SIF Round 3 Project Registration

Date of Submission

May 2024

Project Reference Number

10106218

Initial Project Details

Project Title

UN:LOCK - Unblocking Networks: Local Optimisation, Consumers and Knowledge

Project Contact

ross.bibby@sse.com

Challenge Area

Novel technical, process and market approaches to deliver an equitable and secure net zero power system

Strategy Theme

Net zero and the energy system transition

Lead Sector

Electricity Distribution

Other Related Sectors

Electricity Distribution

Project Start Date

01/03/2024

Project Duration (Months)

3

Lead Funding Licensee

SSEN - Southern Electric Power Distribution Plc

Funding Licensee(s)

SSEN - Southern Electric Power Distribution Plc

Funding Mechanism

SIF Discovery - Round 3

Collaborating Networks

Scottish and Southern Electricity Networks Distribution

Technology Areas

Active Network Management

Low Carbon Generation

Demand Response

Distributed Generation

Electric Vehicles

Stakeholder Engagement

Project Summary

In some areas of Great Britain, high penetration of distribution connected generation is causing network constraints that are blocking the connection of more renewable power. Traditional network reinforcement typically has a long lead time and these delays are slowing the decarbonisation of the country's energy system.

Project UN:LOCK will explore novel market-based solutions to create capacity in constrained areas of network and allow the connection of additional generation, whilst the long-term network reinforcements are being delivered. This will create additional local economic benefit for both generators and consumers as well as accelerating progress to a net zero society.

Add Preceding Project(s)

NIA_SSEN_0038 - E Tourism

NIA_SSEN_0047 - TraDER

NIA2_NGESO001 - CrowdFlex

NIA SPEN 0057 - Re-Heat: Enabling Renewable Heat

NIA_SSEN_0061 - HOMEflex (Household or Microbusiness Energy Flexibility)

ENWEN04 - BiTraDER

NIA_SSEN_0050 - Near Real-time Data Access (NeRDA)

NIA_SSEN_0067 - ExtenDER

10085252 - Local Energy Oxfordshire - Neighbourhoods, (LEO-N); Alpha R2

Add Third Party Collaborator(s)

Regen

Project Budget

£112,637.00

SIF Funding

£101,373.00

Project Approaches and Desired Outcomes

Problem statement

The Isle of Wight receives some of the highest levels of solar irradiation in Great Britain, meaning it is of significant interest to those wishing to connect photovoltaic generation. Currently the amount of electricity that can be exported is limited due to the restricted capacity of the three 132kV subsea cables feeding the island. This limits the ability to connect new generation. While plans are ongoing to install a fourth cable from the mainland, it will take at least 6-10 years to be in operation, due to planning, consenting and construction requirements. The UN:LOCK project will explore ways to reliably increase on-island demand at the appropriate times to create additional capacity on the network allowing for the connection of new generation ahead of the network reinforcement.

As set out in Ofgem's SIF Round 3 Challenge document, in order to achieve Net Zero there is a huge requirement for additional renewable generation and, when also considering the need for significant development of the electricity infrastructure, the Isle of Wight situation is not an isolated one. Project UN:LOCK will build on previous projects such as LEO, CrowdFLEX and TraDER, amongst others, to develop a whole system options analysis to review novel market and technical approaches to cost-effectively free up capacity on the system in a way that is replicable across GB to address similar generation constraints. In this way the project will address Innovation Challenge 1.3, by using demand and supply side flexibility and creating a smarter energy system to remove barriers to connection and accelerate the deployment of renewable generation. Some of the options explored in the Discovery phase will look at how encouraging the deployment of additional demand in the local area can facilitate the connection of new generation.

Project UN:LOCK will also look at using novel commercial arrangements, data and digital tools to maximise network capacity, to enable the accelerated connection of generation and, in doing so, will explore areas of Scope 2 of Challenge 1. The overarching aim of project UN:LOCK is to help the local area to achieve its net zero aims, while offering local residents and businesses the opportunity to participate in flexibility offerings and attracting new demand and generation business to the area, bringing additional economic benefits. Therefore, we anticipate that this project will benefit a wide spectrum of network users, both on the demand and generation sides of the system.

Video Description

https://youtu.be/ZaQ2H2NG6lg

Innovation justification

Generation constraints are becoming a barrier to deploying the volume of renewable generation needed to achieve Net Zero. Traditional reinforcement comes with long lead times, so innovative market solutions need to be found working within existing network capacity to complement and improve the economics of network solutions, such as ANM, or to create capacity for additional generation connections.

There have been previous trials exploring solutions to generation constraints -- for example, time of use tariffs, demand turn-up payments, flexibility markets, and capacity trading,-- however few have become BAU despite being cutting-edge and relevant.

No previous project has researched a full range of options to compare their potential impact and identify the optimal solution. Nor have they explored interactions with other options -- in particular, with an existing ANM system. The scale of the study is targeted at the Isle of Wight due to its position behind a well-defined constraint and its well-defined boundaries, making it an optimal test environment. The core innovative aspect of this project is to develop a replicable tool that identifies the best local non-network options for overcoming a generation constraint, which can be deployed in other areas of GB facing similar constraints.

By the end of the Discovery phase, we do not expect a change in TRL or CRL of the different non-network options, which currently range from 3-9. We expect the IRL to increase from 1 to 3, as we better understand how the different options interact and what the optimal solution is.

Project UN:LOCK is suitable for SIF funding because:

*it is a significant problem with no obvious solution, despite previous attempts to address it.

*it is potentially disruptive, if regulatory change is required.

*it cannot be funded through BAU activities, as it requires collaboration between a number of parties, including the network operator and local actors, in a way that has not yet been defined.

By the end of the Alpha phase we will identify the full design (market, regulatory and economic) of a working solution, replicable across multiple communities.

The counterfactual is to either wait for traditional investment in a new subsea cable or wait for decarbonisation of heat and transport etc. to create the additional demand required to mitigate the constraint. The timelines of these are uncertain and any solutions delivered by UN:LOCK will complement the delivery of both objectives, while helping to accelerate progress towards Net Zero on the island.

Impacts and benefits selection (not scored)

Financial - cost savings per annum for users of network services

Environmental - carbon reduction – indirect CO2 savings per annum

New to market – products

New to market - services

Impacts and benefits description

Impacts and benefits description
These benefits relate to the whole project, not just Discovery which will not deliver tangible benefits, but will lay the groundwork for future phases.

Renewable energy development and carbon reduction

Project UN:LOCK's aim is to unlock capacity to develop renewables. Primary benefit will be increased renewable capacity and annual generation. This will reduce carbon through direct on-island use and through wider grid emissions factor reductions.

There are many prospective projects that could be brought forward if network capacity is created:

*178 MW of new generation/storage projects, some under the ANM scheme

*146 MW that were abandoned due to high connection costs

*20 MW of planning applications that were refuse/expired could be revisited.

For every MW created, assuming it is utilised by large-scale solar, would generate c.1.1 GWh annually (assuming 12% capacity factor). The GB grid electricity emissions factor is c.0.2kgCO2e/kWh. If consumed directly, this equates to 218 tCO2e per year per MW. In reality, new generation contributes to the wider GB grid emissions factor, so carbon savings are indirect.

Cost savings

Consumers will benefit from engaging in local flexibility, either earning revenue or creating bill savings from shifting demand. Previous studies have measured this:

*SPEN's Domestic Demand Shift Trial paid consumers to turn up demand, finding that customers were rewarded with £5 of free energy on average over a 6-week period, some saved up to £73.

*Project TraDER demonstrated that customers earned on average £31/MWh through a capacity trading platform, reducing generation curtailment on Orkney.

We will review relevant studies during Discovery, estimate potential cost savings against a baseline estimate of the island's 2020 electricity bills, when total consumption was around 520 GWh.

New to market

Project UN:LOCK will create a new process for DNOs and local authorities to use to identify optimal solutions to generation constraints. We will estimate a baseline of GSPs in GB that are generation constrained, before estimating how many could be unlocked by the new process.

New products/services may come to market later in the project through the options assessment. These could include new retail tariffs, a capacity trading platform, or demand turn-up flexibility marketplace. There are currently no products in operation other than the ANM.

We will estimate and measure the impact of new services for how much headroom is created, and how much value is created for service providers.

Teams and resources

As a DNO, SSEN authorises and facilitates connections to the network and understands the policies around connections. SSEN operates the ANM scheme on the island and can provide network power flow data and planning expertise to help inform project UN:LOCK's aims.

Regen is an independent, mission-led centre of energy system expertise, which has worked extensively with SSEN on their long-term network planning and led the delivery of the Isle of Wight load growth evidence case study.

Local consultancy, Environmental Project Support Ltd, will be the third project partner supporting stakeholder engagement and providing local knowledge. The Director was formerly energy lead at the Isle of Wight Council, has extensive knowledge of the local energy system, and is chair of the Isle of Wight Mission Zero Energy Hub -- one of several voluntarily run hubs, made up of local experts, that oversee the delivery of the Isle of Wight Net Zero strategy.

The project partners were chosen to build on previous collaborative work. Regen and SSEN have previously undertaken extensive stakeholder engagement on the island, meaning the partners are in a strong position to further develop those relationships to inform the outcomes of this project. Together the partners have the experience, stakeholder relationships, analytical and project management expertise required to deliver a successful project.

Regen's role is technical delivery and project management of WPs 1 to 5. SSEN and Environmental Project Support Ltd will sign off the outcomes of each WP and lead discrete tasks within each WP that align with each partner's skillset. A breakdown of the roles and responsibilities for each task can be found in the Gannt chart attached.

One of the key workstreams of the Discovery stage is establishing a steering group that will include a diverse group of technical experts, network users and consumers and will provide industry insights and feedback to inform the development of options. Parties that have expressed an interest in participating and have been approached to date include Piclo, the Wight Community Energy and representatives from the Isle of Wight Council. This steering group will provide guidance and direction for all stages of project UN:LOCK.

Successful completion of the Discovery phase requires minimal equipment or facilities, other than the following:

*Access to a virtual meeting platform;

*An online platform for sharing and collaborating on documents and data.

The resources required are time and expertise from partners, steering group and other relevant stakeholders

Project Plans and Milestones

Project management and delivery

Regen's approach to project management and quality assurance will draw on proven processes, including: provision of a clear project plan, division of tasks, clear responsibilities, appropriate milestones and regular communication between partners. Tracking of progress will include weekly calls to review progress, as well as any risks or issues which have arisen. Minutes, actions and priorities for the coming week will be circulated. Furthermore, Regen will generate and maintain a risk register and an issues log. The issues log will be used to capture issues and concerns, particularly any changes to the project outputs. For each item recorded, a response and timescale will be agreed. Project risks will be captured and scored on the risk register, along with mitigation action and resultant scores.

The work plan has been divided into five core packages with clear objectives and deliverables assigned to each. All deliverables and dependencies will be tracked using the project Gantt Chart - full detail can be viewed within the attached PM Book. Regen is leading on all of the WPs.

*WP1 Project Management and knowledge dissemination;

*WP2 Management of steering group;

*WP3 Desktop review and engagement;

*WP4 Develop evaluation framework; and

*WP5 Assessment of options.

WP1 will run throughout the project duration, with a formal project kick-off, followed by proactive management of budgets, timelines and regular communication with the partners to ensure successful delivery of outcomes.

Key milestones are the mid and end point reviews with UKRI, and the partner review meetings representing the completion of each of WPs 3, 4 and 5. The success of WP5, culminating in the completion of a shortlist of options to be explored at Alpha, depends on completion of WPs 2, 3 and 4.

Engagement with energy consumers on the island will be undertaken as part of WPs 2 and 3, to ensure the outcomes of the options assessment reflect their needs and priorities. The potential for supply interruptions for consumers, and equitable access to the options developed at the Alpha/Beta stages of this project will also be explored.

Any potential policy and regulatory challenges to deployment, or changes in regulation that will be required to successfully deploy the shortlisted options at Alpha or Beta, will be identified and explored as part of WPs 3 and 5 within the Discovery phase of project UN:LOCK. There are no specific regulatory or policy risks impacting the delivery of the key outputs in Discovery.

Key outputs and dissemination

The key outputs of the Discovery phase are as follows:

*The establishment of a steering group that will provide industry insights and feedback to inform the development of options, highlighting new options and providing a steer on overall viability. The group will convene twice during discovery.

*A design and feasibility assessment will be developed for each of the non-network options for deploying demand and supply side flexibility to free up capacity on the system, that were identified at project outset. In addition, we will seek to identify and examine other options during the desktop research and engagement phase.

*A whole systems assessment tool that compares the interactions and impacts of each of the non-network options will be developed. It will rate and rank each of the options for material impact on the constraint, viability to implement at scale. This tool will be replicable to ensure it can be deployed in other areas facing similar network constraints.

*A shortlist of options to be taken forward to Alpha phase will be determined based on the outcome of this assessment.

These outputs will be used to inform and shape the objectives of the Alpha phase, which will see detailed plans developed for trialing of the shortlisted options. This will include establishing key success metrics and additional project partners to support in the design of trials. Should the project proceed to Beta, this will see trials completed and plans for commercialisation/BAU deployment explored, to meaningfully unlock generation capacity on the island.

Dissemination activities following Discovery will include publication of a press release and project overview on partners' websites, as well as participation in activities stipulated by UKRI such as Show and Tells and publication of a project overview on the ENA's Smarter Networks Portal. This will be led by Regen, with support from SSEN and Environmental Project Support Ltd. Lessons learnt from Discovery will inform the application for Alpha funding.

To avoid undermining the development of competitive markets, findings and outputs from every stage of project UN:LOCK will be disseminated freely for others to learn from, supported by engagement and collaboration with a range of stakeholders. The whole systems assessment tool will also be designed to be replicable, allowing other organisations to develop their own commercial offerings, building on the principles established in project UN:LOCK, supporting wider commercial innovation in this space.

Commercials

Intellectual Property Rights (IPR) (not scored)

To ensure clarity is provided to the Project partners, UKRI and Ofgem regarding the intellectual property (IP) landscape, the Project is using an IP register to track the Background IP provided to the Project, the Foreground IP the Project generates, and the use and access rights to all this IP.

The main contract governing the Project (the Collaboration Agreement) will include detailed, mutually agreed terms governing IP that are in line with the SIF Governance Document. For the Discovery Phase, all the IPR arrangements will follow the default recommendations of Chapter 9 SIF Governance Document.

Value for money

How much will the Project cost for the Discovery Phase and how does it represent value for money for the consumer?
The total SIF funding requested for Discovery is £101,373 of the £112,637 total project cost.

In summary, the total project costs by partner are as follows:

*Regen - £89,100.

£83,600 for staff time to support delivery of the WPs, with £1,500 for travel expenses, £1,000 for venue rental and £3,000 representing reimbursement to steering group members for their time contributing to the project.

*SSEN, £20,537.

£15,531 for staff time to support delivery of all 5 WPs, with £1,400 for travel expenses and £500 for materials.

Environmental Project Support Ltd, £3,000.*

100% for staff time, to support the establishment of the steering group, stakeholder engagement and complete partner reviews for WPs 3,4 and 5.

The total workpack costs are as follows:

WP1 Project Management - £31,382

WP2 Management of Steering Group - £4,950

WP3 Desktop Review and Engagement - £37,444

WP4 Develop Evaluation Framework -£31,783

WP5 Assessment of Options - £7,079

For the Discovery phase, the full 10% compulsory contribution of £11,264 will be provided by SSEN through 'time in kind'.

As mentioned above, members of the steering group will be reimbursed for contributing their time to the project, which has been listed as a subcontractor cost. The steering group contribution is vital to the project as they will be providing stakeholder insights into current understanding of technology and appetite for solutions. They will be contributing to the options assessment and reviewing the outcomes of this to support the creation of a shortlist of options to be explored at Alpha. No additional funding from other innovation funds is expected to support project UN:LOCK, nor will pre-existing assets or facilities be used.

The whole systems options assessment tool will be developed closely with SSEN's operational team so that it can seamlessly transition into BAU. The tool will also be shared with other network companies to support the creation of network headroom in generation constrained areas across GB.

The process of identifying the optimal solutions will support innovators to develop commercial products and services, such as

flexibility trading platforms, electricity tariffs, and aggregation services. Testing these products and services during subsequent project phases will provide confidence in their rollout in other constrained areas. As Regen is a mission-led, not-for-profit organisation, our motivation for contributing to this project is to support the Net Zero transition and we will not benefit financially from any commercialisation of project UN:LOCK's innovation.

Supporting documents

File Upload

UNLOCK-assessment-tool-supporting-documentation-Regen.pdf - 113.1 KB
UNLOCK-assessment-tool-Regen.xlsx - 1.3 MB
UNLOCK-analysis-findings-and-feasibility-assessment-report-UPDATE-04062024.pdf - 1.8 MB
UNLOCK Show and Tell Presentation Final.pdf - 1.9 MB
SIF Round 3 Project Registration 2024-05-23 11_29 - 61.3 KB
UNLOCK End of Phase Presentation Final_ENA.pptx - 2.1 MB

Documents uploaded where applicable?

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