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COMPETITION: STRATEGIC INNOVATION FUND: ROUND THREE - ALPHA

PROJECT TITLE
Rural Energy And Community Heat (REACH)
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Periodic Report

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Project Report

Overall Progress and Key Achievements

Assessment of Project Achievements

Since the last reporting period, the REACH Alpha Phase has demonstrated strong delivery across all workstreams. Led by National Grid Electricity Distribution (NGED) and Smart Grid Consultancy (SGC), with contributions from Regen, VEPOD, Frontier Economics, Cranfield University, and Passiv, the consortium has collectively advanced the technical, commercial, and community engagement components of the project.

Community Engagement and Feasibility Selection

Regen successfully re-engaged seven rural communities, ultimately selecting Awel Aman Tawe and Bigbury Net Zero for detailed feasibility. These two communities were chosen based on a structured scoring approach against technical, locational, and engagement criteria. Site visits, interviews, and feedback loops ensured that community-specific concerns and aspirations were addressed.

Key achievements included:

- Community-facing reports to inform broader learning.
- Two stakeholder dissemination events attended by over 70 participants.
- A recommended engagement pathway for future phases.

Technical Feasibility and Network Constraints

NGED, SGC and, VEPOD delivered detailed load flow and reinforcement analysis across all seven communities. The work confirmed that while current network conditions are generally stable, abnormal running conditions or rapid low-carbon technology (LCT) uptake could lead to significant headroom constraints.

Findings included:

- High sensitivity of rural networks to EV and heat pump uptake.
- Increasing nighttime peak demand due to EV charging.
- The potential value of energy centres in fault scenarios or areas with reinforcement delays.

Energy Centre Design and Load Management

VEPOD developed energy centre designs for both selected communities, incorporating battery sizing, genset capacity, and network export strategies. Passiv’s modelling demonstrated the effectiveness of coordinated heat pump control in mitigating peak loads without compromising comfort—outperforming simple turn-down strategies.

Carbon Impact and Emissions Modelling

Cranfield University’s literature review and modelling revealed significantly higher per capita emissions in rural areas due to off-grid heating and older housing stock. Their Excel-based tool now enables estimation of emissions at both household and community scale.

Key outcomes:

- Scope 1 emissions were 10–20x higher than Scope 2 in rural communities.
- Priority identified for replacing oil and coal-based heating systems.
- EV adoption potential quantified with associated emissions reductions.

Options Assessment Tool Development

Smart Grid Consultancy conceptualised a modular Options Assessment Tool to support community decision-making. This tool will allow users to explore different deployment scenarios and determine the suitability of energy centre adoption.

Core features include:

- A data-driven architecture categorised by requester, source, and relevance.
- Scenario modelling for battery sizing and community energy demand.
- Logic filters to narrow options based on specific rural challenges.

Commercial Model and Cost-Benefit Analysis

Frontier Economics developed a commercial model and SIF-aligned CBA workbook that evaluated deployment pathways. While DNO-led models appear more viable under current regulations, the potential for long-term community participation was also examined.

Highlights:

- Counterfactual scenarios were defined to assess relative value.
- Ownership models mapped against regulatory and financial barriers.
- Illustrative financial flows developed to inform stakeholder discussions.

Refinement of the REACH Deployment Use-Case

A key shift in this reporting period has been the refined positioning of REACH modular energy centres. Originally envisaged as a proactive solution to normal operating constraints, they are now more appropriately deployed as a tactical response only relevant to communities witnessing constraints in intact network conditions.

Exceptions and Variations

Two notable variations were recorded:

1. **Refined Use-Case**: Shift towards tactical deployment due to findings from technical assessments.

2. **Site Visit Reduction**: Full visits were not required for all communities due to adequate remote data access.

Both deviations were justified and did not impact the delivery of project outcomes.

Conclusion

The REACH project has made substantial and strategic progress in its Alpha Phase. All major deliverables have been completed to a high standard, and partner collaboration has been strong. A clear understanding of where energy centres could provide value has been established, for communities witnessing constraints in intact network conditions. Before progressing to Beta, NGED plan to conduct further network analysis to evaluate use cases.

Exceptions

During the course of the project, two exceptions have materialised:

1. During the course of the project, the use-case for how the energy centre may be deployed has shifted somewhat. Initially, we did not expect DNO ownership to materialise, due to the regulatory barriers preventing ownership of storage assets. However, more recently recommendations to consider Ofgem’s regulatory sandbox has

allowed us to consider a use-case whereby Network Operators deploy energy centres as a means to manage local network constraints whilst network reinforcement activity is carried out. In addition, use-cases where community groups self elect to deploy energy centres may be limited due to the high capital cost of deployment. For this reason, development of the Options Assessment Tool has developed into considering how best to support Community Energy Groups through a DNO led deployment.

2. Site visits were originally scheduled to take place with all communities during the beginning of the project. However, when completing the initial high level feasibility assessments and selection process, the project team realised all required information was available either from public databases, or online interview sessions. For that reason, site visits were only held with the two communities taken forward to detailed feasibility.

Recommendations

- Investigate use of Ofgem's regulatory sandbox during Beta phase.
    - One of the key challenges identified is the current regulatory barrier to DNO ownership of storage assets. The REACH team recommends early engagement with Ofgem's sandbox team to explore a bespoke trial exemption, enabling NGED to pilot DNO-led deployment models under tightly defined conditions.
- Refine Community Selection Using Network-First Approach
    - Review secondary system forecasting to locate where NGED are likely to experience network constraints in rural areas in Intact Network loading conditions.

Technical Progress

Work Package: WPA1 – Community Requirements
Actual Starting month : 1 **Actual End month : 6**
Work Package Objectives: Deep dive into partner communities' requirements, feasibility analysis for 2 communities most aligned with REACH goals, wider community engagement to better understand broader support requirements and development of user requirements and guidance for options support tool.

Description of work this period

The work in this period can be categorised into two distinct areas:

- Direct engagement with the selected communities
- Wider cohort engagement

Direct engagement with the selected communities

In the first quarter of the project (December to March), we re-engaged the seven communities and supported the selection of two to continue with.

Our critical task was to select the two communities so that the technical partners would have a location on which to base their further assessments. This was laid out in more detail in our mid-point review report.

In the second quarter of the project (March to May), we have supported the completion of the comprehensive assessments and created reports to enable the seven communities to learn from the assessments.

Comprehensive assessments - Comprehensive assessments were required to evaluate the viability of implementing community energy solutions in these locations. Our support of the comprehensive assessments included being an essential middleman between the communities and the technical partners, both when gathering and feeding back data. This included organising site visits with the two selected communities.

Site visits - The site visits enhanced the technical analysis by enabling direct engagement with community leaders and firsthand observation of local conditions. These interactions provided deeper contextual understanding and practical insights that data alone could not offer, while also strengthening stakeholder relationships.

Findings from detailed engagement

Our top findings from the detailed engagement are as follows:

1. **Improving community engagement**

- When engaging with the community organisations in the **Beta phase**, we should:
  - **Develop accurate visual representations** of the energy centre installation to address aesthetic concerns
  - **Create transparent financial information** that helps communities understand costs, benefits, and potential ownership structures (as seen at the end of Alpha)
  - **Integrate practical considerations** into discussions with communities early in the process, addressing crucial aspects such as optimal energy centre location, visual impact mitigation through landscaping and screening options and any site-specific constraints that might affect implementation.

2. **Value of Complementary Community Characteristics**

- Communities with different profiles would provide valuable diversity for testing the REACH solution.

- **For the Beta phase, we recommend continuing this approach, specifically selecting communities that represent the full spectrum of rural communities within NGED's network to ensure comprehensive testing and wider applicability of results.**

3. Respecting community resources through appropriate compensation

- Our experience highlighted the critical importance of fair and transparent compensation for community participation. Community groups' knowledge, networks and time are valuable resources that deserve proper recognition and remuneration.
- For the **Beta phase**, we recommend a comprehensive approach to compensation, including increasing the Beta phase budget for expanded community roles, benchmarking with sector standards, clearly defining expectations and pay upfront, and recognising communities as essential project partners.

4. Recommended Engagement Pathway for Beta

- We now have much greater clarity about the specific network constraints REACH is best positioned to address and the community characteristics that best align with the REACH solution.
- We recommend that the selection process for communities in the future follow this format:
    - Beginning with NGED’s network analysis to identify areas with appropriate technical challenges
    - Mapping these areas against existing community energy organisations
    - Creating targeted information materials explaining why specific communities are being approached
    - Following with a tailored engagement process based on the number of potential communities identified (e.g., starting with an event to explain the project, followed by a call for those to submit a detailed questionnaire).

Wider cohort engagement

In the first quarter of the project (December to March), we publicly launched our continued involvement in the REACH project, including what we learnt in discovery and our plans for Alpha.
In the second quarter of the project (March to May), we conducted interviews with 10 and held a second knowledge-sharing event with the cohort of community energy stakeholders.

The interviews—We interviewed 10 community energy stakeholders to enable the project team to make informed decisions about the REACH energy centre's future design and deployment plan. Developing the interview protocol involved significant collaboration between project partners to determine the questions needed.

Knowledge sharing event— We held a second knowledge sharing event. Seventy community energy stakeholders, including active community energy groups, local authorities, network operators, consultants, and others, attended.
The speakers introduced rural decarbonisation and demand-related grid constraints, explained the role of the community partners in REACH, and provided updates from each key project partner on their activities and key learnings from the Alpha phase.
The event was also used to verify some of the findings from the interviews with a broader sample. This was done through a live, interactive survey.

Findings from wider engagement - our top findings are as follows:

1. While interviewees aspired to pursue shared low-carbon infrastructure projects, the significant challenges could mean that many communities will likely adopt an approach that focuses on promoting the uptake of household technologies.

In Beta, the project team must consider:

- What are the different possible triggers for reinforcement that will trigger the need for an energy centre?
- How can the deployment plan include considerations for different community contexts?

- Delays may not be an issue in a coordinated approach if identified early.

In Beta, the project team must consider

- How long will it take to deploy the energy centre, considering community engagement, planning applications and construction? Is deploying in areas with constraints at the shorter end of the 1-3 year timeframe still worth it?
- Interviewees raised several concerns about the energy centre's acceptability. Strategies to address these concerns need consideration.

In Beta, the project team must consider:

- How will concerns about the energy centre be addressed? Including, concealment, fire and safety risks, industrialisation, location and longevity of impacts.
- Effective local engagement could boost public support for the energy centre and improve community outcomes.

In Beta, the project team must consider:

- How can effective partnerships be developed with local organisations of varying experience levels to support deployment, especially in areas with limited local representation?

Work Package achievements and highlights

- Direct engagement with the selected communities
  - Kick-off meeting with seven communities
  - Arranging sub-contracts for community partners
  - Data collection on seven communities
  - Selection process and meeting
  - Arranging sub-contracts for selected community partners
  - Arranging site visits with selected communities
  - Providing reports to communities
- Wider cohort engagement
  - Knowledge sharing event
  - Interviews with 10 community stakeholders and discussing findings with the project team.
  - A second knowledge sharing event and stakeholder polling.

Progress towards the Deliverables for this Work Package

Type	Description	Due Date	Revised Due Date	Status	Completion Date
Milestone	WPA1 M1 - Kick off meeting with communities	20/12/2024		Completed	20/12/2024
Milestone	WPA1 M3 - Selection for Feasibility	10/02/2025	12/02/2025	Completed	07/02/2025
Milestone	WPA1 M6a - Event One held	12/02/2025	11/02/2025	Completed	11/02/2025
Milestone	WPA1 M5 - High Level Feasibility Studies Completed	24/02/2025	07/03/2025	Completed	14/03/2025
Milestone	WPA1 D1 - Briefing note on Community Selection	07/03/2025		Completed	07/03/2025
Milestone	WPA1 M2 - Site visits complete	19/03/2025	01/01/1900	Completed	19/03/2025

Milestone	WPA1 M4 - Interviews completed	21/03/2025	04/04/2025	Completed	31/03/2025
Milestone	WPA1 M9 - Site visits Subject Matter Expert Support complete	24/03/2025	24/03/2025	Completed	24/03/2025
Report	WPA1 D4 - User Requirement Report for Options Assessment Tool	04/04/2025	25/04/2025	Completed	28/04/2025
Milestone	WPA1 M6b Second Knowledge Sharing Event	28/04/2025	13/05/2025	Completed	13/05/2025
Milestone	WPA1 M6- Knowledge Sharing Events Complete	13/05/2025		Completed	13/05/2025
Milestone	WPA1 D2 - Briefing Note on Knowledge Sharing Events	15/05/2025	20/05/2025	Completed	20/05/2025
Milestone	WPA1 M7 Summary of Feasibility Process Produced	15/05/2025	23/05/2025	Completed	23/05/2025
Milestone	WPA1 D3 Summary report on insights from detailed community engagement	15/05/2025	29/05/2025	Completed	29/05/2025
Milestone	WPA1 M8 Report on user requirements for tool development	23/05/2025	29/05/2025	Completed	29/05/2025

Description of planned activity for next quarter

N/A

Work Package: WPA2 – Capability Led Network Assessment
Actual Starting month : 1 **Actual End month : 6**
Work Package Objectives: Understand where rural networks are likely to be overloaded and develop operational scenarios for where REACH energy centre would provide benefit over Counterfactual

Work Package achievements and highlights

Working in collaboration with community energy groups and Distribution Network Operators (DNOs), the work package focused on understanding the real-world constraints that rural networks face as the adoption of Low Carbon Technologies (LCTs) increases.

A key outcome of the work has been the identification of future risk areas where rising domestic demand, particularly from electric vehicles and heat pumps, could lead to headroom constraints on the network. Through detailed analysis of distribution transformer loading, substation headroom, and community-level energy use, the work package confirmed that while current conditions are generally stable, some communities are nearing critical thresholds and could face delays or complications in accessing new connections if trends continue.

What we have learned

- **Rural networks are vulnerable to rapid LCT adoption:** Even a modest increase in EVs or heat pumps can erode available headroom due to the limited capacity of radial circuits.
- **Current data reporting is insufficient:** Many LCT installations are not reported properly under the “connect and notify” process, reducing the DNO’s visibility of network stress points.
- **Transformer headroom varies significantly:** Analysis found that most communities still have some headroom, but a small number are already showing signs of overload at specific times of day.
- **Nighttime peak demand is rising:** EV charging in particular is increasing nighttime loads, sometimes exceeding daytime peaks, which traditional network designs weren’t built for.
- **Solar generation can mask daytime loads:** Communities with high solar PV penetration show artificially low daytime demand, complicating accurate headroom assessment.
- **Small-scale housing developments pose an emerging risk:** If new homes are built with LCTs as standard, they could strain already limited capacity and trigger major reinforcement needs.
- **Timelines for rural reinforcement are long and complex:** Upgrading rural infrastructure (e.g., pole replacements, land access negotiations) can take significant time, limiting the agility of response.
- **There is a need for better forecasting models:** Future planning requires a probabilistic approach that reflects behavioural patterns and community-level clustering of LCT adoption.
- **Constraint type:** In all 7 of the communities engaged, reinforcement would be triggered in the next few years as a result of constraints arising under abnormal running conditions, i.e. when an 11kV feeder experiences a fault and the network is re-configured to

accommodate. In this case, temporary increases in capacity is required to maintain network security. However, this is not a situation which happens frequently. DNOs would likely opt for temporary mobile generators to accommodate this additional capacity requirement while in abnormal loading, rather than an expensive energy centre. In the majority of communities studied, voltage drop constraints outside statutory limits are what drives network constraints, rather than the thermal capacity of the conductors or transformers.

Description of work this period.

The WPA2-D1 Rural Load work package focused on evaluating the capacity constraints of rural electricity networks in the context of increasing Low Carbon Technology (LCT) adoption. The work centred on real-world analysis of seven self-selecting rural communities, aiming to understand the existing and future risk of electrical overloading due to domestic electrification of transport and heating, as well as small-scale housing developments.

The team undertook a comprehensive review of network headroom across various distribution levels using data sourced from National Grid Electricity Distribution (NGED) systems. This included assessing both primary substations and local distribution transformers. The intention was to determine whether these communities are at imminent risk of exceeding available network capacity or if risks are expected to emerge over time due to clustered demand growth.

NGED's Secondary System Planning Team undertook headroom assessments and indicative reinforcement plans for all 7 communities, using Sincal – a power flow modelling software. Costs for reinforcement averaged over £1m including HV and LV works. After Bigbury and AAT were selected for detailed feasibility studies, half hourly modelling was undertaken to evaluate the requirements of an energy centre in intact and abnormal network conditions. As outlined, all communities did not experience network constraints while in intact running, but following an aggressive uptake of low carbon technologies, constraints arose during abnormal running conditions. The half hourly feeder loading was provided to VEPOD and Passiv for their analysis. Following the sizing of an energy centre, and optimisation of heat loading, NGED re-studied the network and found the energy centre and heat loading to manage constraints. Whilst it is unlikely for a modular energy centre to be deployed to mitigate constraints in abnormal running conditions, it was a useful exercise in demonstrating the effectiveness of the energy centre in managing constraints.

This work package not only assessed network performance under current conditions but also explored the implications of accelerated LCT adoption, using both empirical analysis and scenario forecasting. It laid the groundwork for the development of a decision support tool to help communities and DNOs collaborate in scoping viable, locally owned energy centre solutions.

Progress towards the Deliverables for this Work Package

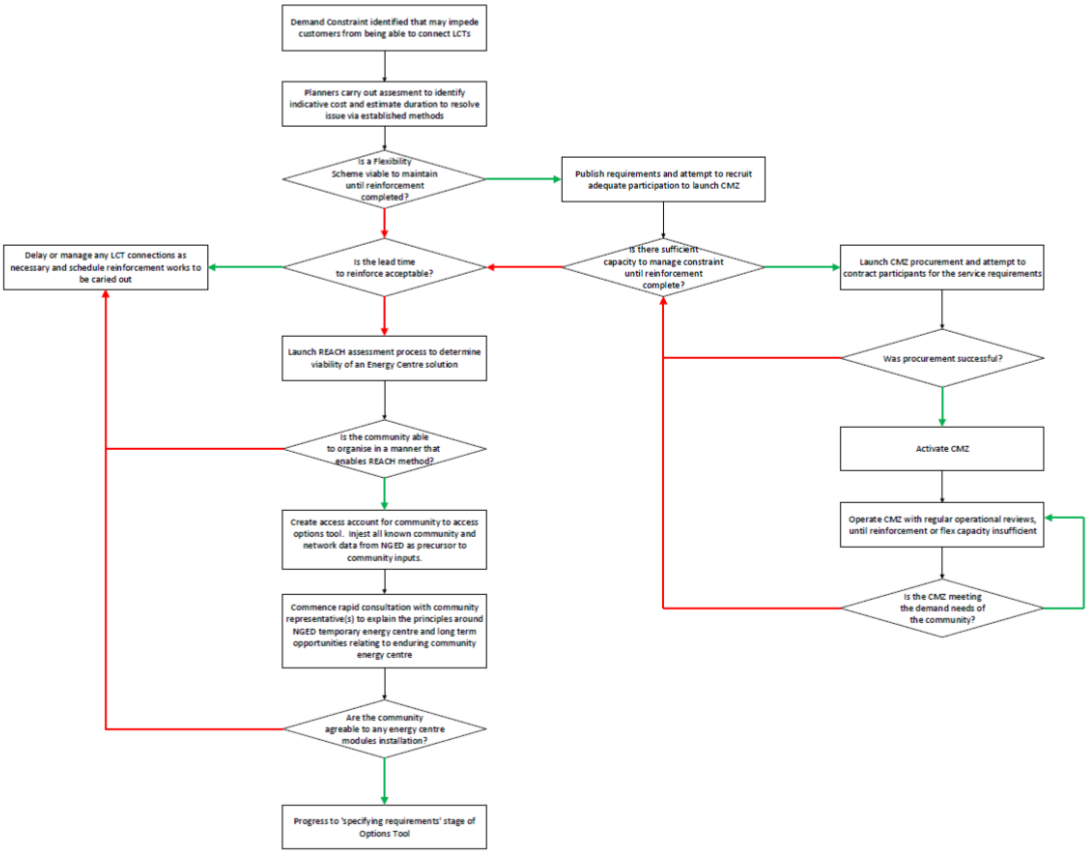
Transformer Demand and Headroom Analysis
The team used NGED data to assess daytime and nighttime maximum demand for each distribution transformer within the selected communities. This enabled calculations of existing headroom and identification of transformers that may already be overloaded or operating close to their limits.

Half-Hourly Load Profiles
Load data was reviewed in half-hour intervals, which provided a more realistic picture of average usage over time. Although this method does not capture short-term spikes, it enabled comparisons of usage trends and peak periods.

Primary Substation Capacity Review
Heat maps and EV capacity maps were used to determine the available headroom at rural primary substations across NGED's entire network. Both current and future (including "accepted but not yet connected") demand were considered to assess potential constraint points.

Community-Level LCT Penetration Analysis The team looked at the presence of EV chargers and solar PV within each community. For example, in Bigbury Net Zero, transformer loads during the day were influenced by solar exports, while nighttime loads were affected by EV charging. **Use of Time Series Forecasting** Both communities' demand growth trends over five years were analysed using time series methods to understand how coordinated and non-coordinated demand growth might impact transformer performance. **Comparison with abnormal Security Standard** The report distinguishes between routine operating conditions and 'abnormal' contingency scenarios. While most analysis was performed under normal operating assumptions, comparison with abnormal criteria helped validate the long-term resilience of the networks. **Scenario Mapping for Small-Scale Housing Growth** In response to anticipated national housing targets, the analysis modelled how small-scale rural developments—combined with LCT adoption—could create "perfect storm" scenarios for demand growth that outpaces reinforcement timelines. **Data Quality and Gap Identification** The analysis also highlighted limitations in data availability. For example, the lack of instantaneous peak measurements and single-line diagrams for 11kV networks restricted the resolution of analysis and the ability to graphically represent risks.
Summarise any variations from the Second Level Plan, giving reasons and action to recover situation if necessary. Key subject matter expert required an extended hospital stay so the timescales required to shift the due date of the deliverable.
Description of planned activity for next quarter N/A

Work Package: WPA3 – Energy System breakpoints
Actual starting month: 4 **Actual end month: 6**
Work Package Objectives: Establish a process diagram for communities to follow when initiating community energy projects. Community guidance document authored, mapping likely conventional network interventions and barriers for rural community energy projects
Work Package achievements and highlights A draft flow diagram has been authored, which is contained in the WPA5 report, which sets out process to identify and engage communities that could benefit from the temporary module to address imminent constraints that ensures no restrictions to the community while reinforcement waited. • **Improved Customer Journey:** The revised process outlined in the flow chart allows the DNO to act quickly when rural constraints are identified, enabling faster community access to LCTs without delays or technical restrictions. • **Avoidance of Negative Outcomes:** The tool and approach aim to prevent two major risks: (1) uncontrolled LCT connections worsening constraints, and (2) restrictions on LCT adoption due to insufficient network capacity. • **Trigger Mechanisms for Intervention:** DNOs may initiate the process based on triggers such as network analysis, LCT connection surges, LAEP activities, load faults, or new connection applications. • **Deployment Pathway for Temporary Solutions:** If upgrades exceed an 18-month timeline, a Constraint Management Zone (CMZ) is declared, if conventional flexibility markets are unable to mitigate the network constraint - a REACH Hybrid Centre study is initiated to assess feasibility and effectiveness.
Description of work this period Work across A2, A4, and A5 were combined into a process diagram explaining the potential barriers and network challenges associated with the development of community scale decarbonisation projects.



Progress towards the Deliverables for this Work Package

Type	Description	Due Date	Revised Due Date	Status	Completion Date
Milestone	WPA3 D1 & M1 - Community Process Guidance Document	23/05/2025	30/05/2025	Completed	02/06/2025

Consultations with NGED planners and associated departments tested the hypothesis within the work package and verified potential issues. We met with network representatives and produced two short videos outlining the challenge and REACH project's solution approach. The discussions incorporated 'Horizon Scanning' objectives for alternative REACH options to avoid duplication and inclusion in the 'Options Tool' design. Positive feedback and interest in the alpha phase's findings has led to the project team progressing a Beta phase application.

Understanding the likely trigger event as a community constraint, we adopted a 2-stage customer journey approach. The first stage is a rapid deployment of a temporary module to manage the issue until upgrades. This is quick, simple, and feeds into the second stage. To specify an energy centre for a commercial opportunity, a complex engagement is needed, which the option tool (WPA5) will primarily focus on. Through community interviews and site visits, we're identifying variables impacting specifications assessment and community questions. Regen has conducted many engagement events and interviews, with site visits scheduled. Cranfield and Frontier have identified essential data requirements.

A first draft of the process flow diagrams outlining the 2-stage approach has been socialised within the team. Revisions may be needed based on community engagements or data requirements from (WPA5).

Summarise any variations from the Second Level Plan, giving reasons and action to recover situation if necessary.

Initially, the options tool was anticipated to be introduced earlier due to regulatory restrictions on DNOs owning certain assets and the requirement for community funding. However, gaining knowledge and experience led to a two-stage process. If a demand capacity issue arises, it is prioritised for resolution, while ‘community energy projects’ are decoupled and pursued at an appropriate pace. This change has altered the anticipated learning outcomes and outputs, but it is not considered a recovery plan. It has also increased the complexity of the proposal, and the questions raised during Regen’s community interviews, but this has not resulted in any adjustments to project deliverables.

Description of planned activity for next quarter

N/A

Work Package: WPA4 – Review of alternative delivery options

Actual Starting month :3
Actual End month : 6

Work Package Objectives:

Establish alternative delivery options for community energy developments according to key network parameters and provide to the monitoring officer by the end of the Alpha Phase comparisons with other innovative approaches to support rural communities in accelerating connection time.

Work Package achievements and highlights

- **Comprehensive review of delivery models** for accelerating the decarbonisation of rural networks including:
    - Community-led
    - DNO-led
    - Third party-led
    - Hybrid approaches
- **Development and integration of a SWOT analysis** linking each delivery model to specific rural barriers, bridging literature and real-world application.
- **Identification of critical gaps** in:
    - Governance models
    - Financial viability
    - Procurement pathways
- **Engagement with stakeholders**, including:
    - Community representatives
    - Staff from NGED
    - Staff from all other UK DNOs
- **Synthesis of findings** from:
    - Systematic literature review
    - Previous engagement activities
    - Internal analysis
- **Forward-looking insights** highlighting opportunities for:
    - Future research and piloting
    - Innovation in governance and funding
    - Development of decision-support tools
    - Beta trials and community modelling efforts in future phases

Description of work this period

During this period, the focus was on completing the options assessment work within the current Work Package. This included a structured review of potential delivery models suitable for rural energy projects, considering technical, governance, and financial factors. The team synthesised findings from a **systematic literature review**, **prior engagement activities**, and **internal analysis** to evaluate four principal models: community-led, DNO-led, third party-led, and hybrid approaches.

In parallel, the potential role of **Modular Energy Centres (MECs)** was explored in greater detail, assessing their compatibility with each delivery pathway and their ability to address infrastructure and funding barriers common in rural settings. This was supported by **ongoing engagement with community stakeholders** and **interviews with DNO staff at NGED** and all other UK DNOs, ensuring that the assessment was grounded in real-world operational, regulatory, and implementation experience.

To structure the comparative analysis, a **SWOT framework** was developed to evaluate the strengths, weaknesses, opportunities, and threats associated with each delivery model, particularly in contrast to the MEC approach. This analysis will underpin the design of a decision-support tool that helps communities and delivery partners identify the most viable pathways for energy centre deployment based on local conditions.

The work also identified critical gaps and forward-looking opportunities. These include the need for innovation in governance structures, more accessible funding mechanisms, and practical implementation support—particularly in areas facing compounded technical and economic barriers. These themes will shape planning for future phases, including potential Beta trials and targeted community modelling work.

Progress towards the Deliverables for this Work Package

Type	Description	Due Date	Revised Due Date	Status	Completion Date
Milestone	WPA4 D1 - Workshop Agenda	07/03/2025		Completed	07/03/2025
Milestone	WPA4 M2 - Summary Report on Delivery Options	28/03/2025	30/05/2025	Completed	02/06/2025

All core deliverables for this Work Package have been completed. A structured assessment of alternative delivery models—community-led, DNO-led, third-party, and hybrid—has been finalised, with each evaluated against the specific barriers facing rural communities using a SWOT framework. This provides a robust foundation for supporting decision-making in the context of local energy delivery.

The role of modular energy centres has also been fully explored, with clear articulation of their potential contribution across different delivery pathways. This includes consideration of how modular infrastructure can address key challenges such as grid constraints, funding limitations, and project scalability.

The findings have been consolidated into a coherent options framework, effectively linking research, engagement, and practical application. This forms the basis for the development of an options assessment tool and ensures that all outputs are aligned with the overall objectives of the Work Package.

Summarise any variations from the Second Level Plan, giving reasons and action to recover situation if necessary.
There were no significant variations from the Second Level Plan during this reporting period. All key activities were delivered in line with the original timeline and scope. Minor adjustments were made to the sequencing of engagement and analysis tasks to ensure findings were effectively integrated into the delivery model assessment, but these did not impact overall delivery. No recovery actions were required.
Description of planned activity for next quarter
N/A

Work Package: WPA5 – Community Low Carbon Options Assessment Tool

Actual Starting month : 2
Actual End month : 6

Work Package Objectives:

Provide a structured framework specifying the calculations, interconnections, and dependencies for the community decision-making tool to be built during the REACH Beta phase.

Work Package achievements and highlights:

During this period, we successfully completed the Alpha Phase development of the Options Assessment Tool, designed to support rural communities in planning and specifying local energy centres. The tool aims to reduce the complexity communities face when evaluating the feasibility and benefits of a local energy system, particularly in areas with limited network capacity and commercial investment interest.

Co-Design and Innovation with Stakeholders

The tool was developed through iterative engagement with community energy groups, National Grid Electricity Distribution (NGED), and technical partners. This collaborative process ensured that both the functional design and user requirements reflect real-world challenges and priorities. The project team incorporated feedback from early engagement activities and survey responses to define the data inputs and decision logic.

Technical Progress and Modelling Framework

Key technical achievements include the design of a two-part modelling framework:

- **Future Community Demand Modelling**: Uses household profiles, LCT/EV uptake assumptions, and local demographics to predict half-hourly demand.
- **Battery Specification Modelling**: Establishes minimum and maximum viable energy storage capacities, balancing grid constraints and economic optimisation.

This modelling work has laid the foundation for a future prototype that will provide communities with tailored energy centre specifications, financial forecasts, and carbon reduction potential.

Evolving Tool Objectives

Originally envisioned as a means to support communities in mitigating network constraints, the tool's scope has expanded to include economic viability assessments. It now would support both technical sizing and investment appraisal, including scenarios where energy centres are owned by communities or third-party funders.

Clarifying Community and DNO Roles

The tool separates the needs of the DNO—who will assess whether a temporary intervention is required—from the community, who may explore a long-term solution. By defining the input data requirements and logic flow, the tool enables clear role delineation and supports strategic planning.

Strategic Alignment and Future Impact

The tool supports early-stage planning aligned with Local Area Energy Planning (LAEP) and feeds into NGED's flexibility and decarbonisation strategies. It is intended to improve the success rate of community-led projects by building confidence in both the technical and economic case, while streamlining DNO impact assessments.

Description of work this period:

In order to create a tool to help guide communities through the early engagement with NGED we have outlined the process diagram from WPA3 within the WPA5 report. This determined the likely process flow from initiation to an end point where it should be possible for communities to make a determination on whether they would like to pursue detailed discussions on installing an energy centre. This initial engagement is highly complex due to the number of variables resulting from the modular options and sheer diversity of communities that may wish to use it.

The work has therefore been focussed in identifying all the data that can assist in marshalling it into a process that allows user to play around with scenarios and iteratively refine the results as they define their requirements. Initial activities across all the partners have identified the data fields they wish and ranked them from essential through to helpful. By mapping the requester, type, source and importance we can start to establish the relationships and an architecture that will underpin the process flow through the options tool.

During the last quarter of the project, SGC conceptualised the Options Assessment Tool following the stakeholder engagement conducted by Regen (see A1 section for detail). This involved writing example Python scripts for the determination of battery sizing and community electricity demand forecasting. An illustrative flow diagram showing the suggested architecture of a future options tool was developed (which could be built into a functioning tool in further work), based on the feedback provided by community energy groups. Engagement in dissemination events and interviews suggested a strong interest in developing community scale projects following the deployment of an NGED led energy centre. The purpose of the Options Assessment Tool is to assist communities in making informed decisions on the use of this potential connection point.

Future work would look to integrate outputs of Frontier Economics' commercial model, and Cranfield University's Carbon Accounting methodology.

Progress towards the Deliverables for this Work Package

Type	Description	Due Date	Revised Due Date	Status	Completion Date
Milestone	WPA5 M1 - High Level Architecture Diagram	09/05/2025	30/05/2025	Completed	30/05/2025

- **Stakeholder Engagement** (led by Regen)**:**
  - Collaborated with rural community energy groups, National Grid Electricity Distribution, and other stakeholders through dissemination workshops and community interviews.
  - Identified community-specific priorities, data availability, and barriers to LCT adoption.
- **Problem Framing:**
  - Defined real-world rural network constraints through case studies of EV charging, heat electrification, and small-scale housing development.
  - Developed customer journey scenarios reflecting regulatory and operational limitations for the ownership of battery assets.
- **Tool Design (Alpha Phase):**
  - Designed a modular, two-part tool structure: future energy demand modelling and energy centre specification.

- Established a logic flow to filter a wide solution space into practical, community-specific options. This work is the foundations for a future development of the Options Assessment Tool in Beta.

- **Data Flow and Input Mapping:**
  - Identified required data inputs from communities (e.g. housing type, heating system, EV ownership) and DNOs (e.g. grid headroom, load forecasts).
  - Categorised households based on archetypes to model granular energy demand patterns.
- **Energy Demand Modelling:**
  - Modelled current and projected half-hourly electricity demand across different household types.
  - Applied uptake factors based on survey data to simulate future adoption of EVs and low-carbon heating.
- **Battery Specification Modelling:**
  - Defined a methodology to establish the minimum battery capacity needed to meet grid constraints, in collaboration with VEPOD.
  - Simulated charging/discharging behaviour over a one-year period to evaluate performance.
- **Modelled battery behaviour (charging/discharging) over a year to determine feasibility and cost savings:**
  - Considered grid constraints, electricity pricing, and battery efficiency.
- **Tool Architecture and Flow Logic:**
  - Built a layered filtering logic to narrow infinite solution possibilities into practical, community-specific options.
- **Validation and Feedback:**
  - Conducted scenario testing and gathered feedback to refine tool logic and usability.
- **Preparation for Beta Phase:**
  - Documented tool design, modelling rationale, and data flows for development of a working prototype.

Summarise any variations from the Second Level Plan, giving reasons and action to recover situation if necessary

There haven’t been any significant variations. The work package is currently running to plan, as most of the work so far has been preparatory. The biggest challenge at this stage is determining the most effective method to present the findings of the intricate relationship between the customer journey and the data flows from various sources.

Description of planned activity for next quarter

N/A

Work Package: WPB1 – REACH Energy Centre – Technical design – VEPOD
Actual Starting month : 2 **Actual End month : 6**
Work Package Objectives: REACH Energy Centre – Technical design and perform high level & detailed feasibility studies.

Work Package achievements and highlights:
• **Artificial demand forecast created by NGED**, using half-hourly data for energy centre sizing, and provided to VEPOD.
• **Network analysis conducted for two selected communities**:
  ○ Overloads occurred only under abnormal (N-1) conditions.
  ○ One community required continuous export with no battery recharge from the network.
  ○ The other community had both export needs and recharge opportunities from the network.
• **Energy centre sizing strategy developed**:
  ○ Genset sized based on mean export value.
  ○ Battery storage sized to handle demand peaks and troughs.
  ○ For the second community, a **battery-only solution** was also designed due to lower net export needs.
• **Battery state of charge analysis** completed to support **carbon assessment work by Cranfield University**.
• **Impact of heat pump control coordination** on REACH energy centre sizing assessed, using data from Passiv.
• **Detailed cost breakdown** conducted for each REACH energy centre design.
• **Central control architecture analysed**, including:
  ○ Optimum configuration
  ○ Initial review of communications between components and NGED control
• **Report extracts prepared for REGEN**, contributing to two detailed feasibility studies.
• **Data shared with SGC** to support development of the **options assessment tool**.

Description of work this period NGED were able to devise an artificial demand forecast with half-hourly data provided to VEPOD for energy centre sizing. In both selected communities, the network was only shown to be overloaded in abnormal (N-1) conditions. One community required a continuous export from the REACH energy centre with no opportunity to recharge the battery storage system from the

network. The other community had periods that required electricity export to the network but also had sufficient opportunities to recharge from the network directly.

Based on an initial analysis of the above demand profiles, a strategy was adopted to size the genset based on the mean export value and then size the battery storage system to cover the peaks and troughs of demand. As the second community had a smaller net export requirement than the import potential, a battery only solution was also designed. The report also analysed the battery system state of charge to enable Cranfield University to undertake their carbon assessment work. Furthermore, the report included an assessment of the impact of co-ordinating the heat pump control on the sizing of the REACH energy centre based on data from Passiv.

Following the sizing work performed, a detailed cost breakdown was undertaken for each REACH energy centre design. Furthermore, an analysis was undertaken to determine the optimum central control architecture and an initial review of how the communication between each of the components (including external NGED control) was completed.

Extracts of the report were prepared for REGEN for inclusion in the two detailed feasibility studies.

Data was provided to SGC for support with the design of the options assessment tool.

Progress towards the Deliverables for this Work Package

Description	Due Date	Revised Due Date	Status	Completion Date
WPB1 M1 - Data requirements passed to Regen ahead of site visits	06/01/2025		Completed	06/01/2025
WPB1 D2 & M2 - High Level feasibility studies undertaken for 7 communities	24/02/2025		Completed	24/02/2025
WPB1 D3 & M3 - Community Support Tool Data	21/04/2025		Completed	24/03/2025
WPB1 D4 & M4 - Energy Centre design specification report for 2-3 selected communities	27/03/2025	02/05/2025	Completed	19/05/2025
WPB1 M5 - Technical Support for network connection module	08/05/2025		Completed	19/05/2025

Completed

- WPB1 M1 - Data requirements passed to Regen ahead of site visits
- WPB1 D2 & M2 - High Level feasibility studies undertaken for 7 communities
- WPB1 D4 & M4 - Energy Centre design specification report for 2-3 selected communities
- WPB1 D3 & M3 - Community Support Tool Data
- WPB1 M5 - Technical Support for network connection module

Summarise any variations from the Second Level Plan, giving reasons and action to recover situation if necessary.

- There is no variation from the second level plan.

Description of planned activity for next quarter

N/A

Work Package: WPB2 – Heat Network – Feasibility assessment
Actual Starting month : 3 **Actual End month : 6**
Work Package Objectives: Support the selection of sites where a shared heating solution is proposed; establish the techno-economic feasibility of a shared heating solution at each site; determine a high level technical solution enabling central coordination of distributed heat pumps to minimise network load.
Work Package achievements and highlights: • Forecasted total electricity demand for each community based on low-carbon heating systems. • Modelled heat pump types and uptake rates using National Grid's 2035 and 2050 projections. • Generated 20 digital twin heating archetypes per community (BNZ & AAT), reflecting occupancy, heating patterns, and technology combinations. • Simulated year-round, half-hourly electricity demand profiles for heat pumps using Passiv's modelling tool. • Mapped heating systems to archetypes to enable detailed load simulations. • Modelled both typical and extreme (coldest winter) heat pump load scenarios. • Produced electricity demand projections to inform REACH Energy Centre sizing. • Incorporated EV and baseload profiles from National Grid, highlighting overnight EV peaks and daytime usage trends. • Found that during extreme cold, heat pumps operate near capacity continuously, with peak overlap during EV demand periods. • Identified that optimised control strategies still require overnight heating to meet morning setpoints, increasing peak load risks. • Simulated a simple turn-down strategy to reduce overnight heating demand, which lowered peak load but led to unacceptable drops in indoor temperature and household discomfort. • Demonstrated that Passiv's automated machine learning coordination effectively flattened demand during overnight peaks. • Showed that Passiv's strategy maintained indoor comfort within ±0.5 °C of setpoint while reducing peak loads. • Concluded that Passiv's ML coordination is more effective than simple turn-down strategies, delivering better peak reduction without sacrificing comfort.
Description of work this period **Heat Demand Modelling** • Forecasted the total electricity demand for each community from low-carbon heating

- Modelling based on National Grid 2035/2050 projections for – heat pump types and uptake rates
- Generated 20 digital twin heating archetypes per community (BNZ & AAT).
- Digital twins represent thermal usage behaviours based on occupancy, heating patterns, and technology combinations.
- The Passiv modelling tool simulates year-round, half-hourly heat pump electricity profiles.
- Assigned heating systems and mapped them to archetypes for load simulation.
- Modelled typical and extreme (coldest winter) heat pump load scenarios
- Generated projections for REACH Energy Centre sizing

Scenario Modelling

- Aggregate community demand = heat load + non-heat (EV + baseload).
- EV and baseload profiles provided by National Grid were used to simulate non-heat loads.
- EV profiles have overnight usage and other baseload use peaks during the morning and evening.
- In the coldest conditions, heat pumps are running near their capacity most of the time
- Even with an optimum start, time-clock control strategy, the heat pumps have to run throughout the night to hit any morning setpoints.
- This results in even higher demand during the EV peak.
- As heat pumps become a larger proportion of the total electricity load, the network challenge increases.

Demand Mitigation Strategies

Coldest conditions risk overlapping EV and heating peaks.

Simple turn-down request across the communities

- We simulate scenarios where an automated command is used to adjust heat pump settings to reduce the overnight peak *(Cold day in February – 2 hrs 22:00-00:00 and 6 hrs between 22:00-04:00)*
- *Result* - overnight peak is reduced but causes a major drop in indoor temperatures and household discomfort.

Passiv coordination across the communities

- Passiv automated coordination attempts to restrict aggregate power to set levels within certain times using machine learning.
- *Result* - Much flatter demand profile seen around the overnight EV peak. No impact on indoor temperature (+/- 0.5 °C of setpoint)

Conclusion: In all scenarios, Passiv ML coordination provides a better reduction in peak load across communities than a simple turn-down request method, without compromising household comfort.

Progress towards the Deliverables for this Work Package

Description	Due Date	Revised Due Date	Status	Completion Date
WPB2 M1 - Data requirements for tool captured	06/01/2025		Completed	06/01/2025
WPB2 M2 - High level feasibility studies complete	24/02/2025	14/03/2025	Completed	14/03/2025
WPB2 M4 Refined techno-economic feasibility report for 2-3 chosen communities	27/03/2025	02/05/2025	Completed	12/05/2025
WPB2 M3 - Summary report explaining control strategy	28/03/2025	02/05/2025	Completed	12/05/2025

All deliverables complete.

- Two communities shortlisted
- Data requirements for the two shortlisted communities defined

• Short report on residential heat decarbonisation pathways completed • Community heat pump power load simulation modelling work - half-hourly power load profiles from mass heat pump adoption in the two shortlisted communities • Simulation and comparison of community heat load management solutions to minimise network load • Data sharing and presentation of findings with partners
Summarise any variations from the Second Level Plan, giving reasons and action to recover situation if necessary. • There are no variations from the Second Level Plan
Description of planned activity for next quarter • N/A

Work Package: WPB3 – Commercial Model
Actual Starting month : 4 **Actual End month : 6**
Work Package Objectives: Generate commercial and ownership models for the REACH energy centre and produce a CBA workbook to evaluate its economic feasibility

Work Package achievements and highlights:
• Defined the intervention (modular energy centre and coordinated heat solution) in collaboration with project partners, including its design, operation, and deployment potential across NGED's network.
• Developed a plausible counterfactual scenario to assess what would occur in the absence of the intervention, enabling clear comparison of costs and benefits.
• Developed cost-benefit analysis (CBA) methodologies in line with SIF CBA guidance to quantify intervention impacts.
• Delivered two key outputs:
  o A report documenting the intervention, counterfactual, commercial model, financial flows, and CBA methodology and results.
  o A completed SIF CBA workbook.

Description of work this period • Defining the intervention and counterfactual: Working with project partners to (i) obtain information on the design of the intervention (modular energy centre and coordinated heat solution) and to understand how it would operate and the potential for deployment across NGED's network; and (ii) develop a plausible counterfactual for what would happen in the absence of the intervention. This allowed us to define costs and benefits arising from intervention (relative to the counterfactual). • Generation of ownership and commercial model: Identifying potential options for the ownership and commercial model – i.e. which entities own which assets, and how revenues are recovered to cover the costs of installing and operating the REACH intervention. Then defining and applying a set of criteria to evaluate options. • Cost benefit analysis: Developing methodologies (in line with SIF CBA guidance) for valuing the costs and benefits arising from the intervention and working with project partners to obtain data, drawing on data available for the two community locations shortlisted during Alpha and scaling to determine potential NGED and GB-wide benefits. Undertaking CBA modelling and populating the SIF CBA template. • Illustrative analysis of financial flows: Describing the financial flows (of costs and revenues) between different parties arising under the commercial model and drawing on the outputs of the CBA modelling to produce illustrative calculations of the financial flows. • Producing two deliverables: 1) Report documenting the intervention and counterfactual, the commercial model and financial flows, and the CBA methodology and results. 2) SIF CBA workbook.
Progress towards the Deliverables for this Work Package

Type	Description	Due Date	Revised Due Date	Status	Completion Date
Milestone	WPB3 M1 Commercial Model Report	15/05/2025	30/05/2025	Completed	02/06/2025
Milestone	WPB3 M2 SIF CBA workbook	22/05/2025	30/05/2025	Completed	02/06/2025

Summarise any variations from the Second Level Plan, giving reasons and action to recover situation if necessary.

Adjustments were made to the timelines for this work package to accommodate data critical to the CBA (relating to the energy centre sizing and operating profile) which was being developed as part of other work packages (particularly WPB1), without comprising overall project timelines.

Description of planned activity for next quarter

N/A

Work Package: WPB4 – Carbon Accounting

Actual Starting month : 3
Actual End month : 6

Work Package Objectives:

Develop methodology for a carbon assessment decision support tool to assess and compare carbon impacts of the baseline case and the proposed solutions.

Work Package achievements and highlights:

- Conducted a systematic literature review via Scopus, prioritising studies using Life Cycle Assessment (LCA) methodologies.
- Identified key rural insights, including higher electricity consumption and emissions, lack of gas infrastructure, fuel poverty, and the potential benefits and challenges of various low-carbon technologies.
- Developed baseline carbon assessments for each community, revealing emissions patterns and key influencing factors.
- Demonstrated carbon savings of 60–85% from switching to heat pumps, depending on the original heating fuel (e.g., coal, oil, gas).
- Found EV adoption could reduce transport emissions by 73–74%, but noted the importance of considering infrastructure, public transport, and renewable charging.
- Developed an Excel-based Carbon Footprint Framework (M4) for estimating household and community emissions, with scalability and time-series capability.
- Designed the framework to support both near real-time and long-term emissions tracking.

Description of work this period

This work package has been successfully completed as planned. The first milestone—delivering a comprehensive literature review on the impacts of low-carbon technologies in urban and rural environments—has been achieved.

A systematic literature review was conducted using Scopus as the primary database, focusing on identifying relevant peer-reviewed studies, and prioritised those utilising Life Cycle Assessment (LCA) to evaluate the environmental impact of low-carbon technologies. Additionally, a rapid literature search targeted grey literature, including governmental websites such as ONS, Census, and DESNZ, as well as research reports, employing key terms like direct household emissions, UK energy consumption, and off-grid heating, to ensure a comprehensive analysis incorporating both academic and policy-related sources. The search strategy was structured around three key categories: methodological approach, technologies, and geographical context. Studies were selected that prioritised LCA to assess technologies such as heat pumps, electric vehicles (EVs), heat storage, large-scale battery storage, and hydrotreated vegetable oil (HVO), examining both urban and rural environments to understand the deployment of these technologies across different settings.

Literature Review Report Conclusions for Rural Areas

1. **Energy Consumption and Emissions**:
   - 1.1. Rural households consume more electricity than urban households due to larger property sizes and greater reliance on electric heating in off-grid areas.
   - 1.2. Rural areas exhibit higher per capita emissions compared to urban areas, primarily due to the reliance on fossil fuels for heating and transportation.
2. **Heating and Fuel Poverty**:
   - 2.1. Many rural areas lack gas grid infrastructure, leading to a higher dependence on oil heating, which is more carbon-intensive and costly.
   - 2.2. Off-grid households face deeper levels of fuel poverty, requiring an additional £568 per year on average to escape fuel poverty.
   - 2.3. Older rural homes are significantly less energy-efficient than modern constructions, contributing to higher emissions and energy costs.
3. **Impact of Low-Carbon Technologies**:
   - 3.1. **Heat Pumps**: Effective in reducing CO_2 emissions, particularly in regions with lower grid carbon intensity. However, their deployment in rural areas is challenged by the need for significant infrastructure investment.
   - 3.2. **Thermal Energy Storage (TES)**: Offers superior carbon efficiency and sustainability advantages over battery storage. TES systems can reduce localised emissions but may lead to higher overall energy demand due to lower coefficients of performance (COP).
   - 3.3. **Electric Vehicles (EVs)**: Adoption in rural areas is hindered by limited charging infrastructure and higher upfront costs. The environmental benefits of EVs in rural areas depend on the electricity grid mix, with renewable energy sources providing the greatest emissions reductions.
   - 3.4. **Hydrotreated Vegetable Oil (HVO)**: Presents a viable lower-emission alternative to fossil diesel, particularly for hybrid buses and other transport applications. Its sustainability depends on the choice of feedstock, with waste-derived HVO offering the greatest environmental benefits.
4. **Regional Disparities**:
   - 4.1. Emissions are unevenly distributed across the UK, with rural areas often experiencing higher per capita emissions due to reliance on fossil fuels and less efficient heating systems.

Progress towards the Deliverables for this Work Package

Type	Description	Due Date	Revised Due Date	Status	Completion Date
Milestone	WPB4 M1 - Report on literature assessment of impacts of low carbon technologies in Urban environments APPROVED	28/02/2025	07/03/2025	Completed	14/03/2025
Milestone	WPB4 M2 - BAU environmental assessment for scope 1 and scope 2 emissions of the selected communities	18/04/2025	12/05/2025	Completed	12/05/2025
Milestone	WPB4 M3 - Report on environmental impacts of alternative LCT scenarios and their assessment in terms of hot spots, key uncertainties and sensitivities	30/05/2025		Completed	30/05/2025
Milestone	WPB4 M4: Development of a stand-alone tool (potentially running in Microsoft Excel) that can be disseminated via Ofgem	30/05/2025		Completed	30/05/2025

WPB4.2: This work package focused on developing a baseline carbon assessment model for two case study areas: Awel Aman Tawe (Neath Port Talbot) and Bigbury (South Hams). The specific objectives of Milestone 2 (M2) were to:

1. Analyse and characterise the two communities in terms of housing and transport profiles.

2. Calculate corresponding Scope 1 and Scope 2 emissions, disaggregated by activity type, property and building type, and aggregated at the community level.

Scope 1 emissions—primarily from fossil fuel use for heating and transportation—were significantly higher than Scope 2 emissions in both areas: 10.5 times higher in Awel Aman Tawe and 19.6 times higher in Bigbury. In Awel Aman Tawe, heating contributed 69% of Scope 1 emissions, followed by 17% from transport and 14% from hot water. A similar pattern was observed in Bigbury, though transport-related emissions were higher at 26% relative contribution.

Scope 2 emissions, arising from household electricity use, were dominated by lighting. In Awel Aman Tawe, 92% of Scope 2 emissions came from lighting, with only 8% from EV charging. In Bigbury, EV charging accounted for a slightly higher share (13%), reflecting greater EV uptake and use. However, it is important to note that vehicle-related data were based on Local Authority-level proxies, not specific to the communities, and should therefore be interpreted with caution.

WPB4.3: This work package focused on conducting an environmental impact assessment of alternative REACH LCT scenarios to identify key uncertainties, hot spots, and sensitivities (e.g., changes in rural travel patterns and energy demand). The main deliverable will be a report on the environmental impacts of alternative LCT scenarios, highlighting hot spots, key uncertainties, and sensitivities.

In M3, we followed the same calculation pathways and principles as with M2 to explore the potential implications on Scope 1 and Scope 2 emissions of adoption of various hypothetical LCT scenarios at household and community level.

The Excel-based framework (M4) was used as the platform to facilitate scenario exploration through use of Energy Performance Certificate based data and information collected via the modelling exercises of REACH consortium partners that focused on specific LCTs (e.g., framework for building archetypes, space heating demand, and coefficient of performances for LCTs).

At a household level, we observed potential reductions in carbon emissions associated with heating ranging between ~60-85%, considering scenarios where households changed from fossil fuel to heat pumps with a 3.5:1 coefficient of performance (kWh output : kWh input). As a case in point, a household under Building Archetype 4 classification would achieve 68%, 69%, 77%, and 83% lower carbon emissions from heating by changing to a heat pump from gas, dual fuel (gas & electricity), oil, and coal respectively.

We further explored hypothetical scenarios for 70% community-wide adoption of heat pumps and 30% adoption of EV technology. Both strategies revealed potential to achieve significant carbon reductions at community level. More importantly, the analysis further highlighted how the heating fuel type being replaced is a critical parameter that affects the potential for emissions abatement.

As anticipated, an analysis through our carbon footprint framework suggests that a prioritisation on replacing oil and coal-based heating systems with LCTs is urgent if large emissions reductions need to be achieved at community scales.

Considering emissions associated with transportation, the analysis indeed revealed that replacing petrol and diesel fuelled vehicles with EVs can reduce carbon emissions by 73 and 74% respectively. However, before prior to proposing a large-scale adoption of EVs for rural communities it is important that factors including potential improvement of public transportation options, access to renewable energy for charging of EVs, seasonal influx of EVs from surrounding areas, and antagonistic effects of electricity reliant technologies besides the LCTs explored here are quantified. The framework we have developed as part of M4 allows exploration of such effects on grid intensity caused by the overlapping effects of EVs and electricity-based heating strategies, however other external factors may significantly affect energy supply potential of the grid (e.g., thermal degradation during hot days and high loads).

WPB4.4: This work package will focus on developing a framework for a standalone assessment tool. The objective is to create a tool that can be used by the energy industry and communities for future environmental and carbon impact assessments and the main deliverable will be a standalone framework

As part of Milestone 4 (M4), we developed an Excel-based Carbon Footprint Framework capable of estimating carbon emissions at the household level, with scalability to community-level assessments. This framework integrates time-series energy consumption data, transport fuel use, and UK Greenhouse Gas Inventory emission factors to calculate both Scope 1 emissions (direct on-site fuel use for heating, hot water, and transport) and Scope 2 emissions (indirect emissions from purchased electricity).

The tool allows users to input data across multiple categories:

- Household Energy Use: Users can select from a range of typical building archetypes and input energy loads for activities such as lighting, heating, hot water, cooking, laundry, and remote working—aligned with Energy Performance Certificate (EPC) categories.
- Transport Emissions: Emissions can be calculated via either direct fuel consumption data or distance travelled.
- Emissions Calculation: The worksheet includes default UK emission factors but also allows users to adjust them for improved geographic or temporal accuracy.

Importantly, the framework supports varying temporal resolutions, enabling both near real-time monitoring and long-term emissions tracking.

Description of planned activity for next quarter

N/A

Work Package: Title – Project Management
Actual Starting month : 1 **Actual End month : 6**
Work Package Objectives: Perform Project Management tasks, author a detailed project plan and outputs for subsequent Beta phase including detailed budget requirements.
Work Package achievements and highlights: • Meeting minutes authored for each meeting • Review and approval of all deliverables • SME and oversight provided by NGED
Description of work this period Weekly project meetings have been conducted, with detailed minutes recorded to ensure comprehensive documentation of discussions and decisions. Governance documentation, including the Action Log, Key Operational Milestones, Risks, and Learning Logs, is meticulously updated weekly or as needed. During these meetings, partners are regularly challenged to provide a detailed account of their work from the previous week and outline their actions for the upcoming week. This ensures accountability and foresight, keeping the project aligned with its objectives.
Progress towards the Deliverables for this Work Package The deliverables for this specific work package were scheduled to be submitted on a monthly basis, with all deliverables for the project being completed and submitted on time as planned.
Summarise any variations from the Second Level Plan, giving reasons and action to recover situation if necessary. No Variations required
Description of planned activity for next quarter N/A

Planned Activities/Dissemination During the Next Reporting Period

Figure 1 illustrates the dependencies between project work, a summary is provided in Table 1: Dependency summary.

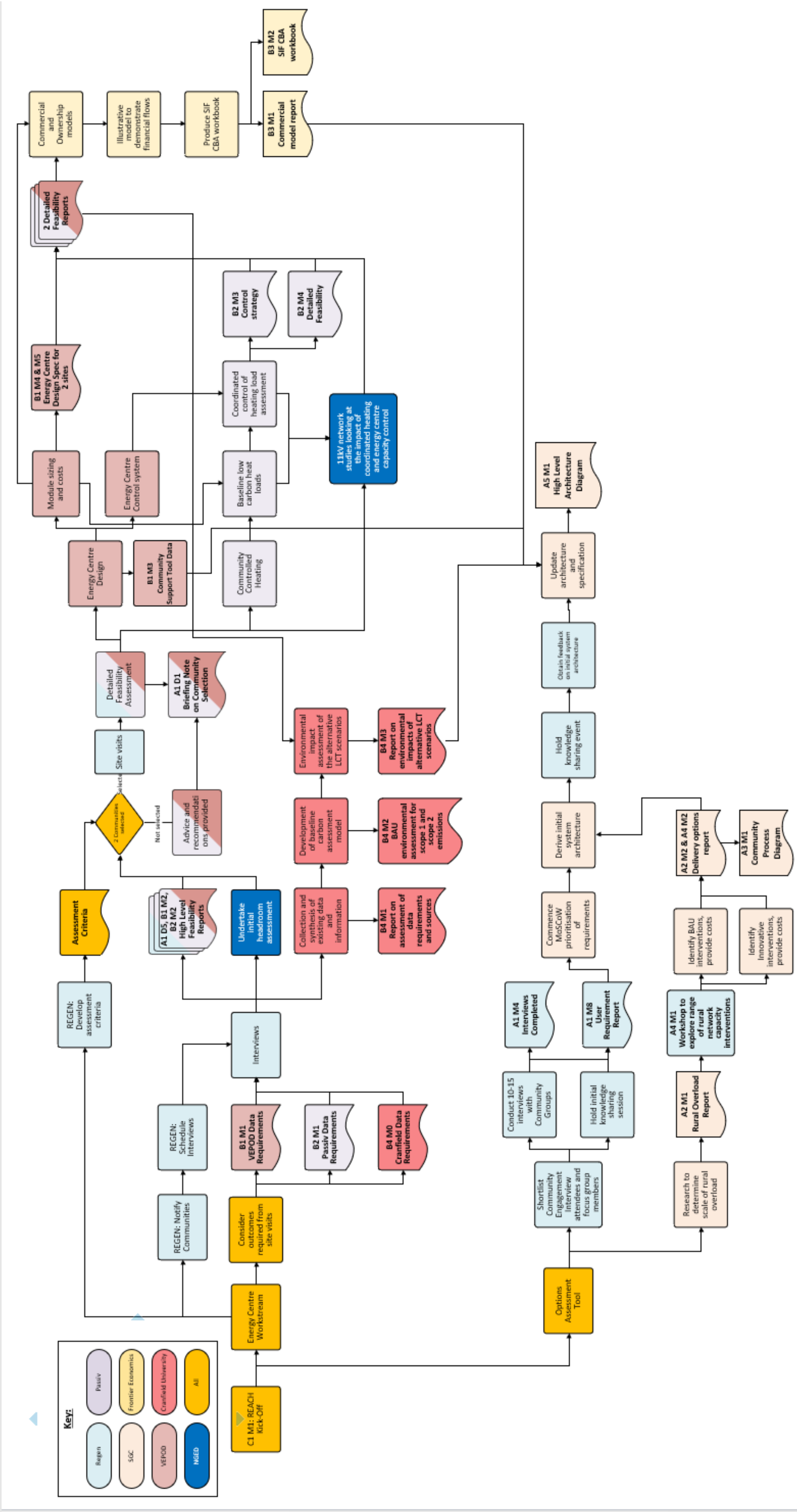


Figure 1: Process flow diagram

Table 1: Dependency summary

Work Package	Planned Activity	Dependence on other Participants	Description of Dependency	Comment on Impact, etc.
WPA1	Site visits to community groups	WPB1, WPB2, Detailed feasibility	Data and information from site visit required for feasibility work	Data required
WPB1	Detailed feasibility, Module sizing and costing	WPB4 – Carbon Accounting	Information on modules required to undertake carbon assessment of energy centre	Data required
WPB1	Detailed feasibility, Module sizing and costing	WPB3 – CBA and Commercial model	Module costs required to undertake CBA	Data required
WPA1	Interviews with community energy groups about Options Assessment Tool	WPA5	User requirements needed	User requirements needed to construct system architecture
WPB2	Heat profiles generated	WPB2 – load flow studies	Heat profiles required to undertake revised load flow studies	Load profiles required

Project Management and Realisation

Detail developments to the project realisation plan, market understanding or commercial opportunities made this quarter.

During this quarter, the REACH project made significant refinements to its realisation plan based on emerging insights from technical feasibility studies, community engagement, and system modelling. Most notably, the team identified that in the majority of locations assessed, the existing electricity networks can accommodate projected loads under normal operating conditions. As a result, the REACH modular energy centres (MECs) are now considered most beneficial in abnormal or fault scenarios, rather than as a routine solution.

In parallel, market understanding has advanced through continued engagement with stakeholders and community groups. These discussions highlighted a strong interest in energy autonomy and local asset ownership but also exposed practical concerns around operational complexity and financial viability. As a result, the commercial model has been further developed to consider both DNO-led and community-led ownership structures. Cost-benefit analyses, completed in line with SIF guidance, suggest that while DNO ownership may offer a near-term route to implementation, more value could be unlocked through future participation in energy markets—subject to regulatory adjustments.

Summarise any management concerns and activities to recover the situation.
The only significant management concern was the unavailability of some key personnel due to health. Mitigating personnel were made available where possible, and delivery dates were adjusted accordingly.

Detail any liaison activities with other projects and with the wider programme activities.
Liaison activities have been an important component of the REACH Alpha phase, ensuring alignment with wider programme objectives and fostering collaboration across the energy sector. To support consistent and accessible communication, the project team produced two short explainer videos—one outlining the goals of the Alpha phase and another detailing the functionality of REACH energy centres. These videos have been shared with other Distribution Network Operators (DNOs) and are being used to support engagement with the many communities expressing interest in the project. In parallel, the team has maintained active links with other innovation projects through direct engagement with other networks. This has helped identify areas of common interest and opportunities for future collaboration. A previous informal check-in with UKRI provided an opportunity to share progress and ensure strategic alignment with wider programme activities. Additionally, early discussions have highlighted the potential for a regulatory workshop that could further enhance knowledge exchange and coordination across the sector.

Detail any publication or other dissemination activity.

Publication:
Project reports will be published on National Grid's REACH project webpage when available, as well as on ENA's Smarter Network Portal.

Dissemination:

- **Videos**: Two explanatory videos were produced to communicate the REACH Alpha Phase goals and energy centre functionality. These were distributed to other DNOs to support consistent messaging across community engagement activities.
- **Events**:
    - *Q1 Dissemination Event*: Engaged 50 stakeholders from the wider energy community.
    - *Q2 Dissemination Event*: Reached 70 stakeholders and included polling to validate interview findings.
- **Stakeholder Engagement**:
    - Conducted in-depth interviews with 10 community energy stakeholders.

Milestone and Deliverable Status

Summarise the composite project progress against all project milestones and deliverables, noting any discrepancies against the Second Level Plan and action to recover situation if necessary.

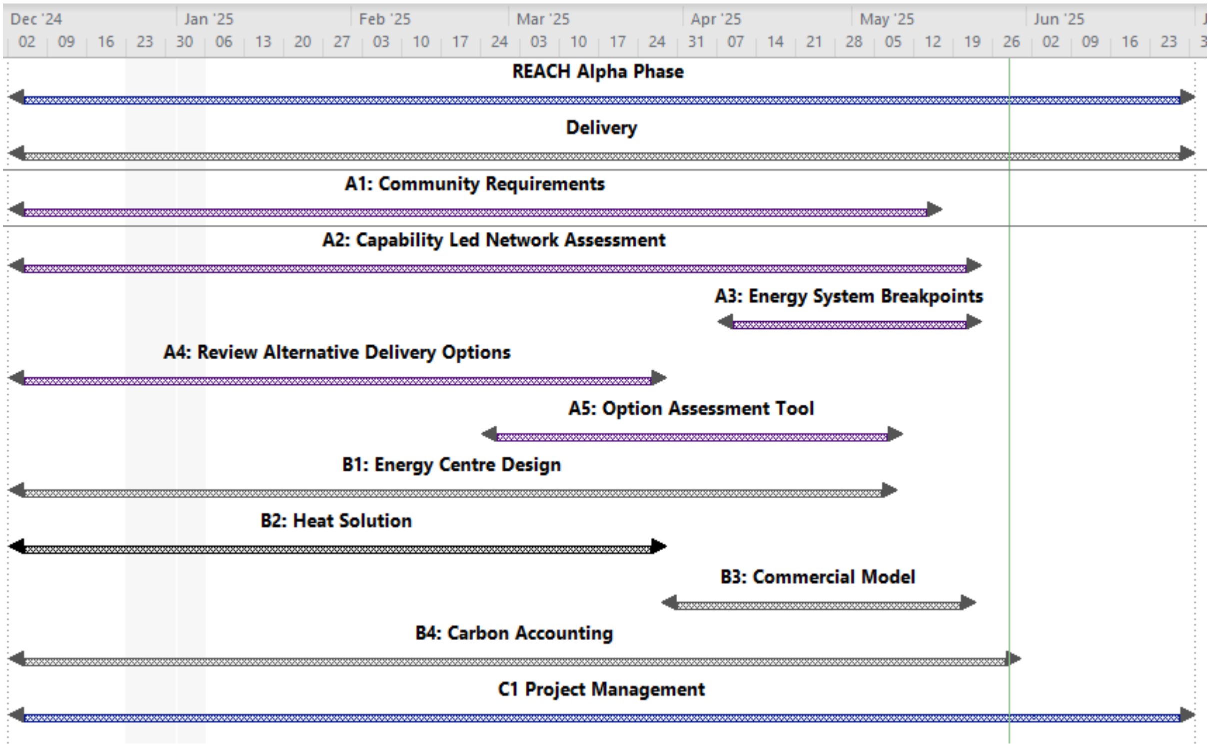
Use **Green** text for completed, **Red** for late and **Blue** for items due in the next quarter.

Title	Responsibility	Original Due Date	Revised Due Date	Actual Date	Comments / Status
WPC1 M1: Kick Off Meeting	SGC	02/12/2024		02/12/2024	Completed
WPA1 M1 - Kick off meeting with communities	REGEN	20/12/2024		20/12/2024	Completed
WPC1 M1 - December SGC PM	SGC	20/12/2024		20/12/2024	Completed
WPB1 M1 - Data requirements passed to Regen ahead of site visits	VEPod	06/01/2025		06/01/2025	Completed
WPB2 M1 - Data requirements for tool captured	Passiv	06/01/2025		06/01/2025	Completed
WPC1 M2 - January SGC PM	SGC	31/01/2025		31/01/2025	Completed
WPA1 M3 - Selection for Feasibility	REGEN	10/02/2025	12/02/2025	07/02/2025	Completed
WPA1 M6a - Event One held	REGEN	12/02/2025	11/02/2025	11/02/2025	Completed
WPB1 D2 & M2 - High Level feasibility studies undertaken for 7 communities	VEPod	24/02/2025		24/02/2025	Completed
WPC1 M3 - February SGC PM	SGC	28/02/2025		28/02/2025	Completed
WPA1 D1 - Briefing note on Community Selection	REGEN	07/03/2025		07/03/2025	Completed
WPA4 D1 - Workshop Agenda	REGEN	07/03/2025		07/03/2025	Completed
WPB2 M2 - High level feasibility studies complete	Passiv	24/02/2025	14/03/2025	14/03/2025	Completed
WPA1 M5 - High Level Feasibility Studies Completed	REGEN	24/02/2025	07/03/2025	14/03/2025	Completed
WPB4 M1 - Report on literature assessment of impacts of low carbon technologies in Urban environments APPROVED	Cranfield	28/02/2025	07/03/2025	14/03/2025	Completed
WPA1 M2 - Site visits complete	REGEN	19/03/2025	01/01/1900	19/03/2025	Completed
WPA1 M9 - Site visits Subject Matter Expert Support complete	REGEN	24/03/2025	24/03/2025	24/03/2025	Completed
WPB1 D3 & M3 - Community Support Tool Data	VEPod	21/04/2025		24/03/2025	Completed
WPA1 M4 - Interviews completed	REGEN	21/03/2025	04/04/2025	31/03/2025	Completed
WPA1 D4 - User Requirement Report for Options Assessment Tool	REGEN	04/04/2025	25/04/2025	28/04/2025	Completed
WPB2 M4 Refined techno-economic feasibility report for 2-3 chosen communities	Passiv	27/03/2025	02/05/2025	12/05/2025	Completed
WPB2 M3 - Summary report explaining control strategy	VEPod	28/03/2025	02/05/2025	12/05/2025	Completed
WPB4 M2 - BAU environmental assessment for scope 1 and scope 2 emissions of the selected communities	Cranfield	18/04/2025	12/05/2025	12/05/2025	Completed
WPA1 M6b Second Knowledge Sharing Event	REGEN	28/04/2025	13/05/2025	13/05/2025	Completed
WPA1 M6- Knowledge Sharing Events Complete	REGEN	13/05/2025		13/05/2025	Completed
WPB1 D4 & M4 - Energy Centre design specification report for 2-3 selected communities	VEPod	27/03/2025	02/05/2025	19/05/2025	Completed
WPB1 M5 - Technical Support for network connection module	VEPod	08/05/2025		19/05/2025	Completed
WPA1 D2 - Briefing Note on Knowledge Sharing Events	REGEN	15/05/2025	20/05/2025	20/05/2025	Completed
WPA1 M7 Summary of Feasibility Process Produced	REGEN	15/05/2025	23/05/2025	23/05/2025	Completed
WPA1 D3 Summary report on insights from detailed community engagement	REGEN	15/05/2025	29/05/2025	29/05/2025	Completed
WPA1 M8 Report on user requirements for tool development	REGEN	23/05/2025	29/05/2025	29/05/2025	Completed
WPA5 M1 - High Level Architecture Diagram	SGC	09/05/2025	30/05/2025	30/05/2025	Completed
WPB4 M3 - Report on environmental impacts of alternative LCT scenarios and their assessment in terms of hot spots, key uncertainties and sensitivities	Cranfield	30/05/2025		30/05/2025	Completed
WPB4 M4: Development of a stand-alone tool (potentially running in Microsoft Excel) that can be disseminated via Ofgem	Cranfield	30/05/2025		30/05/2025	Completed
WPA2 D1 & M1 - Rural Network Overload Report	SGC	21/01/2025	30/05/2025	02/06/2025	Completed
WPA4 M2 - Summary Report on Delivery Options	REGEN	28/03/2025	30/05/2025	02/06/2025	Completed
WPA2 D2 & M2 - Existing resolutions, costs, and timescales report	SGC	04/04/2025	30/05/2025	02/06/2025	Completed
WPB3 M1 Commercial Model Report	Frontier	15/05/2025	30/05/2025	02/06/2025	Completed
WPB3 M2 SIF CBA workbook	Frontier	22/05/2025	30/05/2025	02/06/2025	Completed
WPA2 D3 & M3 - Second release of D2 as D2.1	SGC	23/05/2025	30/05/2025	02/06/2025	Completed
WPA3 D1 & M1 - Community Process Guidance Document	SGC	23/05/2025	30/05/2025	02/06/2025	Completed

Updated Schedule

Provide an updated Gantt chart for the entire project as an attachment if necessary.

Final Gantt chart:



Project Spend Profile

The budgeted, actual, and forecasted spending for the project indicate significant variances in financial allocation across different partners.

1. **Total Budgeted Spend:** £490,017.00
2. **Total Actual Spend:** £226,360.97
3. **Forecasted Remaining Spend:** £263,179.03

Despite the project reaching the end of its delivery window, at the time of writing some deliverables have not been fully approved, as a result outstanding payment milestones are expected to be processed in June.

46.3% of the budget has been spent, due to weighting of deliverables towards the end of the project and payments being made on a fixed cost basis, rather than on Time & Materials.

Table 2: Funding Allocation Per Partner

	Total Project Costs	Project Contribution	SIF Funding requested
National Grid Electricity Distribution	£57,685.00	£6,893.00	£50,792.00
Cranfield University	£57,376.00	£11,475.00	£45,901.00
Frontier Economics	£55,265.00	£5,526.00	£49,739.00
Regen SW	£171,475.00	£17,147.00	£154,328.00
Smart Grid Consultancy Ltd	£206,050.00	£83,432.00	£122,618.00
VEPOD	£36,281.00	£8,994.00	£27,287.00
Passiv UK	£43,725.00	£4,373.00	£39,352.00
Total Cost by Category	£627,857.00	£137,840.00	£490,017.00

Table 3: Budgeted SIF funding profile

Partner	December 24	January 25	February 25	March 25	April 25	May 25	Total
National Grid Electricity Distribution	£0.00	£0.00	£0.00	£0.00	£0.00	£50,792.00	£50,792.00
Cranfield University	£0.00	£17,365.00	£0.00	£16,635.00	£11,901.00	£0.00	£45,901.00
Frontier Economics	£0.00	£0.00	£0.00	£34,817.00	£0.00	£14,922.00	£49,739.00
Regen SW	£0.00	£0.00	£77,792.00	£0.00	£0.00	£76,536.00	£154,328.00
Smart Grid Consultancy Ltd	£8,478.00	£14,353.00	£14,475.00	£30,178.00	£10,728.00	£44,406.00	£122,618.00
VEPOD	£7,670.00	£0.00	£12,028.00		£3,149.00	£4,440.00	£27,287.00
Passiv UK	£4,293.00	£0.00	£0.00	£35,059.00	£0.00	£0.00	£39,352.00
Total	£20,441.00	£31,718.00	£104,295.00	£116,689.00	£25,778.00	£191,096.00	£490,017.00

Table 4: Actual SIF funding profile

Partner	December 24	January 25	February 25	March 25	April 25	May 25	Total
National Grid Electricity Distribution	£3,786.10	£3,156.00	£1,578.00	£3,156.00	£5,579.87	£0.00	£17,255.97
Cranfield University	£0.00	£0.00	£0.00	£17,365.00	£0.00	£0.00	£17,365.00
Frontier Economics	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
Regen SW	£0.00	£0.00	£0.00	£62,060.00	£0.00	£62,856.00	£124,916.00
Smart Grid Consultancy Ltd	£8,478.00	£8,478.00	£8,478.00	£8,478.00	£5,772.00	£0.00	£39,684.00
VEPOD	£0.00	£7,670.00	£12,028.00		£3,149.00	£0.00	£22,847.00
Passiv UK	£0.00	£0.00	£0.00	£0.00	£4,293.00	£0.00	£4,293.00
Total	£12,264.10	£19,304.00	£22,084.00	£91,059.00	£18,793.87	£62,856.00	£226,360.97

Table 5: Forecast SIF funding profile

Partner	December 24	January 25	February 25	March 25	April 25	May 25	Total
National Grid Electricity Distribution						£33,536.03	£33,536.03
Cranfield University						£28,536.00	£28,536.00
Frontier Economics						£49,739.00	£49,739.00
Regen SW						£29,412.00	£29,412.00
Smart Grid Consultancy Ltd						£82,934.00	£82,934.00
VEPOD						£4,440.00	£4,440.00
Passiv UK						£35,059.00	£35,059.00
Total						£263,656.03	£263,656.03

Table 6: Budgeted total cost profile

Partner	December 24	January 25	February 25	March 25	April 25	May 25	Total
National Grid Electricity Distribution	£0.00	£0.00	£0.00	£0.00	£0.00	£57,685.00	£57,685.00
Cranfield University	£0.00	£21,706.16	£0.00	£20,793.66	£14,876.19	£0.00	£57,376.00
Frontier Economics	£0.00	£0.00	£0.00	£38,685.17	£0.00	£16,579.83	£55,265.00
Regen SW	£0.00	£0.00	£86,435.28	£0.00	£0.00	£85,039.72	£171,475.00
Smart Grid Consultancy Ltd	£14,246.62	£24,119.10	£24,324.11	£50,711.78	£18,027.57	£74,620.82	£206,050.00
VEPOD	£10,198.09	£0.00	£15,992.52	£0.00	£4,186.93	£5,903.46	£36,281.00
Passiv UK	£4,770.06	£0.00	£0.00	£38,954.94	£0.00	£0.00	£43,725.00
Total	£29,214.77	£45,825.25	£126,751.90	£149,145.54	£37,090.69	£239,828.84	£627,857.00

Table 7: Actual total cost profile

Partner	December 24	January 25	February 25	March 25	April 25	May 25	Total
National Grid Electricity Distribution	£4,299.91	£3,584.30	£1,792.15	£3,584.30	£6,337.12	£0.00	£19,597.78
Cranfield University	£0.00	£0.00	£0.00	£21,706.16	£0.00	£0.00	£21,706.16
Frontier Economics	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
Regen SW	£0.00	£0.00	£0.00	£68,955.33	£0.00	£69,839.77	£138,795.11
Smart Grid Consultancy Ltd	£14,246.62	£14,246.62	£14,246.62	£14,246.62	£9,699.40	£0.00	£66,685.87
VEPOD	£0.00	£10,198.09	£15,992.52	£4,186.93	£0.00	£0.00	£30,377.54
Passiv UK	£0.00	£0.00	£0.00	£0.00	£4,770.06	£0.00	£4,770.06
Total	£18,546.53	£28,029.01	£32,031.29	£112,679.34	£20,806.57	£69,839.77	£281,932.52

Table 8: Forecast total cost profile

Partner	December 24	January 25	February 25	March 25	April 25	May 25	Total
National Grid Electricity Distribution						£38,087.22	£38,087.22
Cranfield University						£35,669.84	£35,669.84
Frontier Economics						£55,265.00	£55,265.00
Regen SW						£32,679.89	£32,679.89
Smart Grid Consultancy Ltd						£139,364.13	£139,364.13
VEPOD						£5,903.46	£5,903.46
Passiv UK						£38,954.94	£38,954.94
Total						£345,924.48	£345,924.48

Explain the reasons for any deviations in spending from the baseline or previous forecast expenditure.
The only variations between budgeted and forecasted expenditure is the dates which payments are occurring. Additional time for document approval, and variations from the original submitted project plan have delayed the completion of some payment milestones. During the project, Regen exceeded their number of days allocated to their REACH budget by 11 days. Initially, Regen had £7,965 allocated to Travel and Sustenance (T&S) to cover the site visits of seven communities. As a result of only performing 2 site visits, a total of £783.60 was spent on T&S, leaving £7181.40 of available SIF funding. Following confirmation with our Monitoring Officer and Innovation Lead, Regen reallocated this budget to their labour cost centre, facilitating more work on the project than initially budgeted, with no additional SIF funding requested.

Updated Project risk register

A joint risk register will be presented at the review meeting.

Updated Project Issue Register (Q2 meeting)

Risk Description	TASK	Risk	Impact	Mitigation	Status
1 - Technical Risks					
After reviewing more detailed Community Requirements, we establish that a REACH energy centre would not be suitable for any selected community for other than planning reasons (e.g. network constraints)	WP-B1	Medium	Medium	We are taking 7 communities into Alpha, more than originally planned to reduce the likelihood of no compatible communities. In addition, Regen are able to re-open the community engagement should insufficient engagement is possible. The wider community engagement conducted in Alpha will drive more targeted engagement ahead of Beta if required.	Materialised
Technical parameters and local planning requirements impact the ability to deploy a REACH Energy Centre - risk is that no suitable site is identified for a beta trial based on planning constraints.	WP-B1	Medium	High	Project partners Regen experience in local planning to the team. This risk remains as we move into Alpha, but is mitigated by the inclusion of more communities than previously stated to build resilience. In Discovery we asked communities specifically mention planning concerns (i.e. AONBs) Heat control would operate separately to energy centre - if Energy Centre size / planning means no suitable site is identified, we may want to opt for a design that is suitable to local planning	Open
Use case for Options Assessment Tool does not materialize during community engagement.	WP-A5	Medium	Medium	Work with project sponsors to ensure project objectives are met with any revised deliverables.	Open
There is a risk that the REACH energy centre will require a land footprint larger than available for many communities.	WP-B1	Low	Medium	We will continue to work with the communities to understand the spatial restraints on any selected technology. Updates to the design requirements may require iterative design processes, but this is expected and included in Alpha stage work scope. In Discovery Engagement, we specifically asked communities whether the expected footprint was available for the REACH energy centre.	Open
Energy Centre feasibility study cannot be achieved in Alpha Phase budget/ timeline restrictions.	WP-B1	Medium	High	A review of the Alpha phase scope has taken place at the end of Discovery, with MoSCoW prioritisation of key features taking place. The design work will focus on the most important features first.	CLOSED
Sickness/absence of key project personnel.	WP-C1	HIgh	Medium	Require backup personnel for all key actors in project contracts.	CLOSED
Lack of joined up data across DNOs, local councils, communities, commercial operators means Alpha stage work is delayed	WP-C1	Medium	Medium	Data required for the project is coordinated through a data catalogue that is updated in each weekly PM call. If successful, required data will be gathered prior to Alpha kick-off to expedite the process.	CLOSED
Data from communities is unavailable (LAEPs, Planning information, policies in local planning documents	WP-A1	Medium	Low	Bringing the communities onboard as subcontractors within Alpha will provide greater incentive for collaboration. Most community groups are already in partnership with their local council.	CLOSED

Risk Description	TASK	Risk	Impact	Mitigation	Status
Challenges with capturing data from communities to inform the design of the REACH energy centre	WP-A1	Medium	Medium	Plans to remunerate communities for their involvement to support engagement and data capture. In addition, site visits have been discussed with communities during Discovery phase and budgeted for in WP-A1.	CLOSED
Data from DNO - LV monitoring data for selected communities	WP-C1	Low	Medium	Within Alpha, NGED plan to install LV monitoring in selected communities. This will be funded separately to the SIF project through RIIO-ED2 targets. Monitors are only available to ground mounted substations.	CLOSED
Communities rely on volunteers, as such may not have the skills capacity or resources available to support the project	WP-A1	Low	Medium	It is planned to remunerate communities for their involvement, and to develop a tool that helps address the concern over skills and capacity. Within REACH, Regen have the resource and responsibility to assist communities.	CLOSED
Energy centre does not mitigate network constraints enough to avoid / defer network reinforcement. For instance, if the LV network is constrained, would coordinated heat control and Energy Centre be effective and cost comparable to LV network reinforcement.	WP-A2, WP-A3, WP-B1	Medium	High	Conduct network studies to identify specific network constraints arising from LCT adoption, and assess the capabilities required from an energy centre to overcome these.	CLOSED
Communities do not accept the principles of community heat control - they may wish to retain control over heat provision.	WP-A4, WP-B2	Medium	High	Reconsider alternative heat provision technologies - as part of WP-A4	CLOSED
Carbon assessment work delivered does not capture the possible carbon reduction possible by the REACH project.	WP-B4	Medium	High	NGED/SGCPM provide support through project to ensure scope is properly understood and can deliver on time and budget	CLOSED
Low engagement at community workshops fails to deliver user requirements for options assessment tool development	WP-A1b	Medium	High	Communication plan and workshop dates organised	CLOSED
Work carried out by NGED Secondary Network Planning team does not interface with network studies performed by SGC	WP-A2	Medium	Medium	Hold workshop to share learnings and identify network requirements and costs	CLOSED
High level feasibility reports do not meet community expectations -	WP-A1	Medium	Low	Create skeleton report outlining report structure as briefed to communities by regen, outlining the requirements	CLOSED
Risk that communities do not offer the expected level of engagement due to the level of funding available	WP-A1	Low	High	Regen lead community engagement, providing support through the process and adequate engagement	CLOSED
Insufficient community specific data obtained to establish heat load profiles - both controlled and non-controlled	WP-B2	Medium	High	If community specific data is not available, use generic data from DFES or other measured data	CLOSED
Fail to identify, due to inadequate research, existing innovative methods to deliver electrical capacity to rural communities - failing to meet project direction.	WP-A4	Low	Medium	Workshops, literature review, @Gary please update	CLOSED
Identification of 'effective rating' required for energy centre sizing is too difficult to identify	WP-B1	Medium	Medium	Half-hourly load flow modelling is currently underway, which will provide a more effective rating from which energy centre sizing and heat profiles can be determined.	CLOSED
Bottom up assessment by VEPOD and Passiv is different to SSPT's primary down assessment of network headroom	WP-B1	Medium	Medium	LH - update	CLOSED
Current connections process won't allow BES connections in constrained areas due to current policy	WP-B1	High	High	Work with secondary network planning & connections to evolve bespoke energy centre connection design policy and agreement.	CLOSED
Best community led connection location is not optimal location for network	WP-B1	Medium	Medium	Work iteratively with the network planning & connections team to identify optimal connection location.	CLOSED
2 - Commercial Risks					
No ownership model offers a positive CBA for either communities to build energy centres themselves, or DNOs to develop within a new regulatory sandbox.	WP-B3	High	High	Evaluate progression options at the end of Alpha phase, stop project if required.	Materialised
Identification of acceptable funding models is unsuccessful.	WP-B3	High	High	A range of potential funding models have already been identified, we have a designated work package to work closely with community groups to establish customer acceptance of known models.	Materialised
Revised energy centre deployment use case as deployed by NGED would require regulatory change.	WP-B3	High	High	Innovate UK and Ofgem sandbox team engagement to explore required regulatory change	Open
The cost of heat provision, in the absence of direct subsidy, is too expensive for the community energy group / householders, and revenue from network protection is insufficient to 'close the gap'	WP-B2	High	Medium	The project team will draw learnings from the Equinox project regarding value of grid protection; some communities have already expressed interest in other elements that could enhance overall project revenues, such as community-owned solar; waste heat capture, where available, may reduce some capex (e.g. borehole length) of the heat solution	CLOSED
3 - Environmental Risks					

Risk Description	TASK	Risk	Impact	Mitigation	Status
None – Beta Project may incur environmental risks, but due to the desktop nature of Alpha none are present.					

Partner Progress Reports

Attach Minutes of Progress Meetings and other supporting evidence (presentations etc) as appropriate.