**.**
2. **Financial advisory gaps** – Structuring innovative new public-private financial instruments will require better access to specialist financing expertise. Financial advisory capability will be needed to develop the financial structures that can unlock deeper pools of private sector capital.
3. **Project development gaps** – There is a significant lack of technical assistance available to help turn concepts into investable projects with a well-developed and bankable business case. This is the most pressing obstacle to the successful deployment of capital towards net zero.

Funding for local authorities' infrastructure investment has primarily been sourced from the Public Works Loan Board (PWLB). However, the PWLB has a current capacity of £95 billion, which was increased from £85billion in 2019. At the end of 2021, total borrowing from the PWLB had reached 94.7% of capacity. The UK Infrastructure Bank's LA lending facility provides an additional £4billion in funding according to the above Report, which concluded that 'these quantities combined are only a fraction of the investment required to reach net zero'.

The put this into perspective, Surrey County Council identified that the county would require around £4.2billion by the end of 2026 to keep on track of its net zero targets.

Interviews with local authorities in preparation for this Report found that all planned to continue using the PWLB as a primary source for its net zero finance, whilst prioritising applications under the Public Works Sector Decarbonisation Fund. Local authorities acknowledged the need or private capital, but were unsure around best routes to access this funding and the scale of investment that was required to ensure that borrowing was cost-effective.

Research by the Green Alliance (2020) suggests that many LAs in England can fund around 25-35% of their net zero pledges. This means that between 65-75% of finance must come from new sources of funding and local authorities must move away from traditional means of financing infrastructure projects. Local authority budgets are expected to come under increasing pressure due to increasing energy costs and other economic pressures (e.g., fallout from Covid, Brexit, Ukraine-Russia conflict), with the BBC reporting last summer that UK LAs are collectively facing shortfalls of some £3billion in their budgets for 2023-2024.

Innovate UK's Report, 'Accelerating Net Zero Delivery' (2022) concluded that as long as adequate safeguards we present that maintain sustainable levels of debt, an opportunity does exist to optimise local government borrowing. Finance could be raised for delivering net zero programmes by:

- Facilitating partnerships with the UK Infrastructure Bank
- Reviewing lending conditions of the PWLB
- Exploring the use of national guarantees to de-risk lending
- Engaging with commercial banks on new loan structures
- Maximising capital efficiency through revolving fund structures
- Enhancing the market for municipal bonds

This really highlights the opportunity to unlock and blend private capital for the benefit of net zero programmes. The Net Zero Delivery Vehicle will need to further assess the best means of designing and deploying a special purpose investment structure and innovative financing instruments that overcome the barriers to increase participation of the private sector in this space. Examples could include development corporations, land value capture, portfolio investments and local delivery concessions.

There is still a need to upskill local authority key decision-makers (to include Chief Executives, S151 Officers, Councillors) to approve net zero investment programmes, building an understanding of the new approaches to finance and the scales of investment. Failing to address this point could be one of the biggest risks associated with the Net Zero Delivery Vehicle. It is advised that a capacity development programme, led by the Greater South East Net Zero Hub, is established to support key decision-makers and net zero leads at local authorities to build their understanding of new sources / approaches to finance and how the Net Zero Delivery Vehicle can help accelerate the scale and pace of decarbonisation programmes.

(3) Lack of experience in building large-scale decarbonisation programmes

Prior to setting net zero targets, a LA would typically deliver a low-carbon investment programme by adopting a building-by-building approach. These would tend not to have a target date attached to a portfolio of projects and be driven by financial savings. Seeking to achieve net zero significantly changes this approach. There is a need to move faster (many LAs have set 2030 as the target date to achieve net zero across their own estate) and at scale. The current system(s) that are in place at LA level are not sufficient to rapidly mobilise net zero investments.

The Ukraine-Russia conflict has exasperated this issue. As a response to huge increases in energy costs (2 LAs have reported increases in energy costs rising by 500% since the beginning of the year) LAs should be deploying more energy efficiency and renewable generation projects due to quicker returns on their investment. Though there has been little evidence during the Scoping Study exercise that this is what LAs are doing (unless they have been a recipient of PSDF).

One of the main reasons for this is that LAs lack experience in building large-scale decarbonisation programmes. This is often attributable to a lack of project development costs for a lot of LAs outside of major cities, which can prevent opportunities to benefit from private sector organisations with the skills and resources to develop these large-scale decarbonisation programmes.

Unfortunately, this does prevent LAs from benefiting from economies of scale, which can reduce the unit cost of low carbon measures. Analysis by Innovate UK (2022) showed that district heat network's economies of scale reduce the levelised cost of heat to 40% less than an air source heat pump, per household.

Another local barrier linked to this is a LA failing to understand the most appropriate technologies and innovations that can be integrated into these investments. In August 2022 Innovate UK published some work into what it described as a 'range of critical barriers holding back a broad and rapid roll-out of innovative net zero technologies' faced by local authorities. The work was part of Innovate UK's Net Zero Pilot, which saw the Knowledge Transfer Network and East of England Local Government Association engage with 50 LAs around barriers to innovation across the net zero space.

The work detailed 5 main barriers to technology uptake by LAs:

- A lack of alignment between the challenges prioritised by local authorities and the innovation sector's understanding of those challenges and translation of these challenges into relevant, deployable products and services
- The fragmented nature of the local government net zero innovation marketplace
- The complexity, expense and risk associated with procuring net zero innovations at scale
- A lack of clearly articulated and understood business cases for investment in net zero solutions and associated infrastructure
- An underutilisation of dedicated options for procuring innovation

In addition, the Net Zero Pilot convened several workshops with LA attendees who provided a number of additional local barriers and challenges that they are facing:

- Confidence in decision-making
- Understanding what support is available (and who is offering it and how to access)
- Understanding the journey others have taken (not just the outcome)
- Creating an evidence base for a business case
- Difference in language used by different stakeholders
- Getting more people in the discussion from different roles/teams
- Opportunities to learn from others (mistakes/difficulties)
- Understanding technologies

Each of the above can be linked back to a lack of internal capacity, resources and skills.

(4) Lack of coordination across national, regional and local approaches

The Climate Change Committee report, 'Local Authorities and the Sixth Carbon Budget' (2020) called for a framework to enable better coordination between national and local authorities to respond to the complexity of delivering the local net zero implementation challenge. There is a clear disconnect between national and local delivery plans for

achieving net zero, which presents a very real prospect of increasing local delivery costs. This was very apparent when speaking with the LAs involved in the Scoping Study.

Local action often appeared at odds with national strategies and targets. For example, interviews conducted during the Scoping Study revealed that Government targets of decarbonising the National Grid by 2035 had not been factored into strategic plans on achieving net zero, with very few identifying that electricity demand will also surge due to the electrification of heating and a switch to electric vehicles (EVs).

It emerged that there has been very little real coordinated activity between county, districts and boroughs, with unitary authorities seemingly operating in silos. One example is around plans at one county council for its EV strategy to be implemented across the county. Yet, a borough council in the county informed the author of this Report that they had not been approached about their role in implementing the EV strategy.

This is an interesting local barrier to overcome because it represents an opportunity to aggregate net zero investments across a region, enabling LAs to benefit from economies of scale and reducing associated delivery costs. This is not happening. There is a need for LAs to more closely align their net zero approaches regionally.

Innovate UK (2022) suggested that to successfully support regional collaborations around procuring innovative net zero solutions, the following would need to be in place:

- a project partner engaged with, and credible to, regional local authorities to ensure good levels of participation and trust
- an environment of genuine open dialogues between authorities, to ensure that valuable experiences along the journey, rather than just success stories, are shared
- connections and communication with other relevant regional and national stakeholders (including Catapults, Net Zero Hubs, Crown Commercial Services, central government bodies).

These are all extremely valid points that can be applied beyond procuring innovative net zero solutions and should form the basis of any net zero delivery vehicle.

A further point to note is that a lot of the work around developing net zero strategies across the UK has traditionally focused upon large cities, such as London, Glasgow, Manchester, Bristol etc. This does not help the majority of smaller LAs that need to contribute towards net zero and deliver upon their own targets. This contributes to the local barriers and challenges that are faced by many LAs.

Local Authorities and the Sixth Carbon Budget

The Committee on Climate Change's 2020 Report, 'Local Authorities and the Sixth Carbon Budget' stated that

'LAs are increasingly ambitious in their plans to tackle climate change. As of October 2020, over 300 local authorities had declared climate emergencies, and many are now in the process of developing plans to deliver against ambitious net zero targets. Local authorities have a range of existing levers that can be used to deliver local action that reduces emissions and prepares local areas to a changing climate.

However, these levers alone are unlikely to be sufficient to deliver local authorities' net zero ambitions, due to gaps in powers, policy and funding barriers, and a lack of capacity and skills at a local level. Additionally, without some level of coordination from Government, the UK risks pursuing a fragmented strategy towards net zero'.

The Report concluded that the Committee on Climate Change's Sixth Carbon Budget can only be achieved if Government, regional agencies and LAs work seamlessly together.

(5) Lack of understanding at decision-maker level to commit to signing off multi-million £ investment programmes

The final local barrier and challenge is the decision-making process at LAs that is required to be followed to sign-off significant investments. Whilst the Report detailed a lack of capacity, resources and skills internally across LAs as a barrier (see above), there is still a need to upskill LA decision-makers to approve net zero investment programmes. The main focus area needs to be on building an understanding of how these programmes need to be financed, moving away from traditional sources of funding (e.g., PWLB (see above)), while also understanding the other economic, social and environmental benefits that net zero programmes can deliver.

The Local Government Association has described the transformative action local government plays in the race to net zero as master planners, through procurement, as asset owners and conveners of local partners, businesses and civil society. If LA decision-makers (including Councillors and S151 Officers) are not sufficiently upskilled to understand the financial implications of the investments, they will not be able to fulfil this role. It is advised that a capacity development programme is established to support key decision-makers and net zero leads at LAs to build their understanding of new sources / approaches to finance.

One additional local barrier is the engagement and acceptance of residents and businesses to delivering net zero programmes. The Committee on Climate Change has shown that LAs can directly control between 2-5% of local emissions but have direct influence on up to 1/3rd of emissions locally. Engaging with the citizens of a town or city is a key aspect of delivering net zero but has not been explored in any detail due to the scope of this Report.

Options Appraisal:

The barriers and issues above persist for many LAs. Although the NZDV aims to mitigate these issues and barriers, it is not the only option for doing so. Table 9 (overleaf) describes some of the alternative vehicles for assisting with the delivery of NZ projects.

Table 9: An options appraisal of alternative vehicles to assist with the delivery of NZ projects

	Description	Comments
Net Zero Go	Developed over 2 years with £1.5 million investment from the UK Government, Net Zero Go provides councils with a powerful, easy-to-use platform to help them put decarbonisation strategies in place and develop successful, locally focused zero carbon projects, taking initiatives from a standing start to operational and beyond.	Provides an excellent means for LAs to better understand how they can develop a business case for net zero projects. It certainly is part of the solution in terms of delivering net zero programmes and overcoming resource issues for LAs. However, it stops at being a full solution that covers all stages of project development. The solution instead focuses on toolkits for LAs to simplify net zero programmes. There is still a need to support LAs develop large-scale investments and identify the most cost-effective sources of finance for their programmes.
CityLeap	CityLeap is Bristol City Council's energy investment programme with a remit that includes heat networks, smart energy systems, solar PV, energy efficiency for homes and commercial buildings, renewable energy and more. It is a partnership with Ameresco Limited, which is set to last for 20 years and deliver up to £1bn worth of projects.	It has been reported that the setup costs for Bristol City Council were £7.3 million before the delivery partner had been appointed. It has taken 7 years to develop Bristol's response to delivering its net zero targets. Replicability is likely to focus on other cities and devolved areas in the UK, which makes it unlikely it will be beneficial to LAs that fall outside that size. They are focusing on 'city-scale decarbonisation' elsewhere (e.g., not county councils, boroughs, districts).
RE:fit (e.g., ESCo)	The Re:fit programme is a procurement initiative for public bodies wishing to implement energy efficiency measures and local energy generation projects on their assets, with support to assist you in the development and delivery of the schemes. These measures improve the energy performance of assets.	RE:fit is based on the model of local authorities working with a large consultancy and institutional outsourcing. This can make project costs excessively high and prevent projects from being delivered, or result in 'cherry-picked' projects that offer a quick / easy return on investment. Investments focus on LA owned assets, so application is limited outside of that area.

Whilst these descriptions should be compared with the final design for the NZDV, which will be confirmed through stakeholder conversations, multiple options are described in the upcoming sections "Structuring Change" and "Implementing Change". The advantages of these proposed designs have been included below to aid comparison with Table 9 above.

- **Access to proven solutions, the ability to rapidly deploy engagements into hard-to-reach sectors**: Through the ESCO-in-a-box (EIAB) solution, the consortium will be able to leverage proven solutions for hard-to-reach segments such as SMEs and the Third Sector. The central resources such as a ready-to-deploy CRM are combined with flexible, rapid R&D components, such as pre-built stakeholder engagement workshops, marketing plans and messaging development processes.

- **Speed and Ease of Procurement**: The unique procurement framework proposed enables local competition whilst assuring quality. The solution also unlocks greater oversight from the local authority or regional institution, who can contribute to ongoing training, evaluation and qualification of contractors. The procurement of this framework as a whole will lower transaction costs by concentrating administration and procurement procedures at the launch of the NZDV, enabling rapid, reliable and replicable project delivery from that point onwards.
- **Integration of Local Control and Accountability:** the proximity of the final solution, with a tiered, localised design, to political representatives and S151 officers ensures full political, technical and financial oversight. Combined with the stakeholder engagement and market research collateral present in the EIAB ecosystem, public engagement exercises can rapidly be completed and integrated, ensuring broad political support.
- **Local Capacity Building:** The location of PDUs within LA boundaries will enable valuable staff to be seconded and upskilled. This allows technical needs and resources to be shared between collaborating councils without the "boom and bust" hiring cycle often associated with central grant funded programmes. This will allow LAs to build skills within their own boundaries and those of collaborating regional institutions rather than having to buy these skills in from expensive external consultants on a piecemeal basis.
- **Development and Understanding of a Novel Framework Model:**
    - Aggregation of Scale is specialised for regional context, therefore flexible to different regions and their needs.
    - Interventions and asset classes are place-based, leveraging LA strategies and delivery plans. This will ensure interventions target local needs whilst still providing replicability and good value for money.
    - The lack of need for re-procurement allows the solution and its pipelines to gather momentum while reducing ongoing transaction costs. This allows for greater confidence & relationship building with qualified financiers/local contractors.
    - Governance and oversight are structured at higher levels, but still balanced with the needs of a rapid delivery solution: scale, "shovel-readiness" and risk mitigation.
    - The ability to absorb lay resources within LAs and regional institutions (such as secondment). This covers overhead of valuable staff, ensures representation of local stakeholders and experts alike, & aligns the interests of all LAs & local institutions.
- **Access to specialist delivery contractors and technical resources:** Expertise, as well as access to- and qualification of local experts, will be produced centrally within the framework. This will increase competitiveness alongside gathering and replicating best practice. This approach is proven through the EIAB solution.
- **Rigorous M&V, tracking of pilots and project performance:** The need to manage and track central project performance will be key in building inertia towards the net zero transition. This is particularly the case given the innovative pilots being developed by the LAs within our region of interest, such as the Climate Focus Area approach being piloted under ECC. The tracking of these innovative pilots and individual projects will produce valuable learning which this solution can organically capture and share. When paired with rigorous measurement and verification (M&V) collateral from EIAB, EP's M&V expertise, and the output of actuarial/marginal abatement data from the EIAB CRM, this solution will be uniquely placed to create an evidence base that is valuable at both regional and national scales.

Advancing the State of the Art

Proposing a Taxonomy of Net Zero Project Types

The state of the art in Net Zero development is changing rapidly due to advancements from a range of parties. One such party is the Connected Places Catapult, which are following a similar place-based approach as is proposed in this report. Together with UK Cities' Climate Investment Commission, they produced a valuable report outlining place-based net zero investment analyses across a range of cities. One powerful output of this work was the production of a Net Zero Taxonomy, describing the various sectors and investment classes whose engagement is required to reach NZ. A summary of this taxonomy, as well as analysis into the current investment suitability characteristics of the sectors within, is shown below in Figure 20.

Net Zero Infrastructure Sector	Current suitability for private sector investment*	Suitable for: Principle-Agent issue to address?**	Carbon co-benefit payments?	Health co-benefit payments?	Biodiversity co-benefit payments?	Need for policy development to enhance private finance flows	Key Enabling Actions to Increase Private Flows
Domestic Building Decarbonisation		✓	✓	✓	✗	High	• Blending private finance, public funding, and co-benefit payments • Aggregating to street or neighbourhood level to achieve economic efficiencies
Commercial Building Decarbonisation		✓	✓	✗	✗	High	• Blending private finance, public funding, and co-benefit payments • Developing financing arrangements between tenants and landlords, with commercial real-estate companies playing a key role
Renewable Electricity Generation		✗	✓	✗	✗	Low	• Aggregating project types and processes across cities • Integrating with other infrastructure types to support projects with poorer returns
Transport Decarbonisation		✓	✓	✓	✗	High	• Blending private finance, public funding, and co-benefit payments for active travel infrastructure • Using policy to incentivise the provision of charging infrastructure for electric buses
Waste Management Decarbonisation		✓	✓	✓	✗	High	• Combining market mechanisms and policy to increase the cost of higher emitting management practices • Using policy to require green design criteria to minimise waste and maximise re-use and recycling
Green Infrastructure		✓	✓	✓	✓	High	• Effectively pricing co-benefits to develop additional revenue streams • Implementing projects alongside those with direct revenue sources

*Green = Strong existing business case with tangible and predictable financial returns for investors. Amber = Some consistent predictable revenue to provide investors with a return, but lower than desired. Red = Limited to no financial returns.
** Refers to misalignments between those financing projects, and those receiving any associated savings or benefits.

Figure 19: A description of the original taxonomy of NZ investments with their suitability for various forms of decarbonisation or financial incentive, produced by UK Cities' Climate Investment Commission or 3CI

From here, we see six categories or "tags" of NZ investment:

> *Domestic Building Decarbonisation; Non-Domestic Building Decarbonisation; Renewable Electricity Generation; Transport Decarbonisation; Waste Management Decarbonisation; Green Infrastructure (Natural Capital)*

Whilst the original source conceived these definitions as categories, this report shall focus on their role as "tags". This "tag" conception has a key difference in that projects can now be tagged with more than one taxonomic sector, meaning projects with multiple impacts can be evaluated through each lens. Although these tags are no longer mutually exclusive, one should note that a "primary" tag should still be specified in most cases. In addition, some taxonomic categories have been redefined, for example "commercial building decarbonisation" has been reconceptualised as "non-domestic building decarbonisation" in order to clarify the inclusion of industrial buildings and their upstream/downstream processes.

However, these definitions spark a number of follow-on questions, relating to how we layer analysis of specific sectors, supply chains and regional differences on top of this taxonomy to produce place-based solutions. These questions have been categorised and colour-coded based on the following aspects: the classification and prioritisation of key project sectors; the engagement and enabling factors of key stakeholders, and the operation and accounting of projects and their outcomes. These questions and their categorisation are shown in the flow chart below (Figure 21):

Figure 20: A list of questions arising from engagement with the 3CI NZ taxonomy

Moving through these questions below, this report has prepared some preliminary responses to be further developed (Appendix 4). The list of data inputs also provided in Appendix 4 describes how taxonomic tags can be used to help understand many aspects of project development, verification and reporting, as well as the types of input required to enable each use case. However, in order to realise this utility, data must be collected from various sources, as outlined below in Table 10:

Table 10: A list of data inputs and their sources

Data Inputs	**Source**
Framework-level Data: • What frameworks/project pipelines do you run? • How many projects do these contain? • What is their value? • Are there envisaged ends to these frameworks? • Where is the Capital sourced from? • What outputs are expected as part of this framework? • What Conditions and Stipulations exist? • Who/How is the work delivered? • What M&V Processes run throughout?	1. LA Engagement
Project-level Data (inter alia): • Intervention information (tech spec) • Year Starting Operation (+ Implementation) • Metered Intervention? Measurements & Data Frequency • Baseline Data & Format • Revenue Predictions & Uncertainty	1. LA Engagement
Taxonomic Tags	1. Desktop Research (Connected Places) 2. Synthesis
Repository of Actors/Enablers	1. LA engagement 2. Desktop Research
NZ Archetypes	1. Existing Projects (CREATORs) 2. Desktop Research 3. LA Engagement

Data Collection Requirements across Taxonomic Tags	1. Existing Projects (CREATORs) 2. Desktop Research 3. ICP PDS and other Industry Frameworks
Lists and repositories of certification and revenues	1. Desktop Research (CDP) 2. Existing Projects (CREATORs) 3. Gov. Website (incentive schemes and UK green book)
Actuarial Data Specification	1. EP Internal Expertise
Repositories of Output Formats by stakeholder type and taxonomic tag	1. Desktop Research (CDP) 2. Existing Projects (CREATORs)

Table 10 above describes what types of data need to be collected and where they may be sourced from. However, the formation of this document has proven that there is significant effort involved in the collection, synthesis and sharing of data. As such Figure 22 shows a generic and idealised project development cycle, onto which the collection of detailed data can be mapped and reviewed. From here, specific touch points and activities (such as data sufficiency checking) can be defined, enabling the rigorous and structured development and de-risking of varied projects. The following section begins developing these touchpoints, activities and tools further.

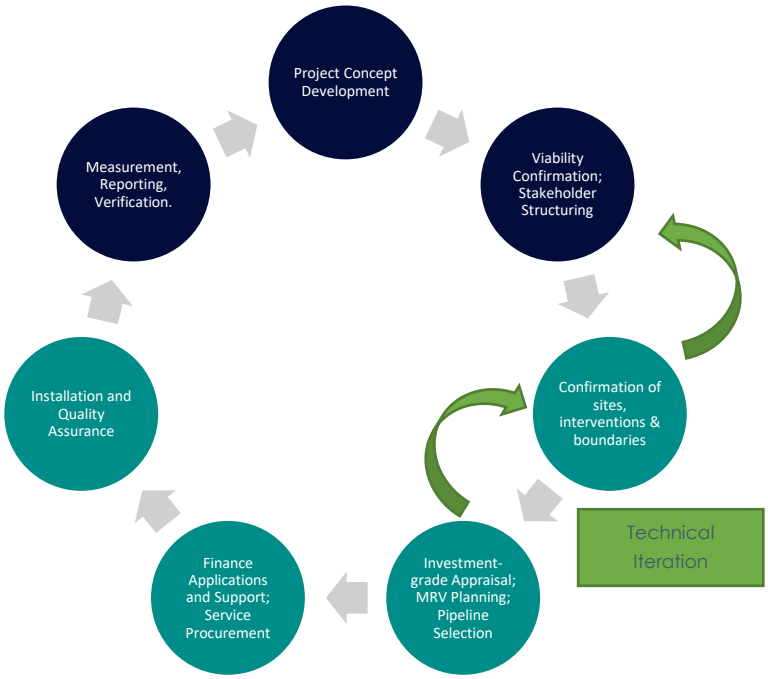


Figure 21: A generic and idealised project development cycle, onto which the collection of detailed data can be mapped and reviewed

Specification of Enablers, Aggregation and De-Risking Measures

The structure developed in the above section is very useful, but highly genericised. This limits its applicability as Net Zero projects are typically diverse, having vastly different needs and risk profiles over the course of their development and implementation. As such, the first step with engaging and de-risking a Net Zero project is to build a greater understanding of the project, the taxonomic sector it occupies, the envisaged lifespan of the project and various other aspects such as system interactions. This also should be completed for projects which have not reached the investment-grade appraisal or implementation stages, in order to avoid any survivorship biases, or when project sets need to be matched to a finance offer,

enabling impact and risk to be derived from complex and varied project contexts. In order to do this, a generic question set has been developed below, which can be deployed to gather de-risking requirements of projects or portfolios of standardised projects. These questions would be asked by the managing organisation or project development unit of the NZDV (depending on whether reviewing a project or portfolio).

1. What taxonomy tags apply? What sub-sectors are relevant?
2. What interventions are your deploying to abate or drawdown carbon?
3. What is the longevity or lifespan of the project? Does this differ from the lifespan of the abatement or drawdown?
4. What intervention impacts, if any, on the wider system are you accounting for (i.e., freeing up grid capacity or alleviating downstream problems)?
5. What metering/measurement solutions are you deploying with this intervention?
6. Do you have any processes or plans to conduct verification and reporting of the project outcomes? If so, please tell us a little about these processes or plans.
7. What Costs and Revenues result from the project? Will the project deliver a final saving, and if so, at what scale and for whom?
8. What uncertainty persists across above aspects? Are there key risks identified / accounted for? Do you have additional risk management procedures in place?

This question set should be deployed and tested with real projects in various taxonomic sectors to reveal any further adaptations, guidance or examples which should be provided as part of the final approach. As the Net Zero taxonomic sectors are also diverse and distinct from one another, the approach should attempt to understand the differences and similarities of projects tagged with various taxonomic sectors. Through this work a set of generic sources of uncertainty and risk can be ascribed to each taxonomic sector, further assisting the NZDV's understanding of risk over time and various project development stages.

This will allow the NZDV to target specific pipelines to ensure sufficient projects of each needed sector or typology are in development, forecasting the expected "drop off" as projects encounter risky project development or pipeline stages. This way, the NZDV can maintain pipeline diversity as necessary, as well as meeting any targets that the LA may have for project delivery and funding allocation across taxonomic sectors.

This will also enable the NZDV to map risks across these project development stages, connecting key enablers, aggregation and de-risking measures as necessary. When combined with a mapping of these measures across the NZ taxonomy, or when associated with specific financial instruments, this approach can provide a "playbook" of de-risking and enabling measures that is at once specific and generic. This will lower transaction costs for project developers as they can plan ahead to integrate de-risking approaches, but also will enable the transfer of best practices and innovative approaches across the taxonomic sectors.

The transfer of these novel approaches to new taxonomic contexts will be essential to realise the low-cost funding and delivery of projects across the NZ landscape. Specific examples include the use of measurement and verification approaches familiar within the energy efficiency sector to conduct statistical analysis, verification and quantification of the impact of nature-based solutions. This can be seen in Table 11 overleaf.

Table 11: Draft mapping of de-risking tools across the taxonomy. Highlighted elements, or components thereof, are contained within EP's proprietary ESCO-in-a-box solution.

Domestic Building Decarbonisation PAS2035 Standards; TrustMark/MCS accreditation schemes; Completion Testing and Performance Contracting/Dispute Resolution Mechanisms; Green Leasing
Non-Domestic Building Decarbonisation Quality assured frameworks; TrustMark/MCS accreditation schemes; Completion Testing and Performance Contracting/Dispute Resolution Mechanisms; Rigorous M&V and O&M planning; Open Source Actuarial Data; ICP best practice; Aggregation
Renewable Electricity Generation PPAs; Insurance; Dedicated Guarantees; Risk-Return Tranche Funding; Policy De-Risking; Public Co-investment
Transport Decarbonisation Impact assessment (physical and climate risk); Policy De-Risking; Public Co-investment; Project Development Specifications and Due Diligence; Rigorous M&V / O&M planning.
Waste Management Decarbonisation Public Consultation; Impact assessment (physical and climate risk); Policy De-Risking; Public/Private Co-investment; Project Insurance; Decommissioning/End-of-life analysis.
Green Infrastructure (Natural Capital) Extensive/site-specific valuation methods; Climate Focus Areas/Pilot Approaches; Public Consultation; Iterative impact assessment (physical and climate risk); Policy De-Risking; Rigorous M&V and O&M planning; Novel Metering and Measurement

The content above relates to de-risking measures, which includes any approach or measure which is implemented to mitigate known or unknown risks within project delivery and operation. However, this section also aims to specify some Enablers to support NZ progress, which are conceptualised as organisations, approaches or resources which can improve the acceleration and accessibility of NZ projects in development and delivery. Aggregation is another key approach, itself being a category of de-risking measure. Table 12 below lists some enablers, aggregation- and de-risking measures for further consideration. For each project pipeline, the project development unit and financiers must agree the deployment of de-risking measures for the portfolio of works. This will occur following the setup of the NZDV managing organisation, who will facilitate the process and support the deployment, which will likely begin with simple de-risking measures and build sophistication over time. We should note that risk is not distributed across parties, and so the definitions below are not universal from each context and perspective. For example, public co-investment does not mitigate performance risk for the project developer, but does enable the project by accelerating delivery. However, from the perspective of the private investor, where public co-investment includes a first-loss guarantee, this effectively helps to de-risk the private investment.

Table 12: Transaction enablers, aggregation- and de-risking measures for further consideration

Transaction Enablers • Project Development Specification(s) with Archetype/Case Study Library • Facilitation Services • Templates (Project Outputs) / Financial Modelling tools • Pre-qualified Finance Offers • Simulation of Systems and Energy Savings • Centralised Marketing Campaigns/Collateral • Industry Groups or Business Associations
Aggregation Approaches • **Aggregation-as-a-Service (i.e., DSM):** Aggregation can de-risk projects by providing additional grid-scale services which can offset project development costs for central or delivery organisations. By aggregating multiple projects the confidence for provisioning a demand-side reduction at certain grid-points or times of the day can be increased

to a verifiable and monetiseable level. This can be applied to peak shaving, reinforcement deferral or a range of other grid services.

- **Tailored Risk Profiles (designed for risk):** This form of aggregation mixes low-risk, low-impact projects with projects that have higher impact but greater risk. The concept is to start with the risk profile accepted by certain financiers or financial instruments, and to work backwards blending different projects of different risk levels to maximise the environmental or strategic impact of the financed project portfolio.

- **Asset Class Aggregation (designed for technical information asymmetry):** This approach combines projects at different sites which deploy the same asset or asset-class, such as Solar PV solutions. This enables a tailored relationship with a financier or financial instrument to be built upon a shared understanding of the technical details of such projects. By limiting the aggregation to a single asset or asset class, this technical understanding can be gathered and maintained by both the financier and delivery organisation in a cost-effective manner, enabling upscaled financing of portfolios of asset upgrades whilst lowering time constraints and transaction costs from the assessment of technical proposals and projects.

- **PDS Aggregation (designed for project quality assurance):** This approach to aggregation builds off standardised Project Development Specifications (PDS), whereby projects are developed to a set of rigorous technical standards defining the collection and analysis of data, the estimation of savings, and the specification of installation, O&M and M&V procedures. This approach builds off the Investor Confidence Project's Investor Ready Energy Efficiency™ (IREE) certification, a workflow which integrates "qualified providers and third-party review ensures that projects leverage industry best practices". This is combined with standardised project documentation to streamline due diligence and underwriting, resulting in lower finance assessment periods and transaction costs. By providing assurance to investors, owners and project stakeholders, this will de-risk project portfolios. In addition, collaboration with financiers could pre-define project qualification criteria such as savings confidence intervals, hurdle rates and simple payback.

- **Regional Externality Aggregation:** This approach aims to leverage external investment from regional or national institutions providing public services, such as regional NHS Clinical Commissioning Groups/Integrated Care Systems, or the Environment Agency. This investment will pay for and be offset by the mitigation of regional externalities (costs which are not borne by the party which creates them), such as the cost of treatment for air-quality related illness. Whilst singular projects do not provide assurance that a regional externality has mitigated, by aggregating projects the NZDV can provide confidence that a certain level co-benefits will be realised. For example, retrofit of a single unit of social housing may not reduce health costs of underheating, but delivering retrofit to 1000 social homes will create a statistically significant reduction in local health and social care costs, which then funds investment.

De-Risking Measures

These measures span the project development lifecycle from concept development (peer review) through to post-project validation (completion testing/impact assessment). These measures may be developed and standardised by the NZDV managing organisation but will be deployed by Project Development Units. This deployment will be determined by trading off the value provided to the financier and local community (who may be one and the same) in assuring the project's expected impact against the additional development cost of de-risking project lifecycles.

- Peer Review or Technical Assistance
- Simulation, Emulation and Optimisation
- PAS2035 Standards
- TrustMark/MCS accreditation schemes
- Completion Testing and Performance Contracting/Dispute Resolution Mechanisms
- Green Leasing
- Quality assured frameworks
- Rigorous M&V and O&M planning

- Open Source Actuarial Data
- ICP best practice
- Aggregation
- PPAs
- Dedicated Guarantees
- Risk-Return Tranche Funding
- Policy De-Risking
- Public Co-investment
- Impact assessment (physical and climate risk)
- Project Development Specifications and Due Diligence
- Public Consultation
- Public/Private Co-investment
- Project Insurance
- Decommissioning and End-of-Life analysis
- Extensive/site-specific valuation methods
- Climate Focus Areas/Pilot Approaches
- Reporting and ESG guidelines
- Iterative impact assessment (physical and climate risk)
- Novel Metering and Measurement

Financial Risk | Operational and Technology Risk | Modelling Risk | Regulatory compliance risk and reputational risk | Strategic and Business Risk

When considering risk, precise definitions are required to distinguish which party experiences the risk, and where the risk originates from. This project deals with many forms of funding (from debt finance to crowd-funding and self-funding). As such, although this section focuses on investment, the perspectives of traditional investors and financial institutions are not the only counter-party perspectives we need to integrate when considering the funding of NZ investments. In addition, each NZ taxonomy will likely have vastly different exposures to various risk categories: for example, credit risk may be a key consideration for building retrofits, whilst green infrastructure projects have a much greater exposure to environmental and ecological risk. It is key that when and where risk and de-risking tools are likely to arise is defined, such that sufficient approaches can be codified in line with pipeline development stages, and that the relevant party is suitably identified, such that they can define the level of de-risking and their preferred approaches at the earliest opportunity.

As such, we have defined a list of 5 risk categories with the intention of highlighting the top three risk categories for each taxonomy of NZ investment. Please note that whilst a de-risking measure will primarily target a single risk type, the majority of the above measures will also support other risk types. For example, creating a quality assured framework will negate the strategic and business risk present in the market, but will also improve operational and technology outcomes through quality-assurance aspects. The 5 risk categories discussed are presented below, as seen in the colour coding in Table 12 (above):

1. **Financial Risk** includes the various types of market risk affecting the delivery of NZ investments (mainly exchange rate risk, interest rate risk and commodities risk, including energy price risk) as well as credit risk, counterparty risk and liquidity risk. This category also includes structural risk where derived from a company's balance sheet structure.
2. **Operational and Technology Risk** is defined as the risk of loss resulting from inadequacy or failures within internal processes, systems and human resourcing; or from external events affecting operation. This definition includes legal risk and environmental/ecological risk, excluding strategic and reputational risk (see below).

3. **Modelling Risk** refers to the potential for losses or adverse consequences from decisions based upon incorrect or misused modelling outputs. Model error may include simplifications, approximations, inaccurate assumptions or an incorrect design process. Meanwhile, misuse refers to the application of models for purposes other those for which they were designed. Model risk can lead to financial loss, reputational damage or even regulatory sanctions.
4. **Regulatory Compliance Risk and Reputational Risk** includes possible impacts resulting from incorrect reporting or non-compliance within an industry or company's existing regulations and standards. These may be articulated through internal or external policies and procedures, alongside the resulting economic impact (fines, penalties, exclusions, non-accreditations etc.). Also included are the potential impacts of damage to the company's brand image and business reputation. This is alongside accounting risk, which is a very specific risk concerning the proper and true economic/financial reflection of the company's true accounts as well as compliance with all related regulations (such as the 2015 Accounts and Audit Regulations in the UK).
5. **Strategic and Business Risk** includes risks relating to the wider macro-economic environment in the nation or nations in which a company operates, as well as the specific industry/sectoral conditions. Also relevant are the market and competitors, as well as the medium- and long-term decision-making processes that may impact on business continuity and profitability.

Table 13 (overleaf) begins to demonstrate the risk mapping approach, by connecting each of the three key stakeholders (Local Authority, Funder/Financier and Delivery Organisation) to the key risks they face within a specific taxonomic sector, in this case Domestic Building Decarbonisation. For each party, the top three risks have been considered and exemplified. One may question why so many risks need to be considered, and from so many perspectives. However, the table below reveals that each party experiences different variations of a single risk category, and thus must deploy different de-risking strategies based upon their relationship to the projects in delivery.

Table 13: A demonstration of the risk mapping approach by connecting each of the three key stakeholders (Local Authority, Funder/Financier and Delivery Organisation) to the key risks they face within a specific taxonomic sector, in this case Domestic Building Decarbonisation. A comprehensive mapping is found in Appendix 2.

Taxonomic Sector: Domestic Building Decarbonisation		
Stakeholder: Local Authority	Stakeholder: Financial Institution / Funder	Stakeholder: Delivery Organisation
Priority 1 Risk Category: Strategic and Business Risk (i.e., national competition for scare supply chain capacity) Mitigation Strategy: • Policy de-risking: Provision of training and accreditation schemes	Priority 1 Risk Category: Financial Risk (I.e., energy price risk, credit risk and interest rate risk) Mitigation Strategy: • Green Leasing / Public Co-investment • Aggregation	Priority 1 Risk Category: Strategic and Business Risk (i.e., low capacity and lack of accredited skills in local supply chains) Mitigation Strategy: • Localised, Quality Assured Frameworks
Priority 2 Risk Category: Regulatory Compliance Risk and Reputational Risk (i.e. the financing of home improvements and energy upgrades can raise reputational risks, particularly where project quality is low, such as with PACE lending in the US) Mitigation Strategy: • Public Consultation • Climate Focus Areas/Pilot Approaches (with rigorous M&V/novel measurement)	Priority 2 Risk Category: Modelling Risk (i.e., modelling of supplier/occupant uptake or domestic load profiles, particularly within project portfolios) Mitigation Strategy: • Emulation and Optimisation • Iterative impact assessment	Priority 2 Risk Category: Operational and Technology Risk (i.e., correct selection of technology & application of PAS2035 retrofit standards) Mitigation Strategy: • PAS2035 standards & guidance • Project Development Specifications and Due Diligence
Priority 3 Risk Category: Operational and Technology Risk (i.e., correct selection of technology for the local climate and grid system) Mitigation Strategy: • Peer Review or Technical Assistance • Novel Metering/Measurement • Rigorous M&V and O&M planning	Priority 3 Risk Category: Regulatory Compliance risk and Reputational Risk (i.e., project quality must be able to support financier costs, and local publics must benefit) Mitigation Strategy: • Public Consultation • Reporting and ESG guidelines	Priority 3 Risk Category: Modelling Risk (i.e., modelling of energy savings and changing energy end uses) Mitigation Strategy: • Iterative impact assessments • Site Specific valuation methods, potentially applied for local building typologies • Simulation, Emulation and Optimisation

Mapping De-Risking Instruments to Financial Instruments

The approach underleaf in Table 13 can be repeated for all other taxonomic sectors. However, even within the singular stakeholder perspective of financiers and funders, there are a range of financial instruments and types of funding which will have a significant impact on the final need for de-risking, or the form or risks which it is targeted through. In order to map de-risking instruments to the funding approaches they unlock best, two approaches are proposed below:

1. Project/Funding Instrument Matching: This approach looks at individual projects, exploring their risk profiles and funding requirements. In tandem, financiers who could satisfy these funding requirements (in part or in full) are invited to comment on the financial offer they could make, and what risk profile would be expected for a given offer. This allows de-risking and mitigation strategies to be defined which enable the modification and matching of the project developer's and financier's risk profiles. This approach would work best with larger scale projects, or complex pilots for a replicable approach due to the time and expense required to explore and specify de-risking approaches in a unique context. A final de-risking specification will be created as a schedule to funding documentation and related contracts. This specification could then be genericised and re-used via the approach below in many cases.

2. Mapping across defined PDS (financier requirements known): This approach looks at a portfolio of replicable and comparable project (or project typologies), such as the retrofit of a whole neighbourhood of domestic households occupying a given building typology (i.e., 1930s semi-detached). One or more financiers would provide an acceptable risk profile given the value of each project and the characteristics of the project portfolio being specified. From here a project development specification can be drawn up which assures best practice and risk mitigation in line with this acceptable risk profile, preferably at minimal transaction cost. This project development specification can then be piloted for a smaller number of projects with rigorous measurement and verification proving project outcomes and exploring the spread of project performance across the pilot. As more measured and verified project outcomes are produced, an actuarial dataset can be assembled, allowing risk for a given PDS to be calculated, at which point the PDS can act as a conduit to finance wherever its requirements (such as use of PAS2035 certified staff) are met. This will then unlock investment at scale whilst enabling various de-risking approaches to be piloted in comparable or diverse contexts. This approach has been proven through both IREE-certified projects and the related ICP PDS, but also through the ESCO-in-a-box solution, which uses standardised quality assurance and project development best practice to de-risk diverse projects, offering pre-qualified finance through partnering financiers.

The above aspects reveal a proposed approach to de-risking which is both iterative and conducive to upscaling. The wealth of available de-risking measures and available best practice has been detailed in prior sections. This offers a host of proven methods to accelerate NZ investments, but one should note that the proposed NZDV structure is inherently place-based, drawing upon local geographies, demographics and public needs

to maximise strategic value and decarbonisation impact alike. As such, each instance of such a delivery vehicle will require some initial piloting or monitoring of test cases to validate the specificity and suitability of de-risking and delivery processes to local context and funding requirements. This can be achieved by rigorous monitoring, measurement and verification of initial project outcomes upon completion, but also through the mapping and application of de-risking measures across the project lifecycle, such that de-risking opportunities can be identified and leveraged for projects in various stages of delivery. As part of this mapping, Figure 23 below shows the association of various de-risking measures across the delivery lifecycle (as seen in Figure 22).

Figure 22: The association of various de-risking measures (see below) across the delivery lifecycle

Mapping across a Project Development Specification (PDS).

Project Concept Development

- Open Source Actuarial Data
- ICP Best Practice
- Policy De-Risking
- Public Consultation
- Climate Focus Areas/Pilot Approaches
-

Viability Confirmation; Stakeholder Structuring

- Peer Review or Technical Assistance
- Aggregation
- Policy De-Risking

- Public/Private Co-Investment
- Project Development Specifications and Due Diligence
- Public Consultation
- Extensive/Site-Specific Valuation Methods
- Climate Focus Areas/Pilot Approaches

Confirmation of sites, interventions & boundaries

- Simulation, Emulation and Optimisation
- Peer Review or Technical Assistance
- ICP Best Practice
- Public/Private Co-Investment
- Impact Assessment (physical and climate risk)
- Extensive/Site-Specific Valuation Methods
- Climate Focus Areas/Pilot Approaches
- Novel Metering and Measurement

Investment-grade Appraisal; MRV Planning; Pipeline Selection

- Peer Review or Technical Assistance
- Simulation, Emulation and Optimisation
- Rigorous M&V and O&M planning
- ICP Best Practice
- PPAs
- Impact Assessment (physical and climate risk)
- Project Development Specifications and Due Diligence
- Public Consultation
- Extensive/Site-Specific Valuation Methods
- Reporting and ESG guidelines
-

Finance Applications and Support; Service Procurement

- PAS2035 Standards
- TrustMark/MCS Accreditation Schemes
- Green Leasing
- Quality Assured Frameworks
- Open Source Actuarial Data
- ICP Best Practice
- Aggregation
- PPAs
- Dedicated Guarantees
- Risk-Return Tranche Funding
- Public/Private Co-Investment
- Impact Assessment (physical and climate risk)
- Project Development Specifications and Due Diligence
- Project Insurance

Installation, Works and Quality Assurance

- PAS2035 Standards
- TrustMark/MCS Accreditation Schemes
- Completion Testing and Performance Contracting/Dispute Resolution Mechanisms
- Quality Assured Frameworks
- Decommissioning and End-of-Life Analysis.

Measurement, Reporting, Verification.

- Simulation, Emulation and Optimisation
- Peer Review or Technical Assistance
- Rigorous M&V and O&M planning
- Public/Private Co-Investment (measurement & verification of public co-benefits can help co-fund this work, reducing cost and improving outcomes)
- Impact Assessment (physical and climatic risk)
- Decommissioning and End-of-Life analysis.
- Climate Focus Areas/Pilot Approaches
- Reporting and ESG guidelines
- Novel Metering and Measurement

This "Lifecycle" approach allows the NZDV to be launched quickly, as attention can be dedicated to the earlier stages of de-risking and project development, before progressing to build out comprehensive de-risking across the lifecycle. This approach would be bookended by good measurement and verification practice, which itself is a key tool for revealing and analysing risk and uncertainty. This focus on M&V and de-risking across the lifecycle allows projects to be developed at large or small scale, and allows a responsive approach to de-risking, where focus is directed to the key tranches of work already being developed and aggregated by LAs across the UK, such as large scale ground mounted solar in Essex and Surry County Council. This will allow the NZDV to act as both a regional and national testbed, gathering actuarial and project performance data as it supports varied projects in diverse, place-based contexts. This diversity of approaches and adaptation to local contexts is itself a de-risking tool, particularly when considering reputational and political risks at a programme level. This adaptable "test bed" approach has already proved successful through the EIAB programme (Appendix 5).

Structuring Change: NZDV Mechanisms & Design

A Novel Net Zero Procurement Framework

One aspect of the NZDV solution proposed is the formalisation of a Net Zero Procurement Framework. This framework would be procured by a LA in order to allow access to range of pre-qualified, quality-assured solution providers. This approach has worked well for both smaller engagements (such as EIAB SME support schemes) and larger regional programmes (such as Re:FIT). The standard benefit of this approach is the trade-off between upfront development costs and lower ongoing transaction costs, as due diligence has been provided at the solution-provider and technology level rather than the project level. This allows multiple quotes to be generated for each project from a pre-qualified set of contractors. This enables competition whilst assuring quality, but also enables greater oversight from the local authority or regional institution, who can contribute to the ongoing evaluation and qualification of contractors. The procurement of this framework as a whole will further lower transaction costs, as administratively complex procurement procedures are concentrated at the launch of the NZDV, enabling rapid, reliable and replicable project delivery from that point onwards.

Despite its similarity to the EIAB and Re:FIT approaches, there are several aspects that make this approach novel and innovative. Firstly, the framework will be holistic, representing all taxonomies of NZ investment at a scale which has previously not existed. The overlap of niche and emerging technologies and approaches with existing regional supply chains enables a regional institution to map and support available skills both within and beyond their boundaries. In addition, valuable solution providers that are not involved with installation directly (PAS2035 Retrofit Coordinators, M&V professionals, metering solution providers, etc.) can be integrated and procured where project scales would benefit from additional support or de-risking. This de-risking goes beyond individual contractors with many of the de-risking tools listed in the prior section being integrated into framework, such that suppliers are held accountable to these de-risking approaches and client expectations. Such examples which already exist in the EIAB supplier framework include:

- ICP Best Practice
- TrustMark/MCS Accreditation Schemes
- Completion Testing and Performance Contracting/Dispute Resolution Mechanisms
- Peer Review or Technical Assistance
- Rigorous M&V and O&M planning

This local capacity building goes beyond the mapping of regional skills and the provision of reliable pipelines to justify contractor's investment in new staff and upskilling. A net zero framework such as this can also engage local colleges and training institutions, drawing them into the framework to provide discounted or direct training, pipelines of graduates and accredited professionals and broader human resourcing input. This will benefit both local delivery organisations and contractors as well as the colleges themselves, which can be supported to develop new apprenticeships, training schemes and adopt current industry accreditations such as PAS2035. Another additional service this framework could provide is impact or ESG reporting, either through support from qualified organisations or as part of the wider monitoring and reporting of the project pipeline. This will assist both the organisation

receiving decarbonisation support and the delivery organisation to better understand their impact and its perception amongst wider publics and supply chain stakeholders. This is just another example of how a framework can support multiple industry actors, from contractor to client to financier.

The Role for Local Authorities

Local Authorities and place-based institutions are far more than just the client in the context of a NZDV. Although it is proposed that local councils procure the final implementation of the NZDV, their far more important role in the structure is to provide oversight (political, technical and financial). The same can be said for other place-based institutions such as the Net Zero hubs, although their oversight will focus more on technical and financial efficacy than political oversight due to the distributed nature of their governance boards. However, this distributed nature will give the Net Zero hubs a key role as cross-boundary facilitators and mediators of political discussions, as they currently act in this capacity within their current remit.

Establishing an arms-length structure, such as a special purpose vehicle or SPV, would enable a flexible relationship between the LA and the central NZDV structure. This would unlock different methods to develop PDUs, both centrally or through dispersed resources (such as existing LA/Net Zero Hub staff), as well as different approaches to balance sheet treatment, collaboration and funding. Although the SPV structure has a high level of familiarity within commercial realms, other legal forms or structures could be investigated. Due to the public good provided by NZDV projects, a range of cooperative or community-benefit structures could also be considered, such as a charitable or non-charitable community benefit society. A full review of these cooperative structures is presented in Appendix 3.

Regardless of the chosen legal structure, a direct connection to LAs should be made through the S151 officer, who provides financial oversight, but there is potential for other connections to be made between the LA and the NZDV. Firstly, the establishment of PDUs can be used to assist LAs with capacity building by helping staff to gain expert local knowledge, by accepting secondments of staff where some redundant or infrequent resource need exists, or by providing direct training to LA staff on carbon literacy and NZ project assessment. Further capacity building would be completed through the professional services delivered through the NZDV managing organisation, such as the use of centralised CRMs, EIAB contracting and international best practices, which lower transaction costs whilst assuring project outcomes.

This international best practice will be key to assuring holistic alignment of all stakeholders. Figure 25 (overleaf) shows the misalignment of incentives from just two key stakeholders: finance providers and LAs. On one hand, it is known that LAs require high-quality project outcomes, building of skills and capacity, and some degree of control and oversight. This is somewhat at odds to finance providers, who desire projects to be developed at scale and minimal cost, clashing with the need to assure outcomes. In addition, the need for "shovel-ready" project pipelines is delayed by the oversight processes desired by LAs. Although both parties benefit from the development of high quality projects, which limit financier risk exposure to only "the right risks", the need to develop projects at speed and scale clashes with the need for LAs to develop skills and capabilities locally, as this increases spin-up time

and adds additional cost, which financiers cannot reclaim by funding CAPEX alone. Figure 25 below shows how the NZDV will balance these two stakeholders' needs.

Figure 23: The needs of two key stakeholder groups (Local Councils and Finance Providers), and how these are balanced in the NZDV design.

Funder Alignment

This section has already spoken on Finance Provider's need for scale; "shovel-readiness" and "Taking only the 'right' risks". However, these aspects must be aligned with the assurance of outcomes, control/oversight & the building of skills, capabilities and capacity desired by LAs.

Therefore, the NZDV will need to start by building narrow but deep project pipelines for proven asset classes (such as roof mounted solar). The selection of a single asset class allows best practice to be integrated at speed, builds relationships with local contractors and training institutions whilst centralising and standardising LA oversight in a replicable manner. The speed of this development, and the known scale of the asset class (1,200 homes by 2023 in Surrey, and all Essex schools by 2050) will satisfy finance provider's need for "shovel-readiness" at scale. The proven nature of this asset class ensures risk exposure is minimal and quantifiable.

Such an approach, moving between asset classes as the NZDV's capacity develops and technology matures, will enable ongoing alignment of funders and risk mitigators per asset class. This will enable the NZDV to gather momentum and build capacity for key

"launchpad" asset classes in each sector (such as renewable generation and traditional energy efficiency measures like LEDs for commercial and public buildings). From here, additional offers for emerging technologies like heat pumps can be developed, funded in part by revolving revenues from profitable "launchpad" asset classes, enabling consistent inertia and reliable project pipelines for local contractors and financiers alike. Upon completion of the initial tranche of each asset class, further project opportunities that arise can be integrated into a mixed asset class pipeline. This will enable actuarial data to be identified, collected and analysed, allowing the risk profile of this final mixed asset pipeline to be ascribed and adjusted.

Together this will avoid finance providers "cherry-picking" the most profitable projects, whilst still ensuring swift impact and the gathering of inertia. Political oversight and centralised data capture and learning processes will ensure that public benefit is maximised throughout this process, whilst taking concrete steps towards a net zero future. These steps are further described in the upcoming section, "Potential NZDV Designs".

Potential NZDV Designs

The integration of stakeholder needs, particularly those of LAs and Finance Providers, is demonstrated in Figures 26 and 27 (below and overleaf):

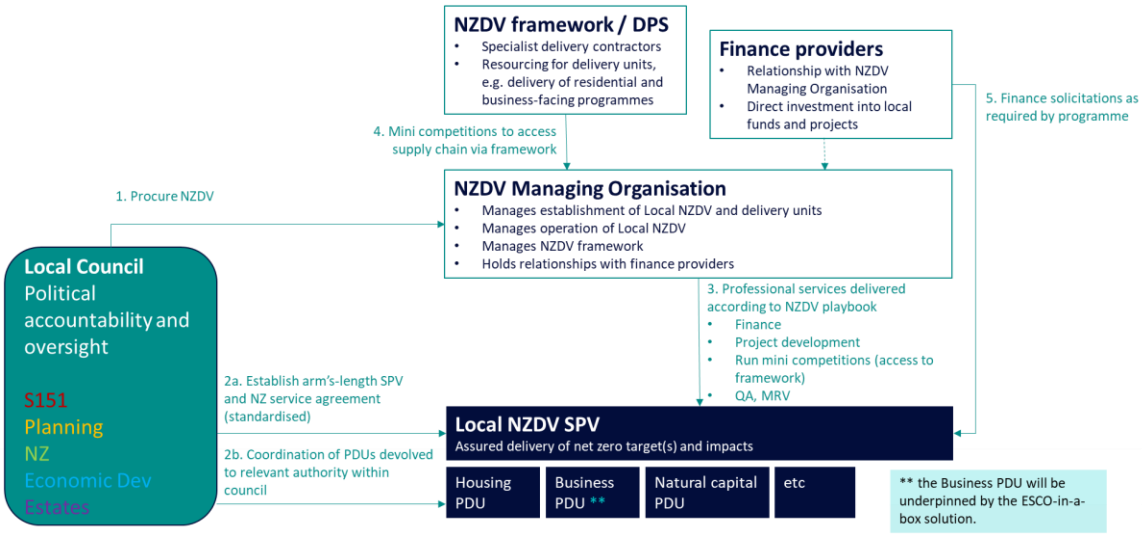


Figure 24: The proposed structure for the NZDV, showing the interrelation of the managing org.

Figure 26 above shows the development of a single place-based NZDV, supported by a centralised NZDV managing organisation (MO). This central MO would oversee the development and maintenance of a NZDV framework or dynamic procurement system (DPS), containing specialist delivery contractors and key resources for PDUs, such as marketing content targeting commercial sectors, or webhosting for data collection exercises. These components allow for quality assurance at the lowest possible transaction cost and would integrate best practice and collateral from systems such as EIAB. This central MO would also gather the requirements and perspectives of finance providers, such that relationships can be strengthened and replicated, channelling direct investment into local pipeline funds and projects. The MO also manages other key professional services such as

project development specifications, framework access requirements, quality assurance/monitoring and measurement, verification and reporting (MRV) outputs.

The PDUs themselves would interact with the local structure (such as SPV), with their coordination devolved to relevant authority within the council. Figure 27 below demonstrates which authority may be assigned responsibility for various PDUs or project aspects. Figure 27 also shows how the NZDV MO could develop its own centralised technical support units as the offer expands beyond a single region, creating avenues through which best practice and learning can be captured and replicated. This central technical support has proven to be a key feature and advantage of the EIAB ecosystem, with individual ESCOs within the family sharing expertise on the engagement of historic buildings, the AgriFood sector, the assessment of non-domestic properties from open source data and methods and the use of novel approaches such as "hub and spoke" engagements of local commercial clusters.

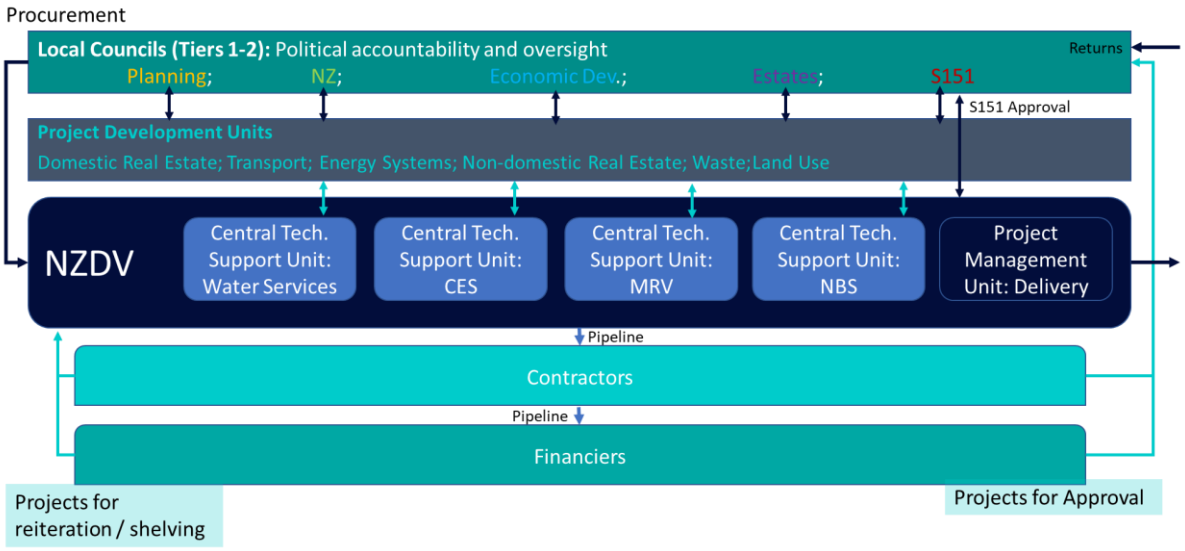


Figure 25: A structural diagram showing the relation between LA/NZDV resources and the PDUs

Implementing Change: NZDV Options & Resourcing

When structuring the development of such a body as those shown in Figures 26 and 27 (underleaf), it is key to consider the setup of the system, the commitment of resources and the timelines involved. Gathering momentum for the solution will be key to ensure the full validation and proof of concept. The first question to solve on the way to implementing wide-reaching change is to consider how the development and launch of such a system will be funded and attributed. To this end, two options are proposed below:

1) **Direct investment in the solution and its development:** This would be the simplest method to realise the NZDV concepts proposed in this report. A central institutional or governmental body (such as the UK Infrastructure Bank or the Department of Business, Energy and Industrial strategy respectively) could recognise the value the NZDV has in both national and regional contexts and invest directly in the development of an open-source methodology and pilot approach. This centralised investment then could be used to leverage support from multiple local authorities in order to develop the solution holistically, integrating cross-border PDUs and technical resources. This will allow the exploration of various forms of collaboration and co-production and provide a roadmap for replication across the UKs regional landscape. This approach would provide the greatest value for money in terms of unlocking strong, early action, but the administrative and business development burden involved with convincing such a governmental body to invest would likely add significant delays and result in loss of inertia.

2) **Development of single PDU or pipeline:** Here several delays would impact the final launch of the NZDV. Firstly, a LA would need to agree to support the development and direct projects and project opportunities towards the preliminary NZDV. These projects would focus on a single project development unit or PDU, resulting in a single-asset class pipeline, likely of a proven, low-risk asset class such as Solar PV. EP would then support the development of this PDU and delivery of the pipeline, with fees from this first tranche of project providing working capital for further development activities. The first PDU would act as a pilot for the structuring and governance approaches required by a full NZDV, and in parallel a scoping and feasibility study would be undertaken to identify and prioritise transitionary PDUs towards full coverage of taxonomic sectors and interventions in-scope for the regional NZDV. This staggered approach is much lower risk but does not offer the same level of strong, early action as proposed by Option 1 and the Stern Review. This approach does allow various novel approaches to be piloted at smaller scale, and de-risking measures could be integrated on an asset-class-by-asset-class basis, lowering upfront costs and the level of technical complexity. This approach, particularly where combined with innovation funding, is proposed as a pragmatic step forward for further consideration, as demonstrated by Figure 29.

These two options above led to the three options for integrating public funds: direct investment, innovation funding and public-private co-investment. The advantages of each of these approaches are described overleaf in Figure 28.

Direct Investment

- This approach allows for resources to be dedicated solely to the development of the NZDV, accelerating outcomes and providing maximum abatement impact. This is the best option for helping the UK effectively and efficiently transition to Net Zero.

Innovation Funding

- 3rd-party innovation grant funding will allow for resource to be dedicated to the development of the NZDV, though likely at a smaller scale than with direct investment. This approach will also accelerate the launch, but scale will be limited to that specified by innovation funding, and the time taken to yield a successful application for innovation funding will further delay the upscaling of the NZDV. This type of funding is intensely competitive in the wake of the UK's exit from the EU and EU-funded R&D programmes.

Public-Private Co-investment

- This approach will not enable great amounts of resource to be dedicated to the development of the NZDV by EP alone. Instead an "at-risk" partnership would be assembled between EP and a LA partner, where each organisation would informally direct or second resources into the development programme. This approach can be combined with innovation funding, particularly where a public-private partnership is a pre-requisite. This approach would be conditional on the associate LA reaping direct benefit by launching pilots and gaining technical expertise for projects within their area, whilst EP would benefit from the redirection of project fees from the initial pipeline into a working capital seed for future development work and upscaling.

Figure 26: The three options for integrating public funds into the development of the NZDV

Taking forward Options 2 and 3, the use of innovation funding and public-private co-investment, a "phased" deployment plan was produced, as shown in Figure 29 below:

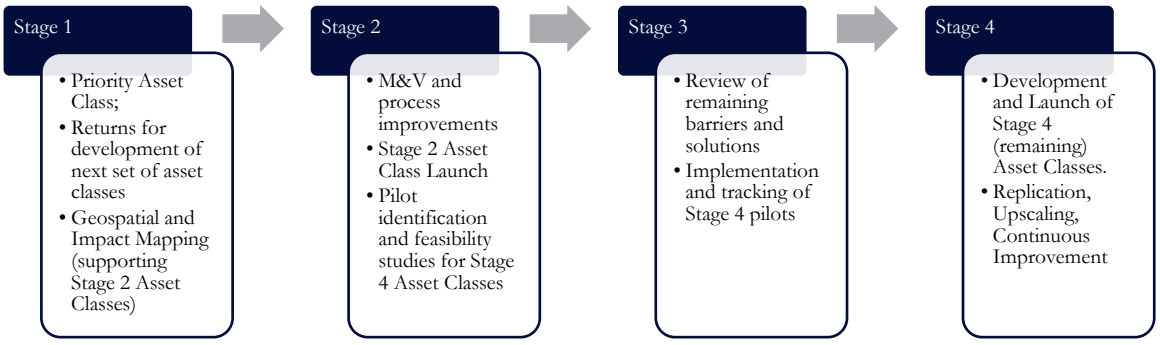


Figure 27: A "phased" deployment plan for launching the NZDV with minimal risk

The above approach is holistic and flexible. It will allow place-based integration and alignment of asset classes and de-risking measures with local strategies. This approach will allow the local authority to determine the final trade-off between economic returns and the provision of social and ethical value by enabling different asset classes and target sectors to be prioritised based on regional need. Thresholds for asset classes could be set and

connected to geospatial and impact mapping, alongside the outcomes of staged pilots and performance data. This would enable asset classes to launch as products and markets emerge, but it would also allow evidence-based objectives to be set and considered. For example, BHCC could set thresholds around which investment and technical development specifications are launched for key climate adaptations, such as those arising from local surface flooding. This approach also enables risk mitigators and transaction enablers to be codified over time in a staggered way, allowing for evaluation and local implementations to emerge. This will ensure that de-risking approaches are practical and not nebulous, with a proven evidence base influencing further strategic decisions.

When combined with EP's expertise in deploying place-based energy service offers (through the EIAB family of ESCOs), the above approach will enable proven EIAB de-risking measures to be deployed rapidly and complemented by specialised asset-class-specific measures. EP's expertise in studying market feasibility and producing relevant, localised value propositions will enable the swift launch of narrow-but-deep single-asset-class project pipelines whilst tangible de-risking and quality-assuring outcomes.

Why is this investment key to the UK's Net Zero Transition?

The NZDV solution we propose offers numerous advantages. Of these advantages, the following examples have been selected for their relevance and uniqueness, demonstrating the suitability of this consortium to advance the place-based net zero agenda and deliver rapid greenhouse gas abatements. These advantages are as follows:

- **Access to Proven Solutions (and the ability to rapidly deploy engagements into hard-to-reach sectors)**: Through the EIAB solution, the consortium will be able to leverage proven solutions for hard-to-reach segments such as SMEs and the Third Sector. The central resources such as a ready-to-deploy CRM are combined with flexible, rapid R&D components, such as pre-built stakeholder engagement workshops, marketing plans and messaging development processes.
- **Speed and Ease of Procurement**: The unique procurement framework proposed enables local competition whilst assuring quality. The solution also unlocks greater oversight from the local authority or regional institution, who can contribute to ongoing training, evaluation and qualification of contractors. The procurement of this framework as a whole will lower transaction costs by concentrating administration and procurement procedures at the launch of the NZDV, enabling rapid, reliable and replicable project delivery from that point onwards.
- **Integration of Local Control and Accountability:** the proximity of the final solution, with a tiered, localised design, to political representatives and S151 officers ensures full political, technical and financial oversight. Combined with the stakeholder engagement and market research collateral present in the EIAB ecosystem, public engagement exercises can rapidly be completed and integrated, ensuring broad political support.
- **Local Capacity Building:** The location of PDUs within LA boundaries will enable valuable staff to be seconded and upskilled. This allows technical needs and resources to be shared between collaborating councils without the "boom and bust" hiring cycle often associated with central grant funded programmes. This will allow LAs to build skills within their own boundaries and those of collaborating regional institutions rather than having to buy these skills in from expensive external consultants on a piecemeal basis.

- **Development and Understanding of a Novel Framework Model:**
  - Aggregation of Scale is specialised for regional context, therefore flexible to different regions and their needs.
  - Interventions and asset classes are place-based, leveraging LA strategies and delivery plans. This will ensure interventions target local needs whilst still providing replicability and good value for money.
  - The lack of need for re-procurement allows the solution and its project pipelines to gather momentum whilst reducing ongoing transaction costs. This allows for confidence and relationship building with qualified financiers/local contractors.
  - Governance and oversight are structured at higher levels, but still balanced with the needs of a rapid delivery solution: scale, "shovel-readiness" and risk mitigation.
  - The ability to absorb lay resources within LAs and regional institutions (such as secondment). This covers overhead of valuable staff and ensures representation of local stakeholders and experts alike, whilst aligning interests of all LAs and institutions.
- **Access to Specialist Delivery Contractors and Technical Resources:** Expertise, as well as access to- and qualification of local experts, will be produced centrally within the framework. This will increase competitiveness alongside gathering and replicating best practice. This approach is proven through the EIAB solution.
- **Rigorous M&V, Tracking of pilots and Project Performance:** The need to manage and track central project performance will be key in building inertia towards the net zero transition. This is particularly the case given the innovative pilots being developed by the LAs within our region of interest, such as the Climate Focus Area approach being piloted under ECC. The tracking of these innovative pilots and individual projects will produce valuable learning which this solution can organically capture and share. When paired with rigorous measurement and verification (M&V) collateral from EIAB, EP's M&V expertise, and the output of actuarial/marginal abatement data from the EIAB CRM, this solution will be uniquely placed to create an evidence base that is valuable at both regional and national scales.

Next Steps

This report has spoken on the challenges of delivering net zero rapidly and effectively within a regional boundary, identifying how these challenges can be overcome and risks mitigated. This has fed into the design of a place-based solution and delivery scheme, along with a description of the value of the proposed approach. This report concludes with Figure 30 below, which shows a delivery timeline for the proposed solution. It is essential that the UK begins gathering momentum on the delivery of these net zero solutions, as strong, early action is the most effective way to reduce the impacts of climate change and to transition to a green, sustainable economy.

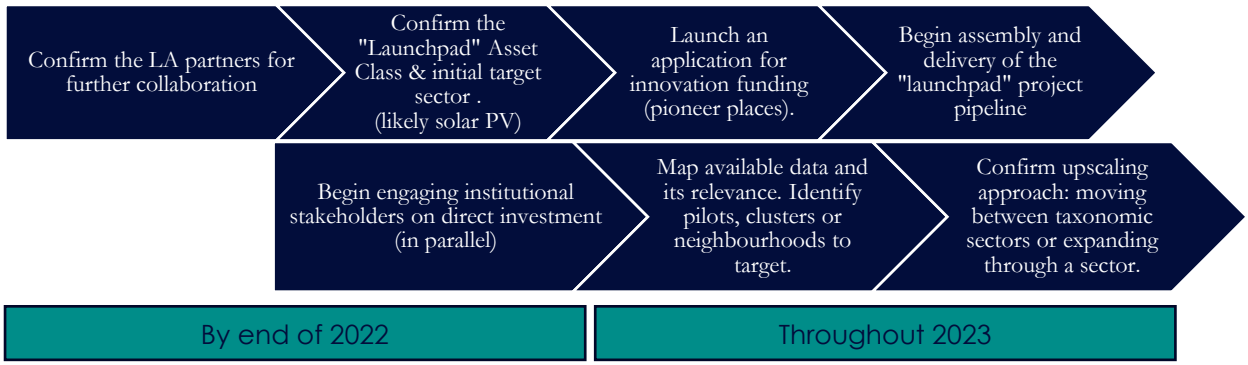


Figure 28: A timeline of proposed next steps to deploy the NZDV structure in the South East.

Appendices

Appendix 1: Pages 69-70

This appendix contains long-form descriptions of the ECC and SCC project pipelines as they currently stand.

Appendix 2: Pages 71-72

This appendix contains a mapping of priority risks across the NZ taxonomy, with a description of financial ramifications and additional tools for de-risking.

Appendix 3: Pages 73-74

This appendix contains a table describing various legal forms for co-operatives or community organisations, which could apply the NZDV managing organisation or regional delivery vehicles.

Appendix 4: Page 75

This appendix contains a interrogations of what is missing or needed within the NZ taxonomy provided in the "Advancing the State of the Art" section, as well as a description of the utility of the taxonomic approach.

Appendix 4: Page 76-77

This appendix contains a case study of how de-risking instruments have been applied and operationalised within EP's ESCO-in-a-box context.

Definition of NZ:

Essex CC's "Making Essex Carbon Neutral" report includes recommendations for most sectors across the county, alongside creation of climate focus areas to spearhead change.

Net Zero Targets/Strategies:

1. Adapting to Climate Change action plan: Adaptation targets supporting 2080 climate resilience
2. Making Essex Carbon Neutral recommendation set: A range of sectoral targets from 2022 – 2050, as well as next steps for strategy & sector recommendations.
3. Essex Green Infrastructure Strategy

Financing and Delivery:

ECC's Energy and Low Carbon team will likely oversee much of the delivery of the actions planned. However, some of the Commicission's recommendations "cannot be delivered by any single agency or body". As such, ECC seeks to establish a Funding and Partnership Development Programme which can act as a catalyst, using local funds as seed capital to attract other funders & empower others to invest in land use change, flood risk management and resilience schemes. For sectors where solutions are not fully mature, ECC is trialling key approaches through the establishment of the Essex Waste Innovation Fund (waste issues) and Climate Focus Areas where deep system change can be evaluated. Annual reports describing process towards the commission's recommendations should also include an integrated Sustainability Appraisal Framework, an Essex Climate Observatory and a Knowledge and Decision Support Framework to support the ambitions in changing systems & land use county-wide

As well as the funding schemes below, alternative funding approaches are being explored for sectors such as transport infrastructure:

- LoCASE business grants (>£20k for Energy Efficiency) (£1.3m secured for 2023)
- Green Homes Local Authority Delivery Grants
- Ground Control's Evergreen Fund (tree planting)
- SELEP Getting Building Funds (£85m across all 6 LAs)
- Central Gov funds (PSDF/PWLB) and Council budget Funding
- Innovate UK grants (Office for Zero Emission Vehicles)

Procurement:

A review of Essex employment, training, skills, procurement, & business operations is planned, with an urgent focus on green procurement standards by the end of 2022 for sustainable building materials. Green procurement standards, evaluating emissions of all ECC procurement, should be integrated & supported by local organisations.

ECC: Council Estate Retrofit Strategy

- 2022 Target: Set up follow up surveys and PSDF Skills Funding (at least £75m) for 250 core council buildings
- Ongoing Target: Installation of LED lighting, control upgrades, ASHPs and 100 kWp of battery-integrated solar at Essex Records Office/Goodman House, top consumers.

ECC: Climate Focus Areas (CFAs)

- 2023 Target: Create two CFAs at the Blackwater and Colne catchments & Harlow & Gilston garden town.
- Blackwater and Colne Targets: 30% of land cover & urban areas managed as natural infrastructure; native tree cover to double to 10%; All farmland to adopt sustainable stewardship; All parishes to have biodiversity and climate emergency strategies.
- Harlow & Gilston Targets: Successfully implement the New Build construction standards and recommendations for over 23,000 new homes, of which 30-40% will be affordable

ECC: Zero CO_2 Homes: Brookfield Close/Swan Housing

- Near-term Target: Construct 62 zero carbon homes (70% affordable), each with energy bills of ~£40/year.
- Transport Target: Construction of walkable neighbourhood with 1 electric charging station and storage for 69 bikes.
- 2022-3 Target: Swan Housing plans use £4.2m of Getting Building funding to help build 1000+ new "low carbon" homes, generating 120+ new jobs in Basildon.

County Improvements: University Waste

- 2022 Target: Ban all sales of single-use plastic on Anglia Ruskin campus
- 2026 target: Increase recycling rate by 60%.

Countywide: Varied Solar

- 2023 Target: University of Colchester's installation generating 720 MWh of electricity, saving ~276 tCO_2e.
- Additional installations have been completed at local schools, with a 2050 target for all roofs to have solar panels

Countywide: LOCASE

- Offers SMEs grants of up to £10,000 for energy efficiency or "green business development" opportunities, along with an environmental training scheme & events.
- 2023 Target: ~200 SMEs, saving ~1,500 tCO_2e & £500k yearly

Countywide: Tree planting

- 2022 Target: 25,000 trees planted (surpassed: 38,725 so far)
- 2024 Target: another 200,000 trees planted (Colchester)
- 2030 Target: another 150,000 trees planted (Chelmsford)

Project Outcomes:

- Energy Efficiency Improvements for ~250+ council core buildings
- ~ 759 kWp of solar installed in the coming year.
- Two Climate Focus Areas will evaluate domestic decarb. & local green infrastructure.
- Construction of ~25,000 low- or no- carbon homes
- Trial of ban of single-use plastic & 60% + recycling uptake at Anglia Ruskin campus
- 375,000+ trees planted by 2030, with support for local ecosystems in rural/urban areas.
- Support for ~200 SMEs, saving ~1,500 tCO_2e & £500k yearly
- Increase cycle parking: 100 built, 69 upcoming alongside additional EV charger

Required Finance:

- Council's "Making Essex Carbon Neutral" plan cost at **£200m**
- SCC's leverage rate indicates that county investment stands at **~£11.8 billion**. This is likely underestimated as Parity Project estimates a **likely investment figure of £13bn** required for Essex's 649,000 dwellings alone.

Definition of NZ:

Surrey CC's Climate Change Delivery Plan includes targets for a number of sectors across the county.

Net Zero Targets/Strategies:

1. Climate Change Delivery Plan (CCDP) 2021-2025: Countywide emissions targets to be achieved by 2025
2. Carbon management Plan: emissions targets for the Council to reach NetZero.
3. Greener Futures Finance Strategy: finance requirements for implementation of both the Climate Change Delivery Plan and Council's NetZero Plan.

Financing and Delivery:

The "Greener Futures Strategic Energy" and "Land and Property" teams develop project concepts and business cases, for review by the Capital Panel and Cabinet. Once approved, the Procurement team manages delivery, using such finance as:

- Grants from Public Sector Decarbonisation fund
- Green Homes Local Authority Delivery Grants.
- Central Gov. Public EV charging installation Grants.
- Council budget Funding

Procurement

SCC has an existing Council Procurement Policy that entails how procurements should be undertaken. This depends on total cost of Procurement with Procurements less than £24,999 require only one quote and above this requiring more than one quote. For large amounts there are requirements for bidding and setting up contracts.

Best Practice & NZ Integration

A Greener Futures Team has been set up covering council estate & fleet decarbonisation, community energy, engagement, sustainable finance, reporting programme management, natural capital & sustainable procurement. The Green Champions Networks supports embedded sustainability across the council

SCC: Building Retrofits

- 2023 Target: 21 Buildings Retrofitted
- 2025 Target: 110 Buildings Retrofitted

SCC: Ground Mounted Solar

- 2023 Target: Project Development Progressing / Complete
- 2025 Target: 15 MW (peak) installed

SCC: EV Fleet Conversion

- 2023 Target: 68 vehicles converted to EV
- 2025 Target: 272 vehicles converted to EV

SCC: LED Streetlighting

- In Progress to be completed by 2023

Countywide: Decarbonisation support for fuel-poor, off-grid or vulnerable homes

- 2025 Target: Support 53,000 vulnerable homes

Countywide: Solar Together group residential procurement

- 2023 Target: 1,200 homes installed with solar panels
- 2025 Target: 6.2m solar panels installed

Countywide: LOCASE

- Offers SMEs grants of up to £10,000 for energy efficiency or "green business development" opportunities, along with an environmental training scheme & events.
- 2023 Target: Engage 600 SMEs
- 2025 Target: Support 7,800 businesses

Countywide: Tree planting

- 2023 Target: ~110,000 trees/hedges planted
- 2025 Target: 600,000 trees/hedges planted

Countywide: Public EV Infrastructure

Countywide: Local Nature Recovery Strategy

Project Outcomes:

- Energy Efficiency Improvements for ~8,000 buildings
- ~ 1255 MW (peak) of solar capacity installed
- Countywide LED Public Streetlighting
- ~50,000 vulnerable and fuel poor households supported
- Integrated EV fleets and infrastructure
- More than half a million trees and hedges planted, with integrated support for local ecosystems.

Required Finance:

- Council's 2030 NZ carbon plan capital costs **£65-£71 million**
- Surrey County Wide Delivery Plan 2021-2025 capital costs of **£3.4 – 4.2 billion**

Net Zero Investment Sector	Priority 1 Risk	Priority 2 Risk	Financial Ramification	Additional De-risking Tools	Sources
Domestic Building Decarbonisation	Transition Risk - decarbonising buildings highly challenging due to differing types of buildings and owner's income ranges (willingness to cooperate) Mitigation Strategy:	Supply chain risk - most decarbonising technology exists but may not be readily available at quoted prices Mitigation Strategy:	Many owners may require additional financial incentives to upgrade, investment should be made early, and insurance acquired for critical materials/technologies	- Technology advancements (decrease costs of operation over time) - Involvement of experienced contractors in planning process (addresses transition challenge) - Incorporate Green Leases	Link
Non-Domestic Building Decarbonisation	Environmental/Social Risk - Retrofitting can be an inconvenient process, entailing upfront sound and air pollution, blocked roads, etc., Mitigation Strategy:	Supply chain risk - most decarbonising technology is existing though not readily available Mitigation Strategy:	Funding will be required to temporarily replace public/commercial services Mitigation Strategy:	- Technology advancements (decrease cost of operation over time) - Incorporate green leases (eliminates problems with data quality and management by incorporating energy-aligned clauses imposed on landlords and tenants) - Involvement of experienced energy services operators (reduces environmental risk) - Incorporation of public consultation (expands social license)	Link
Renewable Electricity Generation	Transition Risk - Threat of displacement (jobs, businesses) Mitigation Strategy:	Supply Chain Risk - Reliant on rare and sought after materials Mitigation Strategy:	Strong investor engagement required to foot initial costs, creative financing approaches may be required to lower operator risk, additional	- Pre-arranged price thresholds with utility operator (caps financial loss) - Dedicated funding to transition traditional energy industries (ensures social viability)	Link

			funding necessary to ensure stakeholder buy-in		
Transport Decarbonisation	Physical Risk - Medium/High exposure to climactic events Mitigation Strategy:	Supply Chain Risk - Difficult to secure low-carbon transport materials/energy Mitigation Strategy:	Strong investor engagement required to foot early/network integration costs, investment from other industry actors may be advisable, additional attention should be given to a strong insurance policy	- Extensive assessment to develop most resilient building method, closely integrated with existing network (reduces physical risk) - Involvement of external financing / expertise (spreads financial and reduces operational risk)	Link 1 Link 2 Link 3
Waste Management Decarbonisation	Moral/Reputational Risk - Situating waste disposal systems, locally or intraregionally is a politically fraught process Mitigation Strategy:	Safety/Operational Risk - Waste management is difficult to reengineer; any changes will have important health consequences for the community Mitigation Strategy:	Subsidies may be required for regions which host waste management facilities, capabilities for proper safety planning and monitoring are necessary (and may be expensive)	- Encourage/positively display engagement of local communities and households, exercise caution in sensitive site selection (promotes local support) - Recruit expert organisations, ideally as co-investors to help manage the project (reduces operational risk) - Acquire insurance for necessary safety risks (hedge against accidents)"	Link 1 Link 2
Green Infrastructure (Natural Capital)	Accounting/Reporting Risk - Difficult to measure Green Infrastructure Effects Mitigation Strategy:	Transition Risk - Displacement of commercial activities Mitigation Strategy:	Financing potentially more challenging to secure, as ascertaining both the initial value of natural capital (i.e., for insurance purposes), and the effects investing in it could produce are ambiguous processes	- Development of extensive/site-specific valuation methods (helps address valuation challenge) - Funding allotted for on-site impact measurement (reduces risk of reporting concerns)	Link

Association Type (sub-types)	Definition
Community Interest Company or CIC (Limited by Shares or Limited by Guarantee)	CIC is a particular type of company that uses its assets and profits for the community benefit. A CIC will satisfy the obligatory community interest test if it can show that a reasonable person might consider that its activities are being carried on for the benefit of the community. It is important to note that CIC's do not enjoy the same extensive tax reliefs that are available to charities. However, they have more freedom about the activities they can undertake, and it is easier to have a paid board. CICs limited by shares can make payments (known as dividends) to their shareholders. However, CICs have a maximum aggregate dividend cap that ensures that the profit distributed by the CIC must not be greater than 35% of its total profit. A CIC limited by shares will also be able to obtain equity finance. However, there are limits on the return that may be paid to investors. In the case of a loan where the interest payable is performance related, the interest cap is currently 20% of the average amount of the company's debt in previous year (this cap was increased in 2014 and older loans may still be subject to a lower cap). CICs must exist for the community interest and set out that community interest in their constitutional documents, which are called articles of association. The constitution of the CIC must also conform to statutory requirements; in particular it must have an asset lock which means that the wealth of the company can never be distributed privately to individuals or for non-community interest purposes. Therefore, the assets must be used solely for the community interest or transferred to another organisation which also has an asset lock such as a charity or another CIC.
Company with Charitable Status (limited by guarantee) (membership or foundation)	This is a conventional company in not-for-profit form, registered at Companies House. A guarantee company does not have a share capital, but has members, who promise that if the company is wound up, they will contribute a specified sum (usually £1) to the assets of the company. A charitable company limited by guarantee has a two tier power structure: the directors, who are the charity trustees; and the members, who have certain rights under the constitution and company law. In **membership CLGs**, the members and directors do not have to be the same people. The trustees do not have to be members, whilst the members do not have to be trustees. The members of the CLG have many of the same rights as shareholders in an ordinary company, which means that they can for example remove a director/trustee. Therefore, the trustees are held accountable to the members. **Foundation CLGs** are more suitable for charities where there is not a large membership. The individuals who make up the board are the same people as the members. Therefore, members and trustees of the charitable company are the same people, so that the trustees are the only members. New appointments to the board are made by the board. When someone ceases to be on the board, they also cease to be a member of the organisation. Since some decisions (e.g., changing the constitution) can only be made by the members, those decisions will be made by the trustees wearing their 'members' hat'.

Charitable Incorporated Organisation (CIO) (Association or Foundation)	CIOs are incorporated organisations, with their own legal identity. A CIO can hold assets in its own name. The CIO has limited liability, meaning that trustees are not generally liable for the debts or liabilities of the charity. The CIO is the only bespoke vehicle for charities. It has been designed with charities in mind, unlike the other legal forms which are adapted for charities. A CIO has a two tier governance system. Like a charitable company limited by guarantee it has both trustees and members. Where the CIO has a wider body of members it is called an "association" CIO. An **association CIO** has a wider membership, including voting members other than the charity trustees. Therefore, a member does not have to be a trustee, someone who manages the charity. In a **foundation CIO**, the trustees and members can be the same people, as with a charitable company limited by guarantee.
Community Benefit Society (charitable or non-charitable)	Community benefit societies may or may not be charitable, depending on their objects and the extent to which they provide public benefit. They can be used to create a co-operative model, depending on how the organisation will be financed Charitable community benefit societies are run by an elected board of charity trustees, with shareholder members, each of whom have one vote regardless of the number of shares held. The constitution of a community benefit society is called its rules.
Charitable Trust	A trust is a simple unincorporated charity. It is important to realise that a trust doesn't give trustees the same protection from personal liability as an incorporated legal form would. The constitution of a charitable trust is a trust deed. This usually also sets out how the trustees are appointed and removed and how meetings are held, amongst other things. A trust does not have a membership, so is a good option for a charity which does not wish to have formal constitutional participation by members, provided the trustees are comfortable with the charity being unincorporated.
Unincorporated Association (Charitable or non-charitable)	An 'unincorporated association' is an organisation set up through an agreement between a group of people who come together for a reason. Unincorporated associations are not registered with any regulators; however, the association may need to register with tax authorities if it starts trading and makes a profit. As the association has no separate legal personality, all the association's legal arrangements are made by the members, acting together. Where the association enters into a contract, for example, it is the management board who enter into the contract. If the association buys property, two or more members will have to hold it on behalf of the association. This can cause complications when the management board members change. An unincorporated association will have rules or a constitution setting out how the organisation operates including how members are admitted and removed etc. It is important to realise that an unincorporated association doesn't give the management board the same protection from personal liability as an incorporated legal form would. A charitable unincorporated association is a simple membership charity. It is important to realise that choosing this legal form doesn't give trustees the same protection from personal liability as an incorporated legal form would. An 'unincorporated association' has a two tier structure with members and trustees.

- What sectors are missing here?
  a. *Inter Alia: Agriculture & Non-Urban Land Use/Extractive Industry)*
- How do we prioritise between different sectors within a region?
  a. *Local importance, sector size (emissions); growth/improvement potential; capacity/constraint*
- What sector-specific barriers exist?
  a. *Various risk distributions; supply chain capacity and maturity; local understanding, uptake and support; varying regulative and legal barriers; business model and technology maturity*
- How will engagement of key stakeholders and publics vary across sectors?
  a. *Top-down and bottom up approaches for each, identification of varied stakeholders, channels and MarComms collateral; feedback and co-production*
- How do we account for/balance trade-offs/synergies between abatement & co-benefits?
  a. *Additionality, Co-benefit incentive schemes and valuation, location of co-benefits and externalities; Cost-benefit assessment*
- How can we best integrate the economic case for each sector into the NZDV?
  a. *Accounting, Certification, Trading, Incentivisation, Centralised or Free Market?, Reinvestment and marginality*
- How will financial and technical resources flow between sectors & sectoral engagements?
  a. *Procurement and bidding, best practice transfers, specialism vs cross-sector upskilling, how best to abstract, transfer and reintegrate knowledge*

These questions demonstrate the utility of the taxonomic approach in revealing the specificities of each project sector & the barriers and challenges present within. However, these taxonomic tags also have great utility in producing solutions to specific problems faced by individual or varied sectors, such as:

1. Matchmaking & Search Categorisation (Funders/Contractors/Facilitation/Technical Support)
   a. *Finding support for further development, investment and implementation*
   b. *Input: Taxonomic Tags; Lists and repositories of enablers/actors*
2. Archetypal Reviews
   c. *Discovering proven models that are currently, or soon will be, available on the market, to help guide project development and communication.*
   d. *Input: Taxonomic Tags; Lists of NZ Archetypes (i.e., Agroforestry: Row Cropping or Thermal Energy Storage)*
3. Data Collection Conditional Logic (data input)
   e. *Providing conditional logic flows to ensure full collection of pertinent and relevant information. E.g., avoids asking energy intervention questions about natural capital projects.*
   f. *Input: Taxonomic Tags; Data Collection Requirements across Taxonomic Tags*
4. Stacking of Certification & Revenues
   g. *Finding industry standard certification schemes, or revenue flow typologies that enable additional value to be captured and capitalised.*
   h. *Input: Taxonomic Tags; Lists and repositories of certification and revenues*
5. Actuarial Data Gathering (data output)
   i. *Gathering relevant data across the NZ taxonomy to support further actuarial and underwriting work, lowering transaction costs and unlocking finance.*
   j. ***Input: Taxonomic Tags; Data Governance & Collection Solutions; Actuarial Data Specification***
6. Output Format Conditional Logic (data output)
   k. *Providing conditional logic flows to ensure pertinent information is output in relevant formats for different stakeholders, project managers or financiers.*
   l. *Input: Taxonomic Tags; Repositories of Output Formats by stakeholder type / taxonomic tag*
7. M&V/Reporting planning
   m. *Providing specifications and support for the production of M&V and reporting plans/procedures tailored to the taxonomic tag*
   n. *Input: Taxonomic Tags; Lists and repositories of M&V/Reporting Components by Taxonomic Tag (CDP?)*

ESCO-in-a-box (EIAB): A De-Risking Case Study

A set of comprehensive de-risking measures and transaction enablers has been assembled above. However, the broader market lacks concrete examples of how these de-risking measures can be applied at a programmatic, regional level. Fortunately, one such case study is salient, the example of ESCO-in-a-box, a product developed and deployed by EP Consulting in many different contexts across the UK and the globe.

Figure 24 below shows the process that EIAB utilises to understand a local market and what de-risking measures and transaction enablers need to be deployed to maximise success.

Figure 29: The process used by EIAB to understand regions and their localised market conditions.

Studying the figure above, it can be seen that the first step "Assemble a set of de-risking measures" has already been scoped and is in completion for the NZDV. The need for each of these de-risking measures will vary significantly between regions and the taxonomic sector and average project profiles being targeted. Therefore, the next step for the NZDV will be to conduct a barriers workshop with stakeholders with deep local knowledge and understanding of the target taxonomic sector. This will help to select and prioritise the initial set of de-risking measures to be developed.

These de-risking measures and their specific implementations can then be tested and discussed with a set of "on-the-ground" stakeholders (either project clients or their liaisons/project officers). This step is key for validating the prior assumptions and enabling stakeholders to co-produce a specialised solution for their local region/sector. This specialised solution can then be finalised and developed into a value proposition for comparison with other services and solutions. This value proposition is key for considering transaction enablers such as marketing programmes and accessible messaging.

The final set of de-risking measures and transaction enablers, once confirmed, can then be applied at a programmatic level (i.e., to all projects within the pipeline) where relevant. For EIAB, this is usually done through the association of a staff resource, software resource or procedural specification with a particular task. Examples where staff resources are deployed include "Peer Review or Technical Assistance" or "Public/Private Co-investment", where EIAB staff would review outputs or forward investment-grade proposals to local grant funding staff respectively. An example of a software resource would be the collection of "Open Source Actuarial Data" through the EIAB CRM, however other key examples include "Simulation, Emulation and Optimisation" or the use of "Novel Metering and Measurement" techniques through automated software such as Wattics. A final example of procedural specifications includes the integration of "Project Development Specifications and Due Diligence" such as that derived from ICP best practice or the use of "Completion Testing and Performance Contracting/Dispute Resolution Mechanisms", which are procedures designed to assure quality and understand and underperformances.

Applying these measures at a programme level greatly increases the frequency at which they are applied, mitigating a significant amount of risk. Although the ubiquity with which these measures apply does increase transaction costs, the transaction costs per individual project are greatly reduced compared to a piecemeal approach, as procedures can be automated and integrated by staff, responsible staff members can specialise in the completion of tasks and automated software can be procured or produced.

Some de-risking measures are too onerous to be completed at a programmatic level (i.e., to all projects), such as impact assessment (physical/climatic risk), end-of-life analysis and the use of Climate Focus Areas/pilot approaches. The burden associated with these measures would be too high to provide a net-benefit to most project, particularly smaller lower-risk projects. In the EIAB example, these measures are held in reserve for larger projects that can service the necessary transaction costs. One example is the use of additional metering devices for larger industrial engagements, which enables M&V to be completed at greater depth and robustness. Often, engineering judgement and client discussions guide the use of these reserve measures, but the NZDV could easily define thresholds or guideline criteria for when these measures should be considered and deployed.

The deployment of these measures in the EIAB system is paired with rigorous outcome monitoring through the EIAB Customer Relationship Manager (see upcoming section). This monitoring is an essential part of the de-risking ecosystem, as it enables the most effective measures to be identified and provides an audit log of all digital actions and analysis to determine if there are any insufficiencies in the processes and procedures as they stand. This approach is also essential where infrequent but in-depth de-risking measures are applied, such as us of impact assessment, as performance data relating to these measures and their application is hard to come by. This provides a great deal of information about which de-risking measures are favoured by clients, ESCOs and financiers alike, and leads to the optimisation of costs and benefits throughout the de-risking process. EIAB has been able to engage and specify projects and delivery methods for a large number of UK businesses, charities and SMEs, driven in large part by the de-risked, quality assured facilitation service it provides.

The benefits these de-risking measures have provided in the context of EIAB have far outweighed the cost of developing and deploying these measures. This is particularly the case as the EIAB approach expands and is replicated in other UK regions. Such a centralised development process is key for maximising value, as discussed in the section titled “Potential NZDV Designs”. This upcoming section also discusses the targeting of singular or synergetic asset classes, with various project development units emerging organically as various taxonomic sectors are integrated or targeted.

In this “tranche by tranche” approach, the costs and benefits of de-risking measures can be reviewed in turn, with the final set of implementations accumulating as further taxonomic sectors and asset classes are de-risked. This approach, combined with the centralised, “replicable regional” development strategy has been proven extensively through EIAB, and is therefore recommended for integration into the final NZDV design.

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