SIF Round 4 Project Registration

Date of Submission

Jan 2025

Project Reference Number

10143030

Initial Project Details

Project Title

RIDES (Rural Industrial DEcarbonisation Support.) Discovery R4

Project Contact

Simon O'Loughlin

Challenge Area

Accelerating towards net zero energy networks

Strategy Theme

Net zero and the energy system transition

Lead Sector

Electricity Distribution

Project Start Date

01/02/2025

Project Duration (Months)

3

Lead Funding Licensee

SSEN - Scottish Hydro Electric Power Distribution Plc

Funding Licensee(s)

SSEN - Scottish Hydro Electric Power Distribution Plc

Funding Mechanism

SIF Discovery - Round 4

Collaborating Networks

Scottish and Southern Electricity Networks Distribution

Technology Areas

Modelling

Demand Side Management

Project Summary

As rural industries decarbonise, they may find this transition challenging. This is where Network operators can provide valuable support to help them make the right decisions. Rural networks are often characterised by radial circuits with limited capacity. These circuits are harder and more expensive to reinforce. RIDES will develop a tool to show rural industries their potential decarbonisation pathways. It will also help network companies to understand what their future investments needs will be, allowing efficient, coordinated investment by network
companies and their customers. RIDES will smooth and accelerate the path to net zero for rural industry

Add Third Party Collaborator(s)

Guidehouse

THE ASSOCIATION FOR DECENTRALISED ENERGY

Project Budget

£123,060.00

SIF Funding

£110,655.00

Project Approaches and Desired Outcomes

Animal testing

- ○ Yes
- ○ No

Problem statement

13.7% of UK's carbon emissions come from industry. Current policy and funding focusses predominantly on reducing the ~50% of emissions from six main clusters. This leaves the remainder, from dispersed sites, under-addressed.

Whilst Distribution Network Operators (DNOs) and Gas Distribution Networks (GDNs) have historic industrial electricity and gas consumption data, they do not know how this will change as sites decarbonise. Industrials themselves often lack clear decarbonisation strategies and are unaware of how their chosen pathways will impact networks.

Without granular, site-level understanding of future decarbonisation pathways, network operators risk making inefficient future network planning decisions. This will increase energy consumer bills and risk network infrastructure not being able to support decarbonised industrial energy demand. The issue is compounded in rural regions, where industrials are often fed by radial circuits with poor resiliency, requiring time-consuming, costly reinforcement. Moreover, many rural industrials are off-gas grid and rely on alternate fossil-fuels (oil, LPG, etc). Networks companies will not have energy consumption data on these off-gas grid sites, exacerbating the challenge of accurately forecasting the network impact of industrial decarbonisation.

Rural Electrification 2.0 and Indus found that additional tools are needed to support rural, dispersed industrials in planning their decarbonisation effectively and for networks to have robust data to make cost-effective investment decisions.

RIDES will build a digital tool that enables site-specific data to be shared securely between DNOs and other relevant stakeholders (GDNs, NESO, etc). The tool will provide industrials with decarbonisation pathway options based on their needs and highlight the pathways' network impact. It will also present opportunities to leverage smart solutions - flexible connections, flexibility services, clustering - to minimise said impact. This will help industrials better understand how to decarbonise in a cost-effective, network-friendly manner.

From a network planning perspective, RIDES will develop a framework to record and share this site-specific data on industrial energy consumption, decarbonisation pathways and timelines across the whole energy system. This will improve demand forecasting and network planning capabilities, enabling costeffective future network planning.

RIDES falls under Challenge 3: Embedding Resilience and focus area 2: Transition planning for an energy system with reducing natural gas demand. The digital tool represents a novel, replicable approach to supporting rural industrial's transition away from natural gas and fossil-fuel consumption in a timely, resilient and cost-effective manner. The framework created will improve network planning and resilience in rural regions, thus alleviating energy network barriers to decarbonising rural communities.

Video Description

https://vimeo.com/1021783755?share=copy

Innovation justification

RIDES will design and develop an innovative digital tool that enables rural industrial customers to identify possible pathways to decarbonise their sites and understand the network impact of these decarbonisation pathways. The tool will also provide industrial customers with insights on how to leverage smart solutions e.g. flexible connections, onsite generation/storage, and industrial clustering, to minimise network impact.

Previous innovation projects e.g. Inform and HV Auto Quote have looked at automated connections and budget estimators to support customers. However, they do not provide customers with much needed insights on possible decarbonisation options and

the impact these options have on the network. Indus explored how industrial clustering could minimise network impact. However, it has not considered the challenges faced by rural industries, who are critical to local communities and risk being left behind in the energy transition.

RIDES will support the efficient deployment of network and industrial infrastructure required to decarbonise rural industrial sites. DNOs will provide information to industrial sites enabling them to make evidence-based decisions around their optimal decarbonisation pathway. In return DNOs and GDNs will gain visibility of the current and future energy needs of customers enabling them to more efficiently plan their respective networks and reducing costs. RIDES proposes to go beyond identifying different technologies needed to decarbonise industrials. It
will also identify how those technologies can be complemented by smart connection solutions e.g. seasonal flexible connections, phased connections, clustering opportunities, on-site generation and storage, etc that minimise network impact.

RIDES requires a range of datasets. The uncertainty around data availability and quality during Discovery may pose challenges for developing a digital tool that provides accurate decarbonisation insights (TRL 3 and IRL 2). The commercial readiness of digital tools that support the identification and assessment of sitespecific decarbonisation pathways is low (CRL 3). Therefore, the uncertainty in being able to gather robust data and develop accurate insights for rural industrials requires further exploration through SIF before networks could confidently invest in developing the RIDES tool.

SIF is the right funding mechanism as the phased structure allows networks to manage the associated uncertainties at minimal risk to energy consumer bills. To avoid duplication, the project will determine whether the functionality of RIDES can be developed in existing tools or whether a new tool is needed. Following a Beta trial, the RIDES tool will have a CRL, TRL and IRL of approximately 8 and be ready for GB-wide rollout.

https://apply-for-innovation-funding.service.gov.uk/application/10143030/form/question/44109/forminput/123465/file/767264/download

Impacts and benefits selection (not scored)

Financial - future reductions in the cost of operating the network

Financial - cost savings per annum on energy bills for consumers

Environmental - carbon reduction – direct CO2 savings per annum

New to market – processes

Impacts and benefits description

Financial - future reductions in the cost of operating the network

Forecasts of future load on networks depend on a range of variables from economics, technology and societal trends, legislation and international markets. Any method which reduced the sources of error on these forecasts carries value. RIDES will reduce the uncertainty associated of the decarbonisation choices that industrial customers will make.

Accurate forecasting translates into driving benefits through:

1. Informed deferment of capital investments

2. Right sizing of reinforcements making "build once" a more realistic option

3. Greater certainty of forecast use of flexibility services

4. Longer deferment because of greater certainty

Given that SSEN Distribution total capital spend in ED2 is approaching £2bn, improved forecasting can create significant benefits. This carries financial benefits for electricity networks and industrial customers alike.

When assessing benefits, the counterfactual we will use will be the cost of uncoordinated build out of the network. This will be measured against the cost of informed network development dependant on the options available, their cost and spread of their likely adoption by rural sites.

In addition, deferment can allow the work programme to be smoothed, creating supply chain savings, in the preparation of our ED2 submission supply chain stakeholder indicated anecdotally that this could be up to 10%.

Financial - cost savings per annum on energy bills for consumers

Industrial sites that fully understand their options for decarbonising will be able to make informed decisions about the degree to which they can change the timing of their operations to take advantage of time of use tariffs or to offer flexibility services such as demand turn down and therefore will be able to reduce their bills.

Savings in the segment will be calculated against a counterfactual of not adopting any flexible behaviour.

Environmental - carbon reduction -- direct CO2 savings per annum

The RIDES tool will facilitate decarbonisation of industrial sites. On the assumption that this will happen eventually, the carbon benefits will be measured as the carbon saved by accelerating against a counterfactual of not providing assistance to these industries.

New to market product and processes

RIDES will deliver a first of its kind software tool and data sharing framework that will enable rural industrial sites to plan their decarbonisation journey economically and give visibility to network companies of future demand profiles in an energy system with reducing natural gas demand.

Teams and resources

SSEN-Distribution:

SSEN-Distribution have two distribution networks, the north of Scotland and central southern England; both covering large sections of remote rural locations. Businesses in these areas are often off-gas grid, mainly relying on oil and LPG for heating. Like other industries, they need to decarbonise, but electricity networks in such sparsely populated areas don't have the capacity required for the net zero transition.

SSEN-D is ideally placed to find the most efficient, cheapest, sustainable network solutions for rural decarbonisation.

SSEN-D Subject Matter Expertise includes:

- Engineering and Investment
- DSO
- Policy and Regulation
- Engagement and Liaison

SSEN-D will provide dedicated Project Management and Innovation Manager expertise to deliver all Project Management activities.

Guidehouse:

Guidehouse brings experts working with global electric utilities, industrial sectors, regulators, and governments on energy transition challenges. They have deep knowledge of energy networks, industrial decarbonisation and digital solution development as highlighted through their work with DNOs, GDNs, UKRI, Ofgem, and DESNZ.

Their energy sector, innovation, and sustainability expertise bring a strong understanding of solutions and challenges for industrial customers to decarbonise and development of pathways to net zero.

In WP3- Rural industrial energy user data mapping, decarbonisation pathway options and CBA, Guidehouse will use their experience in complex data analysis, data mapping, and industrial decarbonisation to develop decarbonisation pathway options. They will also use their understanding network planning and extensive experience in complex innovation business case development to develop a robust cost benefit analysis for the RIDES solution.

In WP4 - Digital solution conceptual design, they will leverage their understanding of existing digital decarbonisation platforms and customer tools to develop a solution design for RIDES that is scalable and where feasible can be integrated with existing

tools and processes.

ADE:

As the UK's leading advocate for decentralised energy, the ADE brings together a diverse network of stakeholders from across the industrial, commercial, and public sectors. Their extensive experience in promoting energy efficiency, combined heat and power, and demand-side energy solutions makes them an ideal partner.

ADE possesses significant expertise in Policy and Regulatory Frameworks and influencing policy to support decentralised energy solutions, and therefore, are crucial to the delivery of WP5 - Governance, policy and regulation.

ADE will also leverage a broad network of stakeholders to facilitate collaboration between industry players, policymakers, and end-users, leading on delivery of WP2 - Research and Engagement.

SSEN have worked with Guidehouse and ADE previously but not on SIF projects.

Project Plans and Milestones

Project management and delivery

SSEN-D will lead on Project Management activities. We will use tools provided by UKRI (Risk Register, Project Plan), as well as tools developed internally (Gantt Chart, Project Costs, Finance Tracker) to regularly monitor project performance.

The Project Team will meet weekly to review progress and collaborate. We will support the team sessions with focused Workpack collaborations, as well as faceto-face sessions (if/when required) to stimulate thinking and provide effective performance while developing outputs.

This approach will enable the project team to monitor across milestones and deliverables' dependencies, ensuring key outcomes complement each other.

The Project has been designed around 5 Workpackages, as outlined below. A named owner has been allocated to lead each package, as well as delivery of individual Key Activity based on their skills, experience and strengths.

- WP1 -- Project Management [SSEN]
- WP2 - Research and Engagement [ADE]
- WP3- Rural industrial energy user data mapping, decarbonisation pathway options and CBA [Guidehouse]
- WP4- Digital solution conceptual design [Guidehouse]
- WP5 - Governance, policy and regulation [ADE]

As shown in the Gantt Chart, all Workpacks have their own distinct targets, but at the same time, they are supporting other Workpacks' deliverables.

As an example, deliverables from WP2 - Research and Engagement will be key to informing outcomes of both WP3- Rural industrial energy user data mapping, decarbonisation pathway options and CBA, and WP4- Digital solution conceptual design.

Several risks have been identified with top scoring items shown below. A full list of risks and mitigations identified are available in the PM Book.

- **Stakeholder Engagement** - Industry sites decarbonisation aspirations are too far in the future. As a result, they do not have an interest in engaging with the project.
- **Data Mapping** - Stakeholders may have concerns about how their data will be used and shared where it is commercially sensitive.
- **Stakeholder Engagement** - Providers of other fuel types may be reluctant to engage, perceiving the project as being a mechanism to reduce their customer
numbers

No regulatory changes will be required for Discovery/Alpha phases. The project will, however, as an output of Alpha, deliver a recommendation of any regulatory change needed to make any new approaches a success.

The Project is not expected to impact on customers reliability of supply or have any direct or adverse impact on existing or future energy consumers and their premises during the Discovery or Alpha Phase.

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Key outputs and dissemination

RIDES aims to develop a self-service optioneering tool that enables rural industrials to better understand their options and plan their decarbonisation journey economically while improving visibility of future industrial demand profiles, which can bring additional granularity to the DFES scenarios and allow for more efficient investment into future network planning.

WP1 -- Project Management (Lead - SSEN): A final Discovery phase report summarising key findings and learnings will be delivered for knowledge dissemination.

WP2 -- Research and Engagement (Lead - ADE): A report on challenges and opportunities associated with rural industrial decarbonisation, informed by engagement with rural industrials, DNOs, GDNs, alternative fuel providers and other relevant stakeholders will be delivered.

WP3 - Rural industrial energy user data mapping, decarbonisation pathway options and CBA (Lead -Guidehouse): A methodology for mapping, displaying and effectively sharing data relevant to rural industrial energy usage and decarbonisation amongst the relevant stakeholders will be devised. Possible decarbonisation pathway options for rural industries will also be ideated and assessed against a multi-criteria framework that will be developed as part of this work package. Finally, a cost-benefit analysis (CBA) will be compiled demonstrating the benefit of RIDES to GB energy consumers.

WP4 - Digital solution conceptual design (Lead - Guidehouse): A conceptual design for the proposed tool will be developed, including how the tool will be used, who the owner(s) of the data flowing through it will be and defining a framework for updating and storing the data.

WP5 - Governance, policy and regulation (Lead -- ADE): A report on regulatory and policy barriers that might hinder the development of RIDES, along with recommendations on how these might be overcome, will be written and delivered.

The outputs of these activities will inform our decision to progress into Alpha Phase and this knowledge and learning will be disseminated to the SIF community through the Show and Tell.

We will promote the work using a multi-channel and multi-party approach, depending on the intended audience. Examples include:

- Amplification of UKRI, IUK and Ofgem official SIF communications
- Press releases, Energy Innovation Summit, websites and social media
- Specific engagement with ESO, Ofgem, Local Authorities and industrial associations such as TechUK

The project will support development of competitive markets by ensuring project learnings are published throughout and the RIDES digital tool is designed to be platform agnostic. Additionally, the pathways to decarbonise will provide whole systems technology options rather than prescribing specific vendors.

Commercials

Intellectual Property Rights (IPR), procurement and contracting (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.

Investment Needs

RIDES will learn from prior innovation projects. Discovery and Alpha will determine whether the proposed solution can be integrated within existing tools, or if a new tool is required. This will ensure an efficient tool design and avoid consumers interfacing with numerous tools.

Key initiatives considered when designing this proposal [full list in PM Book]:

INDUS

Funding: £551,953

Description: Dispersed industrial sites account for ~10% of UK carbon emissions. There is no coordinated plan for decarbonising small-to-medium enterprises. Indus is developing a novel approach to decarbonising industrial heat through site clustering. This enables shared infrastructure investment, co-location of renewables on-site, and improved network planning. Indus is establishing a network-led framework to support commercial development of zero carbon industrial parks. Through market testing with local authorities, industry stakeholders, and gas networks, this whole systems approach to industrial decarbonisation is an innovative step forward against climate change.

RESOP/LENZA [*NIA SSEN 0071]*

Funding: £2,894,574

Description: LENZA is a geospatial planning platform powered by Advanced Infrastructure Technology Limited's (AITL) LAEP+ software. It has been developed through SSEN Distribution's Project RESOP. LENZA supports users in their strategic energy planning endeavours, including the creation of Local Area Energy Plans (LAEPs) and, where relevant, Local Heat and Energy Efficiency Strategies (LHEES). The platform provides local authorities and their delivery partners with data and modelling tools that support informed decision making, including information on network capacity, building stock, and energy consumption. The tool empowers users to plan decarbonisation pathways, which in turn drive SSEN Distribution's longer-term strategic network planning that will power local net zero ambition.

SeaChange [*SeaChange01]*

Funding: £166,035

Description: UK's net zero shipping by 2050 target is driving a surge in national electricity demand. The maritime sector is complex and diverse across ports and their users. SeaChange, with EMEC, PNDC, Ricardo and Scottish and Southern Electricity Networks Distribution, will help develop a replicable, port-level investment model to explore transition scenarios. This model will be used to help identify key network investment requirements and inform/enable ports and their users to plot their most viable decarbonisation pathways.

Rural Electrification 2.0 [*NPG NIA 042]*

Funding: £400,000

Description: Understanding the impact of increasing electrification of the agricultural sector and rural communities on the

distribution network allows the removal of barriers and acceleration of the net-zero transition. It will help Northern Powergrid, and their customers identify new opportunities to support decarbonisation of the rural sector and improve rural network reliability.

Value for money

Total project cost has been set at £123,060, of which £12,405 will be met through compulsory contribution (10%). We are requesting £110,655 of SIF funding.

The balance of costs and SIF funding requested is as follows:

SSEN-D

- Full costs: £32,225
- Funding: £29,003
- Contribution: £3,222 (10%)

Guidehouse:

- Full costs: £55,125
- Funding: £49,612
- Contribution: £5,513 (10%)

ADE:

- Full costs: £35,710
- Funding: £32,040
- Contribution: £3,670 (10%)

Funding is expected to be allocated to deliverables and work packages in the following way:

WP1 - Project Management: Funding: £ 11,150 (10% of total)

WP2 - Research and Engagement: Funding: £26,207 (24% of total)

WP3- Rural industrial energy user data mapping, decarbonisation pathway options and CBA Funding: £33,269 (30% of total)

WP4- Digital solution conceptual design: Funding: £29,202 (26% of total)

WP5 - Governance, policy and regulation: Funding: £10,827 (10% of total)

This project delivers value for money, as if funded, has potential to deliver:

- Financial benefits on future reductions in the cost of operating the network by achieving significant savings from deferred/avoided reinforcement in regions with higher reinforcement costs per customer.
- Cost savings per annum on energy bills for consumers through use tariffs or flexibility services such as demand turn up and down.
- DCO2 savings per annum through accelerated decarbonisation of industrial sites.

SSEN have carefully considered partner selection and deem that both Guidehouse and ADE are essential to the success of the project. SSEN have benchmarked their costs to comparative consultancies and are satisfied that therates provided are appropriate for the expertise they will be providing, and that these skills are not available within SSEN's resource pool. Specifically:

Guidehouse:

- Expertise in industrial decarbonisation pathway and technology modelling;
- Understanding industrial decarbonisation policy landscape in UK and internationally;
- Experience supporting industrial customers with sustainability and decarbonisation planning incl. network connections;
- Extensive experience in complex data analysis and innovation business case development;

- Expertise in innovative digital tool design and development;

ADE:

- Advocacy for decentralised energy;
- Expertise on energy efficiency, combined heat and power, and demand-side energy solutions;
- Expertise on policy and regulatory frameworks; Influencing policy to support decentralised energy solutions;

We are creating a commercially viable tool and support which will be embedded into the SSEN-D business. Discovery and Alpha phases will bring clarity on the best ways to enable seamless integration and how other DNOs will be able to utilise our outputs for their own rural industrial customers.

The finances of all project partners are included in the https://apply-for-innovation-funding.service.gov.uk/application/10143030/milestones-summary

Supporting documents

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