

# Project Progress Report 2024



## Document Control

### Key Contributors

Name	Company	Contact Details
Sarah Rigby	SSEN Distribution	<a href="mailto:sarah.rigby@sse.com">sarah.rigby@sse.com</a>
Maciej Fila	SSEN Distribution	<a href="mailto:maciej.fila@sse.com">maciej.fila@sse.com</a>
Rob Middleton	Costain	<a href="mailto:robert.middleton@costain.com">robert.middleton@costain.com</a>
Jonathan Woodthorpe	E.ON	<a href="mailto:jonathan.woodthorpe@eon.com">jonathan.woodthorpe@eon.com</a>

### Version Control

Version	Date	Owner	Status
1.0	13/12/2024	Sarah Rigby	Final version for submission following SSEN Distribution review and sign-off

### Reviewers

Name	Company	Job Title
Tim Sammon	SSEN Distribution	Innovation Programme Delivery Manager

## Contents

Contents.....	2
Executive Summary.....	3
Overview of RaaS.....	3
Overall Project Progress .....	3
Key Challenges Encountered .....	4
Learning and Dissemination .....	4
Project Manager’s Report.....	6
Project Summary .....	6
Project Management .....	7
Stakeholder Advisory Board .....	7
Key Challenges Encountered .....	7
RaaS Work Packages .....	9
Outlook for Next Reporting Period.....	13
Business Case Update .....	14
Progress Against Plan.....	15
Summary of Progress.....	15
Focus of this Reporting Period.....	15
Key Activities for the Next Reporting Period .....	16
Additional Considerations .....	16
Progress Against Budget .....	17
Comments around variance .....	17
Project Bank Account.....	18
Project Deliverables .....	19
Data Access Details .....	21
Learning Outcomes .....	22
IPR .....	26
Risk Management .....	27
Material Change Information .....	28
Accuracy Assurance Statement .....	29
Appendices.....	30
Appendix 1 - Project Bank Account .....	31
Appendix 2 - Original Risk Register .....	32
Appendix 3 - Revised Risk Register .....	34

## Executive Summary

### Overview of RaaS

The Resilience as a Service - RaaS - innovation project seeks to improve the operational resilience of electricity distribution networks in remote areas.

The aim is to develop and trial a new market-based solution which can swiftly and automatically restore supply to customers in the event of a fault, using services provided by a local Battery Energy Storage System, and incorporating local Distributed Energy Resources.

The application of RaaS would improve Security of Supply for customers, reduce the use of temporary diesel generation, and enhance the use of local renewable schemes, supporting the UK's transition to Net Zero.

The project is a partnership between SSEN Distribution, E.ON and Costain, and has been awarded funding of £10.9m through Ofgem's Network Innovation Competition.

In addition to demonstrating the technical concept, the work will develop the commercial framework for RaaS - evaluating the financial case from a DNO perspective and assessing the investment case for RaaS Service Providers with options for revenue stacking in other flexibility services markets.

The first phase of the project focused on site selection, system design for the chosen demonstration site, and refinement of the business case for RaaS. The purpose of this stage was to evaluate the technical feasibility and financial viability of the RaaS concept. The conclusions from this work together with feedback from external stakeholders through a series of consultation events informed the decision to proceed to the trial phase with installation of a demonstration scheme supporting Drynoch primary substation.

### Overall Project Progress

The project commenced in early 2020 and this Project Progress Report covers the fourth reporting period from December 2023 to December 2024.

Key activities during the reporting period include:

- progression of the electrical and civils designs for each aspect of the trial scheme
- shipping of the battery modules into Europe - the majority of the battery modules arrived into the UK via Grangemouth Port, with some modules routed to Loccioni's facility in Italy for testing
- creation of one overall programme representing all project partner and consultant delivery activities, as the basis for coordination of site activities, identification of overlap between different contractors' activities and assessment of potential impacts of delays affecting activities of another party
- establishment of the Construction Design and Management (CDM)<sup>1</sup> site and commencement of site works for installation of the trial scheme
- further exploration of the business case and potential commercial framework for with RaaS, with stakeholder engagement to review proposals and feed into Project Deliverable 5 (PD5) 'Supply Chain Engagement - Commercial Framework'<sup>2</sup>, published in July 2024
- acceptance of a further Material Change request submitted to Ofgem in the previous reporting period related to an extended project timeline and revised dates for submission of the remaining Project Deliverables

<sup>1</sup> The Construction (Design and Management) Regulations 2015, [www.hse.gov.uk/construction/cdm/2015/index.htm](http://www.hse.gov.uk/construction/cdm/2015/index.htm)

<sup>2</sup> PD5 'Supply Chain Engagement - Commercial Framework', <https://ssen-innovation.co.uk/wp-content/uploads/2024/08/RaaS-PD5-Overview.pdf>

- further engagement regarding a regulatory Sandbox application<sup>3</sup> submitted to Ofgem September 2022 - this application is associated with the widespread issue of network constraints impeding generation connections, and is specific to the context of an innovation project working to develop a new solution for network operation
  - Sandbox support which offers capability to more fully demonstrate the RaaS concept during short intervals over the course of the project will provide additional learning from the innovation trial whilst avoiding periods when there are risks of constraints on the transmission or distribution systems - any export to grid would occur within network capacity limits by arrangement and agreement with the DNO, ESO and TNO, and only to the extent necessary to demonstrate the scheme
- continued ongoing review of costs in light of market changes and price variations, supporting evaluation of the available project budget

The project team continue to review the project budget as information from suppliers is provided and project activities progress, communicating the position to both the Project Steering Board and Ofgem Project Officer for RaaS. This is key in understanding the impact of external market influences on equipment costs and the overall RaaS concept, and in ensuring that the project has sufficient funds to continue with the build phase and it remains appropriate to proceed.

### Key Challenges Encountered

Key challenges encountered during the reporting period include:

- ongoing impacts on supply chains due to geopolitical events and the broader economic climate
  - increased costs for key items of equipment
  - extended supply chain delivery timeframes
- resource availability for asset and infrastructure delivery
  - impacts on design and construction delivery timeframes
- issues related to grid connection, and subsequent exploration of options that will allow the project to more fully demonstrate the RaaS technical solution and improve confidence in this as a new service for network operation

### Learning and Dissemination

In addition to the formal Project Deliverables set out in the Project Direction, the project team have defined a suite of intervening deliverables which each contribute to the project objectives. Associated reports are published on the project website - [www.project-raas.co.uk](http://www.project-raas.co.uk) - and made available to all interested parties.

During this reporting period a wide range of engagement and dissemination activities have been undertaken, including:

- presentations about RaaS at relevant external events, including the ENA Energy Innovation Summit and Utility Week Forum
- engagement with the ENA's Open Networks team to provide more information on RaaS and discuss broader considerations around common approaches to flexibility procurement and considerations/distinctions for products such as RaaS, January 2024

---

<sup>3</sup> Ofgem launched the regulatory Sandbox in 2017 as a means of enabling trials and supporting innovation projects that are working to deliver new low carbon services and products by providing tools which recognise that the rules in place to govern the energy sector at present may not accommodate some trials or proposed future solutions - Ofgem aim to ensure that regulation facilitates innovation in consumers' interests, and so the regulatory, legal, and strategic assessment undertaken for a Sandbox application assess the extent to which a proposal will support innovation and experimentation to create low carbon services that will directly benefit consumers, [www.ofgem.gov.uk/publications/innovation-sandbox-service-overview](http://www.ofgem.gov.uk/publications/innovation-sandbox-service-overview)

- attendance at other external events to continue learning from, feeding into, and seeking synergies with other innovation projects and initiatives relevant to the future rollout of RaaS
- a series of bilateral supply chain stakeholder engagement events held to present and seek feedback on options and preferences around a commercial framework for the introduction and future roll out of RaaS, to feed into PD5 'Supply Chain Engagement - Commercial Framework'
- engagement with a consortium from NEDO (New Energy and Industrial Technology Development Organisation), Japan, to exchange knowledge and experience on technical and operational challenges associated with transition between grid connected and islanded modes, local black start, and requirements for microgrids<sup>4</sup>
- regular meetings with other network operators, including engagement with Northern Powergrid on development of their MultiResilience project<sup>5</sup>
- holding biannual RaaS Stakeholder Advisory Board meetings

Throughout all dissemination activities the RaaS project continues to receive significant interest and highly pertinent and insightful questions and feedback.

---

<sup>4</sup> the NEDO consortium includes TEPCO (Tokyo Electric Power Company), The Okinawa Electric Power Company, Mitsubishi and CRIEPI (Central Research Institute of Electric Power Industry)

<sup>5</sup> MultiResilience is a SIF (Strategic Innovation Fund) funded project being led by Northern Powergrid, [https://smarter.energynetworks.org/projects/npg\\_sif\\_013](https://smarter.energynetworks.org/projects/npg_sif_013)

## Project Manager's Report

### Project Summary

The Resilience as a Service (RaaS) innovation project seeks to improve the operational resilience of electricity distribution networks in remote areas that are more susceptible to power outages. The aim is to develop and trial a new market-based solution which uses services provided by a Battery Energy Storage System (BESS) together with local Distributed Energy Resources (DER) to swiftly and automatically restore power to customers in the event of a fault on the upstream network. Through temporary operation of the network in islanded mode<sup>6</sup>, RaaS would maintain supply to the local community as the DNO work to repair the fault or dispatch a conventional diesel generator to site for a longer term issue. At other times, a RaaS Service Provider would be able to use the battery to provide other services to the electricity system, with this revenue stacking capability contributing to the business case and reducing overall costs for enhanced resilience. Figure 1 provides a high-level illustration of the RaaS solution.

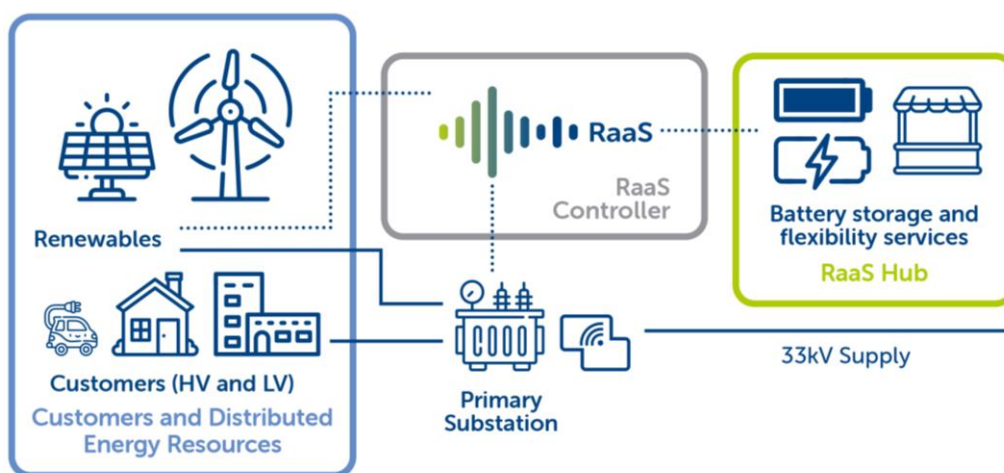


Figure 1 - Schematic of the RaaS solution supporting a 33kV to 11kV primary substation

The RaaS concept represents a flexible solution for improving security of supply in areas where traditional reinforcement or use of DNO owned standby generation to provide network resilience would be prohibitively costly.

The provision of cost effective local network resilience would improve Security of Supply for customers, reduce the use of temporary diesel generation, and enhance the use of local renewable schemes, supporting the UK's transition to Net Zero.

In addition to demonstrating the technical concept, the work will develop the commercial framework for RaaS - evaluating the financial case from a DNO perspective and assessing the investment case for RaaS Service Providers with options for revenue stacking in other flexibility services markets.

The first phase of the project focused on site selection, system design for the chosen demonstration site, and assessment of the business case for RaaS. This stage evaluated the technical feasibility and financial viability of the concept, with findings presented to external stakeholders to invite feedback and challenge. The conclusions from this work and the support demonstrated by a range of stakeholders informed the decision made during the Stage Gate review to proceed with the deployment and operation of a RaaS system to support Drynoch primary substation.

The project is a partnership between SSEN Distribution (SSEN), E.ON and Costain, and has been awarded funding through Ofgem's Network Innovation Competition (NIC).

<sup>6</sup> in islanded mode, an area of the network is disconnected from the main electricity grid and operates independently

## Project Management

The project team continue regular 'stand-up' meetings to support an efficient decision-making environment where progress and emerging issues can be shared and acted upon quickly.

The Project Steering Board (PSB) continues to sit quarterly, and comprises senior managers from SSEN, E.ON and Costain. PSB meetings have also been called where significant issues have become apparent, to ensure awareness and allow collaborative discussion at that level.

During this reporting period the team has maintained several documents for use in developing project activities and supporting collaboration between project partners. These include:

- a Stakeholder Engagement and Communications Plan
- a 'relevant projects for RaaS review' log - a list of other projects and initiatives that the project team have identified as being relevant to RaaS, with useful working relationships developed to share learning which will compliment and build on individual project activities
- a 'RaaS - additional considerations' log - a log of ideas and points for consideration across a range of themes, which have become apparent through ongoing project activities, to ensure that these are incorporated into project plans and addressed fully

These documents are kept on the project's collaboratively managed secure file share system along with regular project management documents including:

- the Project Programme
- the Risk and Opportunities Register
- an Actions Log
- a Stakeholder Engagement and Communications Log

## Stakeholder Advisory Board

As part of the project governance plans, the Stakeholder Advisory Board (SAB) for RaaS provides strategic oversight, ensuring that the project:

- remains relevant to strategic direction of the GB electricity sector
- considers relevant learnings from other innovation projects
- flexes according to changes in regulation and to new market trends
- delivers learning outcomes relevant to all GB DNOs

The board represents a range of stakeholder perspectives, with participation from the following organisations: BEIS, Citizens Advice, ENA, National Grid ESO, Northern Powergrid, Ofgem, Scottish Government, Sustainability First.

The seventh and eighth Stakeholder Advisory Board meetings were held in March and November 2024 respectively.

## Key Challenges Encountered

A number of the challenges experienced since the outset of the project reflect events and circumstances within wider industry, society and political landscapes.

Key challenges encountered by the project during this reporting period are described below, and relate to:

- ongoing impacts on supply chains due to geopolitical events and the broader economic climate
  - increased costs for key items of equipment
  - extended supply chain delivery timeframes
- resource availability for asset and infrastructure delivery



- impacts on design and construction delivery timeframes
- issues related to grid connection, and subsequent exploration of options that will allow the project to more fully demonstrate the RaaS technical solution and improve confidence in this as a new service for network operation

These factors continue to be closely evaluated and managed by the project team, and considered in detail by the Project Steering Board.

### **Ongoing impacts on supply chains due to geopolitical events and the broader economic climate**

As identified in prior Project Progress Reports, supply chains and delivery timeframes continue to be impacted by global and national political events and economic changes. The impact on material, manufacturing and contractor services prices has driven equipment and site delivery quote figures higher than originally budgeted for. Relatedly, delivery dates for the BESS and DNO equipment have been notably longer than the expected timeframes built into the original project programme.

The project team continue to keep this under consideration, and to communicate with both the Project Steering Board and Ofgem Project Officer for RaaS.

### **Resource availability for asset and infrastructure delivery**

A shortage of skilled & qualified resources for asset and infrastructure delivery is evident across utilities, manufacturing and construction industries.

For RaaS, impacts have been seen across design (electrical, civils, etc.), civils contracting, equipment manufacture activities, and in the availability of authorised supervision personnel required for safe delivery of siteworks adjacent to electricity network assets.

This has impeded a number of project activities over the reporting period, and contributes to difficulties around timely coordination of activities across multiple suppliers and contractors.

A further consideration here is the requirement for RaaS project compliance with NIC governance and prescribed timeframes, with a similar consideration around funding budget within a changing economic climate.

The Project Delivery Board continues to liaise closely with appointed and potential contractors/subcontractors for clear communication of timeframe requirements, early identification of any resourcing issues, assessment of the impacts of any potential delays on NIC project delivery, and collaboration in working to resolve issues.

An associated risk item has been added to the Revised Risk Register provided as Appendix 3, and issues are communicated to the Project Steering Board as necessary.

### **Grid connection**

As described in prior Project Progress Reports, the generation connection application for the RaaS trial scheme is held in a queue of generation schemes waiting to connect to the Dunvegan distribution network, which serves Drynoch primary substation and the wider network area. The connection of new generation schemes at distribution level in this area is prevented due to constraints at transmission system level. The resolution that would allow these applicants to connect to the network centres around the Skye 132 kV Reinforcement project proposed by SSEN Transmission, for which a Final Needs Case decision was issued by Ofgem in August 2023<sup>7</sup>.

Significant industry focus on issues related to network constraints and new connections has continued over this reporting period, with a wide range of initiatives currently underway to improve the connections processes at both transmission and distribution level. Whilst these can be expected to support the future application and rollout of RaaS, within project timeframes the trial scheme will not obtain a generation connection for BESS export to grid.

<sup>7</sup> [Isle of Skye - Final Needs Case decision](#), Ofgem, August 2023

Acknowledging the nature of this BESS connection in the context of an NIC innovation project to develop a new solution for network operation, and the learning that could be obtained through the installation and demonstration of a trial RaaS scheme, a regulatory Sandbox application was submitted to Ofgem in September 2022.

If granted, Sandbox support would allow the project team to coordinate approaches for identifying and utilising limited ‘windows of opportunity’ for innovation project related export to grid at times which would avoid any risk of constraints on the transmission system, working with NESO and SSEN Transmission.

A limited and managed capability to export working within agreed parameters would allow the project to more fully demonstrate the RaaS technical solution and improve confidence in this as a new service for network operation.

The project team continues to engage with SSEN Transmission, NESO and Ofgem regarding the Sandbox application.

## RaaS Work Packages

The project has been divided into eight Work Packages (WP) as shown in Table 1. A brief description of each Work Package is given below together with an update on the progress of each over this reporting period.

Table 1 - Overview of the RaaS Work Packages

Work Package	Title
WP1	Project Coordination
WP2	Front End Engineering Design
WP3	Detailed Design
WP4	Planning for Operational Commercial Optimisation
WP5	Business Model
WP6	Supply Chain Engagement
WP7	Demonstration Site Construction and Operation
WP8	Dissemination

### WP1 - Project Coordination

WP1 covers all core project management activities carried out by each partner.

The project team hold agile ‘stand-up’ meetings each week to discuss current and upcoming tasks, progress against plan, potential risks, and any additional points identified. The project has also hosted quarterly Project Steering Board meetings, and two Stakeholder Advisory Board meetings over this reporting period.

As the trial site design and planning activities have progressed, project coordination has also extended to relevant teams and individuals from delivery contractor organisation. This includes collaborative engagement between the BESS and DNO suppliers on both the electrical designs and civils designs, and on the control systems to develop the interface for RaaS control functionality.

Similarly as the project has moved into delivery of the demonstration scheme at the trial site, coordination of site activities has commenced, with Freedom appointed as Principal Contractor under CDM regulations<sup>8</sup>.

<sup>8</sup> The Construction (Design and Management) Regulations 2015, [www.hse.gov.uk/construction/cdm/2015/index.htm](http://www.hse.gov.uk/construction/cdm/2015/index.htm)

## **WP2 - Front End Engineering Design (FEED)**

WP2 consisted of the initial design phase for the proposed technical solution. This included identification of the requirements and use cases of the RaaS system and service provision, analysis and initial specification of the required operational processes, evaluation of interfaces and responsibilities between the RaaS Provider and the DNO, and definition of key protection and earthing arrangements.

The trial site selection process also formed part of WP2, and the extensive site selection process identified Drynoch primary substation on the Isle of Skye as the proposed trial site for the demonstration of RaaS.

## **WP3 - Detailed Design**

WP3 built on WP2 to develop a detailed technical design for the application of RaaS. This comprised design of the BESS and associated Energy Management System (EMS), the DNO side aspects of the scheme and integration with existing substation assets and control systems, the interfaces between the DNO and BESS systems, the communications requirements and information exchanges, the network protection systems, and the associated roles and responsibilities. Plans have also been drawn up for the various stages of testing required during development and commissioning of the RaaS scheme.

E.ON's engagement with potential BESS equipment suppliers during this detailed design stage formed the basis for the full tender process used to identify and appoint the BESS system provider for the project trial scheme.

## **WP4 - Planning for Operational Commercial Optimisation**

WP4 explored operational schedules for a BESS scheme focused on the provision of RaaS and participation in other ancillary service and arbitrage markets available at that time. Three initial product design scenarios were used to represent different levels of granularity in RaaS service level requirements, with optimisation modelling applied to evaluate the potential income from other revenue streams. This work then informed the initial investor business case assessment undertaken within WP5.

During this reporting period the project has taken forward observations and proposals from this work to develop a more detailed understanding of how different payment structures and approaches to DNO requirements specification can influence service provider operational optimisation, and provision of RaaS with other energy system services. Alongside wider strategic considerations this contributed to the development of a commercial framework for future roll out of RaaS, as presented in PD5 'Supply Chain Engagement - Commercial Framework', published in July 2024<sup>9</sup>.

The range and nature of products open to flexibility service providers continues to evolve, and the project team continue to follow wider industry initiatives relevant to the potential future rollout of RaaS, and participate in events feeding into the development of new approaches to, for example, flexibility services and market platforms.

## **WP5 - Business Model**

WP5 brought together technical and operational perspectives from the initial stages of the project to evaluate the business model for potential RaaS suppliers. This work was based on an initial set of product design scenarios, and included an investor business case (IBC) for RaaS providers seeking to optimise revenue stacking across a number of markets, and an Investor Risk Evaluation informed by engagement with different potential investor types to ensure stakeholder views were represented.

As an enhancement to the original scope, this work also developed an assessment of the business case for RaaS from a DNO's perspective.

---

<sup>9</sup> PD5 'Supply Chain Engagement - Commercial Framework', <https://ssen-innovation.co.uk/wp-content/uploads/2024/08/RaaS-PD5-Overview.pdf>

These corresponding views provided an initial understanding of how the RaaS Investor and DNO business cases aligned, and supported the identification of options that could improve the attractiveness of RaaS to both parties.

Conclusions and recommendations from this work package have been used within this reporting period to further develop and refine proposals on the future commercial framework for RaaS, as presented in PD5 'Supply Chain Engagement - Commercial Framework'.

### **WP6 - Supply Chain Engagement**

The objective of WP6 is to ensure that RaaS is scalable from a single pilot scheme into BAU across all suitable GB DNO sites. WP6 aims to support development of a broad supply chain for the provision of RaaS supporting efficient and cost effective application of RaaS - appropriate to different locations, network topologies and local energy resources - and allowing the benefits to customers to be fully realised.

Within this reporting period a series of targeted stakeholder engagement events have been used to present and seek feedback on options and preferences around a commercial framework for the introduction and future roll out of RaaS. The approach taken to develop the proposed commercial strategy and engage with the supply chain is presented in PD5 'Supply Chain Engagement - Commercial Framework'.

Stakeholder engagement will continue throughout the project to share learning from the trial phase and promote awareness of the potential opportunities associated with local network resilience solutions.

### **WP7 - Demonstration Site Construction and Optimisation**

WP7 comprises the procurement, construction, installation and commissioning of a RaaS system at the Drynoch trial site, with detailed testing and live operation.

This reporting period has seen ongoing placement of contracts for delivery of the BESS and DNO side aspects of the trial scheme and orders for major items of equipment. Further, work has commenced on site with establishment of a CDM area and initiation of civils activities for delivery of the trial scheme.

The key challenges experienced over this reporting period, as set out above, primarily relate to this work package and delivery of the trial scheme. The project team will continue to evaluate and manage these factors over the next reporting period, responding to further information or developments as necessary.

### **WP8 - Dissemination**

WP8 comprises all project dissemination activities, including conferences, presentations, webinars, and attendance at other relevant events. Key activities over the reporting period have included:

The project team has continued to engage with stakeholders to disseminate findings from the project and participate in wider industry discussions regarding network resilience, flexibility services and market platforms, and grid connections. This has included:

- presentations about RaaS to:
  - Brunel University's 'Smart Grid Operation and Management MSc module' students, April 2024
  - the Energy Innovation Summit in Liverpool, 29 & 30 October 2024
    - RaaS and MultiResilience covered as part of the 'Understanding and developing operational and technical resilience, to reduce outages and speed up restoration' session, with the project team also participating in the conference poster session for detailed questions and discussion
  - the Utility Week Forum in London, 19 & 20 November 2024
    - RaaS and MultiResilience covered as part of the 'Leveraging energy flexibility to improve energy security' session

- engagement with the ENA’s Open Networks team to provide more information on RaaS and discuss broader considerations around common approaches to flexibility procurement and considerations/distinctions for products such as RaaS, January 2024
- attendance at other external events to continue learning from, feeding into, and seeking synergies with other innovation projects and initiatives relevant to the future rollout of RaaS:
  - the ENA’s Open Networks Insights Forums, December 2023 & July 2024
  - Use Case Advisory Group meetings for National Grid ESO’s ‘Virtual Energy System’ project<sup>10</sup>, January, March & May 2024
  - National Grid ESO’s ‘Connections Reform Final Recommendations’ webinar, December 2023
  - Ofgem’s ‘Future of Distributed Flexibility (FoDF) Common Asset Registration for Flexibility Markets’ workshop, March 2024
  - Northern Powergrid’s ‘How to participate in Northern Powergrid’s upcoming Spring tender’ webinar, March 2024
  - Edie.net’s ‘Combining battery storage and renewables on the path to net-zero’ webinar, April 2024
  - ACI’s ‘National Microgrids Online’ webinar, October 2024
  - Elexon’s ‘Market Facilitator Workshop 1’, November 2024
  - Regen’s Electricity Storage Network Winter Conference 2024, November 2024
  - CIREN’s ‘How are DSOs using flexibility to deliver the low-carbon energy transition now and in the future?’ webinar, December 2024
- a series of bilateral supply chain stakeholder engagement events held to present and seek feedback on options and preferences around a commercial framework for the introduction and future roll out of RaaS, to feed into PD5 ‘Supply Chain Engagement - Commercial Framework’, June 2024
- engagement with a consortium from NEDO (New Energy and Industrial Technology Development Organisation), Japan, to exchange knowledge and experience on technical and operational challenges associated with transition between grid connected and islanded modes, local black start, and requirements for microgrids<sup>11</sup>
- regular meetings with other network operators, including engagement with Northern Powergrid on development of their MultiResilience project<sup>12</sup>
- biannual Stakeholder Advisory Board meetings in March and November 2024 - board members comprise representatives from BEIS, Citizens Advice, ENA, National Grid ESO, Northern Powergrid, Ofgem, Scottish Government, Sustainability First

<sup>10</sup> [www.neso.energy/about/our-projects/virtual-energy-system](http://www.neso.energy/about/our-projects/virtual-energy-system)

<sup>11</sup> the NEDO consortium includes TEPCO (Tokyo Electric Power Company), The Okinawa Electric Power Company, Mitsubishi and CRIEPI (Central Research Institute of Electric Power Industry)

<sup>12</sup> MultiResilience is a SIF (Strategic Innovation Fund) funded project being led by Northern Powergrid, [https://smarter.energynetworks.org/projects/npg\\_sif\\_013](https://smarter.energynetworks.org/projects/npg_sif_013)

## Outlook for Next Reporting Period

Key project activities planned for the next reporting period include WP7 activities related to:

- ongoing manufacture, assembly and testing of all elements of the trial scheme
- shipping and delivery of remaining key assets and equipment
- progressing site works for delivery of the project trial
- evaluation and management of the key issues identified over the current reporting period, responding to further information or developments as necessary

Each aspect of asset or infrastructure delivery may bring issues that represent key challenges for a project. For RaaS this includes external factors such as supply chain pressures; international shipping; weather and climate related risks; and coordination of multiple suppliers and contractors on site and during interface & interaction testing, where a delay in the timeframes or supply of equipment of one party may have a resulting impact on the activities of other parties.

The project team continue to work closely with contractors and suppliers for early identification of potential issues, supporting assessment of impacts, and collaboration in working to reduce risks and resolve issues.

Safety will continue to be the primary priority for the project.

Alongside delivery of the trial scheme, the project will continue to explore options for how local resilience solutions could be best implemented to provide cost efficient improvement of customers' security of supply, with business case, use case, and commercial strategy considerations.

Commercial aspects of RaaS must be founded in the context of wider industry and flexibility market developments, and with regard to enhancing use of distributed energy resources and whole systems opportunities. This work will build on the commercial framework presented in PD5, and consider both the potential introduction of RaaS to the market, and its evolving future roll out.

WP8 will continue engagement with a wide range of external stakeholders to share project findings and invite feedback.

A decision from Ofgem regarding the regulatory Sandbox application is also expected during the next reporting period, representing a key issue for the project.

Should Sandbox support be granted, the project team will coordinate with NESO and SSEN Transmission on approaches for identifying and utilising limited 'windows of opportunity' to export to grid at times which would avoid any risk of constraints on the transmission system, and agree terms for any permitted innovation project related export. This capability would augment demonstration of the RaaS scheme, helping to build confidence in the solution and providing evidence to support the future rollout of RaaS as BAU, amongst both DNOs and the potential supply chain.

In the event that Sandbox support is not available, the extent to which the trial system can be demonstrated will be reduced, impacting the learning that it will be possible to obtain from operating this prototype scheme.

Engagement with wider industry initiatives relevant to the potential future implementation of RaaS will continue, with participation in events that are feeding into the development of new approaches to, for example, flexibility services and market platforms, grid connections, and network resilience.

The project team also continue to keep the budget under close review.

## Business Case Update

The first phase of the project included a review of the Business Case for RaaS from both the DNO and RaaS Service Provider perspectives. These corresponding views provided an initial understanding of how the RaaS procurer and investor business cases aligned, and supported the identification of options that could improve the attractiveness of RaaS to both parties.

During this reporting period the project has taken forward observations and proposals from this work to develop a more detailed understanding of how different payment structures and approaches to DNO requirements specification can influence service provider operational optimisation, and provision of RaaS with other energy system services.

Alongside wider strategic considerations this contributed to the development of proposals around a commercial framework for the introduction and future roll out of RaaS, as presented in PD5 'Supply Chain Engagement - Commercial Framework', published in July 2024<sup>13</sup>.

Business case, use case, and commercial strategy considerations will continue to be explored as the project progresses to draw conclusions and recommendations on how local resilience solutions could be best implemented - providing cost efficient improvement of customers' security of supply and enhanced use of local energy resources.

---

<sup>13</sup> PD5 'Supply Chain Engagement - Commercial Framework', <https://ssen-innovation.co.uk/wp-content/uploads/2024/08/RaaS-PD5-Overview.pdf>

## Progress Against Plan

### Summary of Progress

The project commenced in early 2020 and this Project Progress Report covers the fourth reporting period from December 2023 to December 2024.

Following the positive Stage Gate decision the project has progressed activities for delivery of the trial and demonstration scheme at Drynoch on the Isle of Skye, and commenced further work on the business case and commercial considerations related to RaaS.

As set out in the **Project Manager's Report** section, a number of factors have and continue to impact the timeframes associated with project activities. This has led to the approval of a further Material Change regarding an extended project timeline and revised dates for submission of the remaining Project Deliverables, as described in the **Material Change Information** section of this report. The revised PD submission dates are set out in the **Project Deliverables** section of this report.

High levels of engagement within the project team and with external parties have been maintained to progress delivery activities, and to discuss, evaluate and identify resolutions for the key challenges that have continued through this reporting period.

### Focus of this Reporting Period

Key activities during the reporting period include:

- progression of the electrical and civils designs for each aspect of the trial scheme
- shipping of the battery modules into Europe - the majority of the battery modules arrived into the UK via Grangemouth Port, with some modules routed to Loccioni's facility in Italy for testing
- creation of one overall programme representing all project partner and consultant delivery activities, as the basis for coordination of site activities, identification of overlap between different contractors' activities and assessment of potential impacts of delays affecting activities of another party
- establishment of the CDM site and commencement of site works for installation of the trial scheme
- further exploration of the business case and potential commercial framework for with RaaS, with stakeholder engagement to review proposals and feed into Project Deliverable 5 (PD5) 'Supply Chain Engagement - Commercial Framework'<sup>14</sup>, published in July 2024
- acceptance of a further Material Change request submitted to Ofgem in the previous reporting period related to an extended project timeline and revised dates for submission of the remaining Project Deliverables
- further engagement regarding a regulatory Sandbox application<sup>15</sup> submitted to Ofgem September 2022 - this application is associated with the widespread issue of network constraints impeding generation connections, and is specific to the context of an innovation project working to develop a new solution for network operation
  - Sandbox support which offers capability to more fully demonstrate the RaaS concept during short intervals over the course of the project will provide additional learning from the innovation trial whilst

<sup>14</sup> PD5 'Supply Chain Engagement - Commercial Framework', <https://ssen-innovation.co.uk/wp-content/uploads/2024/08/RaaS-PD5-Overview.pdf>

<sup>15</sup> Ofgem launched the regulatory Sandbox in 2017 as a means of enabling trials and supporting innovation projects that are working to deliver new low carbon services and products by providing tools which recognise that the rules in place to govern the energy sector at present may not accommodate some trials or proposed future solutions - Ofgem aim to ensure that regulation facilitates innovation in consumers' interests, and so the regulatory, legal, and strategic assessment undertaken for a Sandbox application assess the extent to which a proposal will support innovation and experimentation to create low carbon services that will directly benefit consumers, [www.ofgem.gov.uk/publications/innovation-sandbox-service-overview](http://www.ofgem.gov.uk/publications/innovation-sandbox-service-overview)



avoiding periods when there are risks of constraints on the transmission or distribution systems - any export to grid would occur within network capacity limits by arrangement and agreement with the DNO, ESO and TNO, and only to the extent necessary to demonstrate the scheme

- continued ongoing review of costs in light of market changes and price variations, supporting evaluation of the available project budget

The project team continue to review the project budget as information from suppliers is provided and project activities progress, communicating the position to both the Project Steering Board and Ofgem Project Officer for RaaS. This is key in understanding the impact of external market influences on equipment costs and the overall RaaS concept, and in ensuring that the project has sufficient funds to progress with the build phase and it remains appropriate to proceed.

### Key Activities for the Next Reporting Period

Key project activities planned for the next reporting period include:

- continuation of demonstration site delivery, including ongoing manufacture, assembly and testing of all elements of the trial scheme; shipping and delivery of remaining key assets and equipment; and progressing site works for delivery of the project trial
- should Sandbox support be granted, the project team will coordinate with NESO and SSEN Transmission on approaches for identifying and utilising limited 'windows of opportunity' to export to grid at times which would avoid any risk of constraints on the transmission system, and agree the terms for any permitted innovation project related export
- progression of activities to further develop commercial aspects of RaaS
- ongoing engagement with external stakeholders to share project findings and invite feedback, and inform plans for the potential introduction of RaaS to the market, and its evolving future roll out
- continued engagement with wider industry initiatives relevant to the future implementation of RaaS

All areas of work have the potential for issues to be identified which represent challenges for the project, with regard both to delivery of the trial scheme, and to technical and/or commercial aspects of the RaaS concept.

The project team will continue to evaluate and manage the key issues identified over the current reporting period and challenges experienced during the next reporting period, responding to further information or developments as necessary.

Safety will continue to be the primary priority for the project.

### Additional Considerations

Internal discussions, engagement with stakeholders, and the advancement of wider industry initiatives over the course of the project continue to highlight a range of factors that will be important to consider and address. These items complement the original project plans by ensuring that ideas elicited through ongoing project activities and wider engagement inform the project work and development of the RaaS solution. Additional considerations are logged and assigned to appropriate work packages to influence the development of project activities, and ensure that suitable feedback is provided to stakeholders.

## Progress Against Budget

Table 2 below details expenditure to date against each line in the Project Budget and compares this with planned expenditure to date. Commentary is also provided below for projected variances greater than 5%.

Table 2 - Summary of Project Budget

Cost Category	Total Budget (Project Direction)	Expenditure to Date (phased)		Variance	
		Expected (original budget)	Actual	£	%
Labour	£1,489,316	£1,489,316	£1,241,597	-£247,719	-17%
Equipment	£3,308,967	£3,308,967	£1,431,733	-£1,877,234	-57%
Contractors	£5,262,815	£5,262,815	£2,907,862	-£2,354,953	-45%
Travel and Expenses	£513,671	£513,671	£5,602	-£508,069	-99%
Decommissioning	£356,338	£356,338	£0.00	-£356,338	-100%
<b>Total</b>	<b>£10,931,107</b>	<b>£10,931,107</b>	<b>£5,586,794</b>	<b>-£5,344,314</b>	<b>-49%</b>

### Comments around variance

As previously reported, a number of factors have impacted the timeframes associated with project activities, resulting in two Material Change requests having been approved by Ofgem to extend project timeframes. These have accordingly resulted in changes to expected payment milestones across all cost categories.

The 'Travel and Expenses' cost category has continued to realise efficiencies and cost savings in line with the move to alternative ways of working and use of remote working technologies, which will continue to be reflected in project expenditure for this line item.

## Project Bank Account

Copies of the project bank account statements for this reporting period are provided as Appendix 1 (confidential).

## Project Deliverables

The RaaS Project Direction defines nine Project Deliverables, as presented in Table 3.

All Project Deliverables and supporting reports are available via the documents section of the RaaS website - <https://ssen-innovation.co.uk/raas/project-docs>.

As set out in the **Material Change Information** section of this report a further Material Change request was approved by Ofgem in June 2024. The table below gives both the original dates set out in the Project Direction and revised dates in line with the further Material Change.

The key challenges moving into the next reporting period relate to:

- ongoing impacts on supply chains due to geopolitical events and the broader economic climate
- delivery of the demonstration scheme at the project trial site with securing availability of resources, coordination of multiple partners and contractors, external factors that may impact contractor and supplier delivery timeframes, and dependence on weather events
- issues with the grid connection for the BESS and what may be possible during the trial in the event that Sandbox support is or is not granted







The statuses of deliverables 6, 7 and 8 reflect the risks and potential impacts associated with these challenges.

The project team continue to keep all aspect under consideration as information from suppliers is provided and project activities progress, communicating the position to both the Project Steering Board and Ofgem Project Officer for RaaS.

Table 3 - RaaS Project Deliverables

Deliverable	Description	Due	Evidence	Status
1	Front End Engineering Design (FEED) (WP2)	Project Direction: Aug 2020 Submitted: 25 Feb 21	<ul style="list-style-type: none"> <li>■ Report detailing the selected site for demonstration and proposed Use case(s) for the RaaS demonstration.</li> <li>■ External peer review of FEED.</li> </ul>	Completed
2	Detailed Design (WP3)	Project Direction: Jan 2021 Submitted: 17 Nov 21	<ul style="list-style-type: none"> <li>■ Detailed design of controls, electrical integration, available DER and the BESS complete.</li> <li>■ Publish Trial Programme on SSEN RaaS webpage.</li> </ul>	Completed
3	Business Model for Potential RaaS Suppliers (WP5)	Project Direction: Feb 2021 Submitted: 18 Jan 22	<ul style="list-style-type: none"> <li>■ Construct investment business case for RaaS supplier.</li> <li>■ Produce draft Heads of Terms for RaaS method.</li> </ul>	Completed
4	Stakeholder Feedback Event (Stage Gate)	Project Direction: Apr 2021 Submitted: 25 Feb 22	<ul style="list-style-type: none"> <li>■ Stakeholder feedback event to disseminate and gather feedback on outputs.</li> </ul>	Completed

5	Supply Chain Engagement (WP6)	Project Direction: Nov 2021 Submitted: 29 Jul 2024	<ul style="list-style-type: none"> <li>■ Publish Commercial Strategy on SSEN RaaS webpage.</li> <li>■ Present Enterprise design for Resilience as a Service on SSEN website</li> </ul>	Completed
6	Network Adaptation and Acceptance Testing (WP7)	Project Direction: Mar 2022 Revised: Oct 2025	<ul style="list-style-type: none"> <li>■ Produce interface and configuration specifications and commissioning reports.</li> </ul>	Challenges identified above may impact.
7	Trial 1 - Demonstration at first site complete (WP7)	Project Direction: Dec 2023 Revised: Jun 2026	<ul style="list-style-type: none"> <li>■ Publish Demonstration analysis results on SSEN RaaS webpage covering both technical and commercial aspects.</li> <li>■ Stakeholder dissemination event showcasing learnings.</li> </ul>	Challenges identified above may impact.
8	BAU Preparation	Project Direction: Jun 2024 Revised: Mar 2026	<ul style="list-style-type: none"> <li>■ Technical design to support second demonstration site.</li> <li>■ Consultation with potential RaaS market for second demonstration site.</li> </ul>	Challenges identified above may impact.
9	Comply with knowledge transfer requirements of the Governance Document.	End of project	<ul style="list-style-type: none"> <li>■ Annual Project Progress Reports which comply with the requirements of the Governance Document.</li> <li>■ Completed Close Down Report which complies with the requirements of the Governance Document.</li> <li>■ Evidence of attendance and participation in the Annual Conference as described in the Governance Document.</li> </ul>	Ongoing

<b>Key</b>			
	Completed (Deliverable met)		Emerging issue, remains on target
	On target		Unresolved issue, off target
			Deliverable completed late
			Not completed and late

## Data Access Details

Data obtained over the course of the RaaS project will be available to interested parties through appropriate channels, such as published project reports and deliverables available via the project website. This information will be provided in accordance with the SSEN Network Innovation Competition (NIC) and Network Innovation Allowance (NIA) Data Sharing Procedure, reference PR-NET-ENG-020<sup>16</sup>.

For further information please email [future.networks@sse.com](mailto:future.networks@sse.com).

---

<sup>16</sup> SSEN Network Innovation Competition and Network Innovation Allowance Data Sharing Procedure, Revision 2.00, [PR-NET-ENG-020](#)

## Learning Outcomes

The learning outcomes defined for the RaaS Project are as follows:

- 1) Understand how resilience can be supplied as a service
- 2) Demonstrate that the system components for the provision of resilience can be integrated into the network, with clarity on the division of scope of supply between the DNO and resilience supplier
- 3) Confirm that storage technology providing resilience is capable of achieving the expected revenue streams to minimise the cost of the resilience service
- 4) Develop an understanding of the optimum relationship between the resilience services that could be provided, whilst ensuring commercial viability for all participants
- 5) Develop supply chain models for the provision of resilience, and understand how the service can be procured in the most cost effective way
- 6) Disseminate Project results within the industry

A summary of the progress against these objectives is given below, together with information on associated dissemination activities.

### Understand how resilience can be supplied as a service

This learning outcome aims to provide an understanding of both the technical and commercial aspects of how resilience can be supplied as a service.

#### Technical aspects

During this reporting period design and planning activities for installation of the RaaS trial and demonstration scheme have progressed within Work Package 7 'Demonstration Site Construction and Operation'.

Delivery of the trial scheme continues, working towards commissioning and operation to demonstrate the control systems and technical functionality designed through the project.

#### Commercial aspects

As set out in the [Business Case Update](#) section of this report, the project has also taken forward observations and proposals from the first phase of the project to develop a more detailed understanding of options that could improve the attractiveness of RaaS to both DNOs and potential service providers.

Business case, use case, and commercial strategy considerations will continue to be explored as the project progresses to draw conclusions and recommendations on how local resilience solutions could be best implemented - providing cost efficient improvement of customers' security of supply and enhanced use of distributed energy resources.

### Demonstrate that the system components for the provision of resilience can be integrated into the network, with clarity on the division of scope of supply between the DNO and resilience supplier

The project partners have maintained engagement with appointed suppliers during development of equipment specific plans and designs for the DNO and RaaS Service Provider aspects of the trial scheme, with all parties giving clear consideration to the integration of electrical and control systems between the BESS scheme and existing network assets.

Technical details of the scheme implemented for the trial and the testing and commissioning activities undertaken will be reported in PD6 'Network Adaptation and Acceptance Testing'.

## Confirm that storage technology providing resilience is capable of achieving the expected revenue streams to minimise the cost of the resilience service

The business case assessment undertaken during the first phase of the project, and presented in PD3 'Business Model', included both the DNO perspective and the RaaS Service Provider perspective with revenue stacking from participation in other ancillary service and arbitrage markets available at that time.

The range and nature of products open to flexibility service providers continues to evolve, and the project team continue to follow wider industry initiatives relevant to the potential future rollout of RaaS, and participate in events that are feeding into the development of new approaches to, for example, flexibility services and market platforms, grid connections, and network resilience.

## Develop an understanding of the optimum relationship between the resilience services that could be provided, whilst ensuring commercial viability for all participants

This objective recognises the need to be pragmatic about establishing an acceptable balance between a system which provides a full capability resilience service and a system which provides an economic level of security based on anticipated costs and benefits for market participants.

During this reporting period the project has taken forward observations and proposals from the first phase of the project to develop a more detailed understanding of how different payment structures and approaches to DNO requirements specification can influence service provider operational optimisation, and provision of RaaS with other energy system services.

This work fed into PD5 'Supply Chain Engagement - Commercial Framework', published in July 2024<sup>17</sup>.

## Develop supply chain models for the provision of resilience, and understand how the service can be procured in the most cost effective way

The first phase of the project included consideration of the potential market structures and supply chain for RaaS.

During this reporting period further work on the business case has been used with wider strategic considerations to develop proposals around a commercial framework for the introduction and future roll out of RaaS. This includes consideration of the RaaS product and DNO requirements specification, payment structures, and procurement and tender processes.

A further aspect of the approach developed was the clear need for recognition of and alignment with wider industry developments regarding flexibility procurement frameworks, such as:

- registration - the ENA's Open Networks project has worked to align sign-up and pre-qualification<sup>18</sup> processes for flexibility service procurement to provide a simpler and more consistent user experience for service providers and DSOs
- the platform to be used - the tendering process for RaaS would employ the platform(s) used by SSEN Distribution for other DSO products, and it is recognised that over time wider industry initiatives may introduce new digital and/or dynamic platforms for flexibility market services, for example:
  - outcomes from Ofgem's Future of Distributed Flexibility (FoDF) common Flexibility Digital Infrastructure (FDI)<sup>19</sup> work

<sup>17</sup> PD5 'Supply Chain Engagement - Commercial Framework', <https://ssen-innovation.co.uk/wp-content/uploads/2024/08/RaaS-PD5-Overview.pdf>

<sup>18</sup> Open Networks 'Flexibility Service Pre-qualification Standard Template', March 2024

<sup>19</sup> Ofgem's FoDF work aims to develop a market enabling platform for co-ordinating DER assets participating in the provision of services to distribution networks (FDI previously referenced as Common Digital Energy Infrastructure (CDEI)), Ofgem [Future of Distributed Flexibility presentation](#), November 2023



- development of Elexon’s role as Market Facilitator<sup>20</sup> and the work now progressing to scope out and develop plans that fulfil their mandate
- timeframes - timeframes associated with other aspects of scheme development, including potential alignment with the evolving connections application processes<sup>21</sup> (i.e. application windows, progression gates), must be considered within the tender process for RaaS

To test and seek feedback on proposals, through Work Package 6 a series of bilateral supply chain stakeholder engagement events were held in June 2024. These were used to present the work and discussion options and preferences, with perspectives sought from flexibility service providers, asset investors/developers, community energy groups, and industrial/large energy user organisations.

This engagement served to raise awareness of RaaS as an emerging market-based approach to improving security of supply, and understand the views of potential future service providers on how the commercial approach can best promote market development, enhance the attractiveness of bidding for and delivering RaaS in remote areas, and enable market participants to efficiently engage with RaaS.

This engagement directly informed PD5 ‘Supply Chain Engagement - Commercial Framework’.

### Disseminate Project results within the industry

The project team has continued to engage with stakeholders to disseminate findings from the project and participate in wider industry discussions regarding network resilience, flexibility services and market platforms, and grid connections. This has included:

- presentations about RaaS to:
  - Brunel University’s ‘Smart Grid Operation and Management MSc module’ students, April 2024
  - the Energy Innovation Summit in Liverpool, 29 & 30 October 2024
    - RaaS and MultiResilience covered as part of the ‘Understanding and developing operational and technical resilience, to reduce outages and speed up restoration’ session, with the project team also participating in the conferences poster session for detailed questions and discussion
  - the Utility Week Forum in London, 19 & 20 November 2024
    - RaaS and MultiResilience covered as part of the ‘Leveraging energy flexibility to improve energy security’ session
- engagement with the ENA’s Open Networks team to provide more information on RaaS and discuss broader considerations around common approaches to flexibility procurement and considerations/distinctions for products such as RaaS, January 2024
- attendance at other external events to continue learning from, feeding into, and seeking synergies with other innovation projects and initiatives relevant to the future rollout of RaaS:
  - the ENA’s Open Networks Insights Forums, December 2023 & July 2024
  - Use Case Advisory Group meetings for National Grid ESO’s ‘Virtual Energy System’ project<sup>22</sup>, January, March & May 2024
  - National Grid ESO’s ‘Connections Reform Final Recommendations’ webinar, December 2023
  - Ofgem’s ‘Future of Distributed Flexibility (FoDF) Common Asset Registration for Flexibility Markets’ workshop, March 2024

<sup>20</sup> Ofgem published their decision to appoint Elexon as Market Facilitator in July 2024 - this creates a single entity responsible for standardising DSO markets and driving alignment between DSO and NESO flexibility markets to foster and manage local flexibility markets, [www.elexon.com/2024/07/29/elexon-appointed-as-the-market-facilitator-for-local-flexibility](http://www.elexon.com/2024/07/29/elexon-appointed-as-the-market-facilitator-for-local-flexibility)

<sup>21</sup> National Grid ESO’s [Connections Reform](#) project is working to address challenges and establish longer term changes to the connections process

<sup>22</sup> [www.neso.energy/about/our-projects/virtual-energy-system](http://www.neso.energy/about/our-projects/virtual-energy-system)

- Northern Powergrid's 'How to participate in Northern Powergrid's upcoming Spring tender' webinar, March 2024
- Edie.net's 'Combining battery storage and renewables on the path to net-zero' webinar, April 2024
- ACI's 'National Microgrids Online' webinar, October 2024
- Elexon's 'Market Facilitator Workshop 1', November 2024
- Regen's Electricity Storage Network Winter Conference 2024, November 2024
- CIRED's 'How are DSOs using flexibility to deliver the low-carbon energy transition now and in the future?' webinar, December 2024
- a series of bilateral supply chain stakeholder engagement events held to present and seek feedback on options and preferences around a commercial framework for the introduction and future roll out of RaaS, to feed into PD5 'Supply Chain Engagement - Commercial Framework', June 2024
- engagement with a consortium from NEDO (New Energy and Industrial Technology Development Organisation), Japan, to exchange knowledge and experience on technical and operational challenges associated with transition between grid connected and islanded modes, local black start, and requirements for microgrids<sup>23</sup> - following email contact a meeting between members of the consortium and RaaS project team was held in October 2024, also joined by industry colleagues from Northern Powergrid
- regular meetings with other network operators, including engagement with Northern Powergrid on development of their MultiResilience project<sup>24</sup>
- biannual Stakeholder Advisory Board meetings in March and November 2024 - board members comprise representatives from BEIS, Citizens Advice, ENA, National Grid ESO, Northern Powergrid, Ofgem, Scottish Government, Sustainability First

---

<sup>23</sup> the NEDO consortium includes TEPCO (Tokyo Electric Power Company), The Okinawa Electric Power Company, Mitsubishi and CRIEPI (Central Research Institute of Electric Power Industry) - the group are working to develop a microgrid and energy storage project, and made contact with SSEN Distribution having found contact details via the [RaaS](#) project website

<sup>24</sup> MultiResilience is a SIF (Strategic Innovation Fund) funded project being led by Northern Powergrid, [https://smarter.energynetworks.org/projects/npg\\_sif\\_013](https://smarter.energynetworks.org/projects/npg_sif_013)

## IPR

No relevant IPR has been generated or registered during this reporting period, with none anticipated to be generated or registered during the next reporting period.

## Risk Management

When preparing the Full Submission for RaaS, the team identified key project risks and defined strategic mitigation measures, as presented in Appendix 13 to the RaaS Full Submission Pro-forma.

As reported in the previous PPRs, following the successful NIC award and initiation of the RaaS project in early 2020, a workshop was held between key individuals from all project partners to define the risks and mitigation measures in more detail. This resulted in the creation of a detailed risk register which is now used as a live document for reviewing and addressing project risks on an ongoing basis.

Where necessary, significant risks are escalated to the Project Steering Board, to seek views and support as required.

The refined RaaS project risk register categorises risks as follows:

- Project Management
- Site Selection
- FEED
- Detailed Design
- Phase 2 Conclusions
- Market Design & Supply Chain Appraisal
- Trial Deployment
- Monitoring & Analysis of Trial Sites
- Knowledge Dissemination

The original Full Submission risk register is included as Appendix 2, and a snapshot of the refined risk register which is now used for ongoing project management is provided as Appendix 3.

## Material Change Information

During the previous reporting period a further Material Change request related to extended project timeframes was submitted to Ofgem in line with the 'Electricity Network Innovation Competition Governance Document v3.0', and this was approved in June 2024.

The revised PD submission dates are set out in the [Project Deliverables](#) section of this report, with a revised project completion date (as referenced in Section 7 'Project Implementation' of the Project Direction) of 30 June 2026. In accordance with paragraph 8.30 of the Electricity NIC Government Document the revised Project end date is no later than two years after the original Project end date.

## Accuracy Assurance Statement

### PPR Preparation Steps

The following steps have been used to prepare and ensure the accuracy of this report:

- Initial preparation and drafting by SSEN Distribution
- Review by the Project Delivery Board members
- Review by the Project Steering Board
- Standard SSEN Distribution internal review process, including Senior Managers and the Data Assurance and Regulation teams
- Approval by the SSEN Distribution Senior Manager responsible for the project

### Sign-off

As the senior manager responsible for the RaaS Project, I confirm that the processes in place and the steps taken to prepare this PPR are sufficiently robust and that the information provided is accurate and complete.



**Stewart A Reid**

Head of Future Networks

Scottish and Southern Electricity Networks

**Date 13/12/2024**

## Appendices

Appendix 1 - Project Bank Account (confidential)

Appendix 2 - Original Risk Register

Appendix 3 - Revised Risk Register

## Appendix 1 - Project Bank Account

Please see accompanying Appendix 1a and 1b files (confidential) - two statements are presented for this reporting period due to a change in account provider during the year.



## Appendix 2 - Original Risk Register

Risk ID	Risk Category	Date Raised	Risk Description	Impact	Probability of Risk Occurring	Project Impact if Risk Occurs	Expected Value for Each Risk
RRaaS001	Technical	01 July 2019	The project fails to deliver the expected financial and technical benefits expected.	Lower than expected value delivered	4	-5	-20
RRaaS002	Technical	01 July 2019	Significant involvement for single supplier of RaaS creates an uncompetitive market post-project.	After project is completed, the supply chain is not able to respond to the call for tender.	4	-5	-20
RRaaS003	Technical	01 July 2019	The project requirements and deliverables are ambiguous.	Requirements creep and loss of confidence will occur.	3	-4	-12
RRaaS004	Technical	03 June 2019	Circuits that require resilience are constrained such that the storage system providing resilience can't operate in different markets.	Cost of resilience can't be reduced to economically viable levels and traditional reinforcement is more economically viable.	3	-7	-21
RRaaS005	Technical	01 July 2019	The revenue generated from other markets by the RaaS provider fail to reduce the cost of resilience to an economical level.	The learning outcome that provision of market revenues and resilience are mutually exclusive.	3	-5	-15
RRaaS005 (sic)	Social	01 July 2019	Stakeholders develop inaccurate expectations.	Stakeholders will lose confidence in and support to project.	3	-5	-15
RRaaS006	Technical	01 July 2019	The RaaS solution, its design and implementation are more complex than first thought.	Application of RaaS is not feasible and project stops.	5	-5	-25
RRaaS007	Technical	01 July 2019	Suitable sites for the trials prove inadequate or are not available.	Costs increase, confidence lost and the project is delayed.	3	-5	-15
RRaaS008	Technical	01 July 2019	Integration of equipment and systems not achievable or takes longer than planned.	Costs increase and alternative funds required for the completion of the project.	4	-5	-20

Risk ID	Risk Category	Date Raised	Risk Description	Impact	Probability of Risk Occurring	Project Impact if Risk Occurs	Expected Value for Each Risk
RRaaS009	Political	01 July 2019	UK legislation changes forces project mandate, deliverables and requirements to change.	Project will be delayed or require re-scoping.	1	-3	-3
RRaaS010	Social	03 June 2019	Risk of outage during project demonstration is deemed unacceptably high.	If sensitive loads that can be not tolerated the demonstrations can't be carried out	1	-5	-5
RRaaS011	Economic	01 July 2019	Non-BAU technology proves to be more expensive than previously expected.	Project overspend requiring additional partner contribution or request to Ofgem for additional funding.	4	-5	-20
RRaaS012	Economic	01 July 2019	Lack of business support from partner organisations.	Intra organisational tensions increase causing delays or withdrawal from the project.	3	-4	-12

### Appendix 3 - Revised Risk Register

A snapshot of the project risk register is given below.

Revisions from the table provided the December 2023 PPR are shown in teal, including the addition of Risks 4i and 4b relating to difficulties with the availability of third party resources, and coordination of multiple suppliers and contractors on site, respectively.

Risk 07a has been added, reflecting the importance of third party contractor design and/or delivery quality on SSEN's siteworks for delivery of the trial scheme. This sits alongside Risk 06a associated with E.ON's project activities.

As PD5 has now been published Risk 25a relating to commercial strategy insight and engagement with the supply chain for PD5 has been closed, and Risk 25b related to the market and supply chain for future rollout of RaaS has been added.

Risk 31 has been revised to include reference to coordination of collaborative interface and interaction testing between multiple third party suppliers.

Risk 24b relating to the further Material Change request submitted to Ofgem has been closed as this was approved in June 2024, as set out in the **Material Change Information** section of this report. Risk 11 relating to Covid-19 risk has also been closed reflecting the wider social environment.

Risk ID	Risk Item	Potential Impact	Probability of Risk Occurring	Impact if Risk Occurs	Risk Rating	Mitigation / Contingency
<b>Project Management</b>						
02	Difficulties resourcing the RaaS project internally within the SSEN Future Networks team	Lack of sufficient input to the project results in the design & implementation of a system which does not fulfil the objectives of the RaaS concept, and/or results in the production of poor quality deliverables.	2	-3	-6	An SSEN Project Manager and Project Engineer have been assigned to the project. Detailed introduction and/or handover processes to be used to ensure continuity & consistency where new individuals join the project team.
03	Difficulties resourcing the RaaS project or ensuring consistency internally within Costain	Key members of the RaaS project team move on from Costain leaving knowledge gaps within the organisation.	2	-3	-6	Project team members will be expected to develop a broader understanding of the whole project rather than just their own role to ensure knowledge continuity should one member leave. Detailed introduction and/or handover processes to be used to ensure continuity & consistency where new individuals join the project team.

04	Difficulties resourcing the RaaS project or ensuring consistency internally within E.ON	Lack of key resources assigned to the project or key personnel changing rapidly leads to discontinuity of E.ON's work, delays and/or poor quality.	2	-3	-6	Project sponsored and support by Senior Management of each involved E.ON entity to ensure focus and consistency, with support committed via Collaboration Agreement. Management focus on continuity and detailed handover in case of changes in personnel, with internal documentation and knowledge management.
04i	Difficulties with availability of third party contractor resources	Industry workloads and availability of resources for design (electrical, civils, control systems, etc.), civils contracting, equipment manufacture, authorised supervision personnel, etc. lead to issues such as delay in tendering for subsequent contracts, missed production slots for equipment, timely commencement of site works in line with NIC project timeframes, etc.	4	-4	-16	RaaS Project Delivery Board to liaise closely with appointed and potential contractors/subcontractors for clear communication of timeframe requirements, early identification of any resourcing issues, assessment of the impacts of any potential delays on NIC project delivery, and collaboration in working to resolve issues. RaaS Project Delivery Board to communicate issues to the Project Steering Board as necessary. SSEN Project Manager to communicate issues to Ofgem.
04a	Lack of close programme management leads to issues with timely project delivery	The absence of detailed tracking of project activities & progress results in delays to the programme, impacts on the project team's ability to identify and resolve issues in a timely manner, and could harm the reputation of the project partners which may weaken future funding opportunities.	2	-3	-6	The Further Variation to the Collaboration Agreement, July 2023, identifies SSEN as the lead party for WP1 'Project Coordination' of NIC project delivery, and each project partner has responsibility for their own activities working collaboratively with the other partners. For delivery of the trial scheme CDM appointments have been made, and Project Managers specifically dedicated to the project partners' activities on site have been appointed.
04b	Difficulties with coordination of multiple suppliers and contractors on site	Delay in the timeframes of one party (particularly those relating to external factors outside contractual matters) have a resulting impact on the activities of other parties, potentially resulting in delays or preventing implementation of the trial scheme.	3	-4	-12	For delivery of the trial scheme CDM appointments have been made encompassing the entirety of works for delivery of the RaaS scheme (all contractors/subcontractors for DNO and BESS site works), and Project Managers specifically dedicated to the project partners' activities on site have been appointed. One overall programme representing all project partner and consultant delivery activities has been created by the Principal Contractor, as the basis for coordination of site activities, identification of overlap between different

						<p>contractors' activities, and assessment of potential impacts of delays affecting activities of another party.</p> <p>RaaS Project Delivery Board to maintain engagement with the project team for early identification of any coordination issues, assessment of the impacts of any potential delays on NIC project delivery, and collaboration in working to resolve issues.</p> <p>RaaS Project Delivery Board to communicate issues to the Project Steering Board as necessary.</p> <p>SSEN Project Manager to communicate issues to Ofgem.</p>
05	Difficulties with consultant/supplier recruitment for development & implementation of the DNO-side system architecture and control platform	The absence of a consultant/supplier with sufficient knowledge & expertise results in the design & implementation of a system which does not fulfil the objectives of the RaaS concept.	1	-4	-4	A supplier for development & implementation of the DNO-side system architecture and control platform has been appointed, with work progressing in close collaboration with SSEN and the wider project team.
06	Difficulties with supplier recruitment for the BESS & EMS system architecture and control platform	Inability to find suitable suppliers or to obtain quotes within budget results in delays, budget overruns and eventually the need to stop the project.	1	-4	-4	A supplier for the BESS & EMS system architecture and control platform has been appointed, with work progressing in close collaboration with E.ON and the wider project team.
06a	Issues with the quality of deliverables from consultant and/or suppliers related to E.ON project activities	A lack of quality or detail in material created by consultants or provided by suppliers results in delays to the project due to reworking, or the design & implementation of a system which does not fulfil the objectives of the RaaS concept.	2	-4	-8	<p>Undertake due diligence and detailed negotiations for e.g. the BESS MF/1 contact, with provisions to ensure quality and timely delivery.</p> <p>Work undertaken by consultants/suppliers/<b>contractors</b> will be closely tracked by E.ON to maintain focus, promote quality and ensure timely delivery.</p> <p>Material created by consultants or provided by suppliers will be reviewed by the project team <b>and/or be subject to standard E.ON approval processes where relevant</b>, prior to being finalised/accepted.</p>

						Any issues identified will be raised with the wider project team at the earliest opportunity, allowing evaluation of the potential impacts and resolutions.
07	Difficulties in obtaining support from SSEN resources in other areas of the business	Lack of support from relevant teams within SSEN results in the design of a system which does not adequately meet business requirements, or prevents/results in delays to implementation of the trial scheme.	3	-3	-9	<p>Early and ongoing engagement with the associated departments is critical to make them aware of the project, the requirements and the potential additional workload.</p> <p>Allowance has been made within the bid submission project budget to cover internal SSEN resourcing costs.</p>
07a	Issues with the quality of deliverables from consultant and/or suppliers related to SSEN project activities	A lack of quality or detail in material created by consultants or provided by suppliers results in delays to the project due to reworking, or issues during siteworks for delivery of the trial scheme.	2	-4	-8	<p>Undertake due diligence and detailed negotiations for all contracts placed in line with standard SSEN procurement processes.</p> <p>Work undertaken by consultant/suppliers will be closely tracked by SSEN to maintain focus, promote quality and ensure timely delivery.</p> <p>Material created by consultants or provided by suppliers will be reviewed by the project team and/or be subject to standard SSEN approval processes where relevant, prior to being finalised/accepted.</p> <p>Any issues identified will be raised with the wider project team at the earliest opportunity, allowing evaluation of the potential impacts and resolutions.</p>
08	Lack of budget to complete project and/or individual deliverables or over spend on budget	Over spend on any individual aspect(s) of the project could lead to a lack of funds across other activities to complete to work to the desired timeframes and standards. (references to Phases 1 & 2 removed)	4	-5	-20	<p>Regular review by the project partners of expected costs and expenditure against forecast to identify and understand any differences.</p> <p>Careful procurement processes to ensure quotes are acceptable against budget, inc. maintaining the distinction between Phase 1 and Phase 2 budgets.</p> <p>Work closely with project suppliers to identify any issues and avoid potential overspend.</p> <p>As quotes &amp; prices are being consolidated during Phase 2, project team to continue to review costs against budget, also review the scope of individual project partner</p>

						<p>milestone deliverables in light of learning from earlier stages of the project to ensure relevance and value, and present findings and other key considerations to the Project Steering Board for the board to make a decision on whether a) project budget is sufficient to proceed with the build phase and b) it remains appropriate to proceed in delivering value to the industry.</p> <p>Links to risk 9 and 26a.</p>
09	External contractors and/or equipment is more expensive than expected	If equipment is more expensive than expected, project may not be in a sufficient place to continue with plans.	5	-5	-25	<p>Develop a procurement plan that will allow equipment, specialist consultancy and additional support resources to be sourced in a cost effective way.</p> <p>Compare and review all quotes received in detail considering both capabilities/functionalities and costs.</p> <p>Phase 1 evaluated the potential costs of RaaS and reported these as part of the Stage Gate decision process - where costs were likely to be higher than expected at project initiation, this would have informed the decision as to whether or not to proceed to Phase 2 and implementation of RaaS at the selected trial site.</p> <p>As quotes &amp; prices are being consolidated during Phase 2, project team to continue to review costs against budget, also review the scope of individual project partner milestone deliverables in light of learning from earlier stages of the project to ensure relevance and value, and present findings and other key considerations to the Project Steering Board for the board to make a decision on whether a) project budget is sufficient to proceed with the build phase and b) it remains appropriate to proceed in delivering value to the industry.</p> <p>Links to risk 26a.</p>
10	Legislative, regulatory or trading issues are identified which present barriers to the application of RaaS	Legislation, regulatory or trading requirements or changes have practical, technical or cost implications for the application of RaaS in different locations.	1	-3	-3	<p>Monitor any proposed legislative changes, assess the potential impacts on project delivery and/or future roll out of RaaS, and provide input into any associated consultations.</p>

						Review the project scope if necessary, likewise revise the scope of individual project partner milestone deliverables in light of learning from earlier stages of the project to ensure relevance and value. Communicate issues to Ofgem and other industry forums as relevant.
11a	Impacts of geopolitical events on supply chains	Global political events have impacted supply chains and market prices resulting in: - extended supply chain delivery timeframes for the BESS and DNO equipment - increased equipment costs due to external market influences  Supplier delivery timeframes have implications for the completion of deliverables by project partners and/or submission of PDs to Ofgem.	5	-3	15	Undertake detailed contract negotiations for e.g. the BESS MF1 contract, with provisions around e.g. cost variations - necessary in the event that a variation is more than the project can afford.  Project team to track project progress closely to ensure early identification & assessment of the impacts of any potential delays on any aspect of the project programme, communicating these to the RaaS Project Delivery Board in a timely manner to maintain awareness and allow potential issues to be resolved in an acceptable way.  RaaS Project Delivery Board to communicate issues to the Project Steering Board and Stakeholder Advisory Board as appropriate.  SSEN Project Manager to communicate issues to Ofgem.
12	Changes to the political landscape (e.g. Brexit, trade deals)	Political changes may have implications for an international project consortium.	1	-3	-3	Collaboratively monitor the political landscape and raise news or issues which may impact the project with the project team.
<b>Site Selection</b>		With the completion of site selection process, and submission of PD1, all associated risks have been closed.				
<b>FEED</b>		With the completion and Peer Review of the FEED, and submission of PD1, all associated risks have been closed.				
<b>Detailed Design</b>		With the completion of the detailed technical design, and submission of PD2, all associated risks have been closed.				
<b>Phase 1 Conclusions</b>		With the completion of Phase 1 and the conclusions from the Stage Gate decision, the associated risks have been closed.				
<b>Phase 2 Conclusions</b>						
22a	Learning during Phase 2 indicates that the benefits of RaaS (including both improved resilience for the	An attractive proposition can't be offered to the market for BAU rollout of RaaS until	2	-5	-10	The project team will continue to review project findings to identify and understand ways in which the commercial model will be attractive to the DNO and supply chain, and communicate these with the Project Steering Board, the



	DNO and revenue stacking for the RaaS service provider) will be too low, or that the costs or risks will be too high	any barriers identified have been addressed.				<p>Ofgem Project Officer for the project, and all relevant external parties.</p> <p>The project will continue to explore options for how local resilience solutions could be best implemented to provide cost efficient improvement of customers' security of supply, with business case, use case, and commercial strategy considerations.</p>
23a	The BAU commercial model for RaaS is not sufficient to attract a supply chain for wider deployment across GB	An attractive proposition can't be offered to the market for BAU rollout of RaaS until any barriers identified have been addressed.	2	-5	-10	<p>The project team will continue to review project findings to identify and understand ways in which the commercial model will be attractive to the supply chain, and communicate these with the Project Steering Board, the Ofgem Project Officer for the project, and all relevant external parties.</p> <p>Stakeholder engagement has been used to inform development of a potential commercial framework for the introduction and future roll out of RaaS, as presented in PD5.</p> <p>Further stakeholder engagement will continue, to explore and refine commercial considerations and preferences with the potential supply chain in the context of wider industry changes.</p>
24a	Regulatory Sandbox support is not granted by Ofgem, or subsequent discussions with National Grid ESO and SSEN Transmission don't result in the identification of means to utilise short, limited 'windows of opportunity' to export to grid at times which would avoid any risk of constraints on the transmission system	In the event that Sandbox support is not available, or agreement can't be reached with National Grid ESO or SSEN Transmission, the extent to which the trial system can be demonstrated will be reduced, impacting the learning that can be obtained to improve confidence in this as a new service for network operation.	3	-3	-9	<p>Continue engagement with Ofgem, National Grid ESO and SSEN Transmission to answer questions and respond to requests for further information.</p>

Market Design & Supply Chain Appraisal						
25b	Service provider business case and commercial considerations associated with RaaS do not align well with wider markets	Market/value propositions are limited, thereby impacting the potential future roll out of RaaS as a solution for electricity network resilience.	2	-3	-6	The project team will continue to consider proposals for the RaaS commercial strategy and product design, and engage with supply chain stakeholders on factors that enhance the attractiveness of RaaS to service providers, building on the commercial framework presented in PD5 and in the context of wider industry and flexibility market developments.
Trial Deployment						
26	Delays in obtaining all permits / licenses / authorisations required for construction (inc. civils)	Not possible to commence construction within the timeframes set out in the project programme.	3	-3	-9	Monitor and report to the PSB any effects on the programme.
26a	Issues with the application of RaaS at the trial site become apparent following commencement of Phase 2 of the project	Deployment of RaaS at the planned trial site is impacted, e.g. requires significant re-work of the detailed design, requires significant supporting activities (e.g. civils works, etc.), constrains or prevents comprehensive demonstration of the RaaS concept in full during the project trial period, or delays delivery of PDs beyond the 12 months acceptable within the NIC governance terms.	5	-4	-20	<p>Issues identified since commencement of Phase 2 include:</p> <ul style="list-style-type: none"> <li>- BESS costs, equipment price volatility, equipment delivery timeframes, availability of skilled &amp; qualified resources</li> <li>- delays to project delivery &amp; submission of PDs beyond 12 months necessitating Material Change requests</li> <li>- generation constraints at transmission level &amp; associated connection queue</li> <li>- potential import constraints at distribution level</li> </ul> <p>Project partners to communicate any issues identified at the earliest opportunity, and to work collaboratively to seek solutions and/or alternative options.</p> <p>Issues to be raised with the Project Steering Board as necessary, with project plans and costs vs budgets reviewed to ensure that the project continues to represent value for NIC funding and that it is appropriate to proceed/continue with construction &amp; delivery of the trial site.</p> <p>Issues or concerns regarding project plans and/or resources to also be raised with the Stakeholder Advisory Board and Ofgem in a timely manner.</p>

27	Delays in meeting regulatory obligations / legislative requirements for construction (inc. civils)	Not possible to commence construction within the timeframes set out in the project programme.	3	-3	-9	Monitor and report to the PSB any effects on the programme.
28	Ecology surveys identify protected species, e.g. badgers, bats, great crested newts, etc.	Not possible to commence construction within the timeframes set out in the project programme.	3	-3	-9	Monitor and report to the PSB any effects on the programme.
29	Third parties (e.g. the local Fire Service) raise concerns regarding fire safety related to the BESS	Not possible to commence construction or operation within the timeframes set out in the project programme.	3	-3	-9	Monitor and report to the PSB any effects on the programme.
30	Delays in shipping & delivering equipment	Not possible to commence construction or operation within the timeframes set out in the project programme.	3	-3	-9	Monitor and report to the PSB any effects on the programme.
30a	Security of equipment storage	Loss of equipment and tools could impact delivery timescales (and potentially project costs), particularly for items with long lead times.	3	-3	-9	Undertake security risk assessments for all potential storage locations, select appropriate storage site, and implement relevant control measures.
30b	Weather during construction phase	Poor weather conditions (e.g. rain, wind, snow, ice, fog) could impact delivery or construction works through delay due to e.g. - adapting work plans to ensure safety - lack of suitable conditions for site work activities (e.g. concrete pouring, batteries to be unpacked in a dry conditions) - damage to equipment	5	-5	-25	Review long range weather forecasts regularly and evaluate potential impacts to planned activities, adapting the programme accordingly. Implementing appropriate measure to maintain a safe working environment (e.g. temporary/task lighting). Undertake regular POWRA (point of work risk assessments) and adapt plans to changing weather and environmental conditions.
30c	Flood risk	Flooding impacts construction (resulting in delays and/or re-work) or operation of the trial scheme.	2	-5	-10	Ensure BESS equipment sits above the flood risk level, whether through a thicker concrete platform for the containers or with the containers on stilts. As a minimum ensure that the floor level of the containers matches the level of the existing switchgear building base.

30d	Remote location with seasonal tourism	Seasonal availability and demand impacts such things as accommodation options (e.g. accommodation booked up during the tourist season, accommodation and dining options closed out of season) and travel arrangements/parking options for those working on site.	3	-3	-9	Book accommodation and travel at earliest date possible. Look into options for parking arrangements.
30e	CDM roles not clearly defined or understood throughout the different stages of delivery	Lack of clarity of roles results in e.g.: - potential injury to people - conflicting plans - delay to programme - damage to equipment	3	-3	-9	For delivery of the trial scheme a single CDM site has been established, with CDM appointments made encompassing the entirety of works (all contractors/subcontractors for DNO and BESS site works).
31	Delays in testing, installation or commissioning of each aspect of the RaaS system, including coordination of collaborative interface and interaction testing between multiple third party suppliers	Not possible to commence operation within the timeframes set out in the project programme.	3	-4	-12	Track project progress closely to ensure early identification & assessment of the impacts of any potential delays on any aspect of the project programme, communicating these to the RaaS Project Delivery Board in a timely manner to maintain awareness and allow potential issues to be resolved in an acceptable way. RaaS Project Delivery Board to communicate issues to the Project Steering Board and Stakeholder Advisory Board as appropriate. SSEN Project Manager to communicate issues to Ofgem.
32	Issues in scheduling outages in conjunction with the relevant SSEN teams	Delays to scheduling outages for installation & commissioning mean that it is not possible to commence operation within the timeframes set out in the project programme.	3	-3	-9	Existing SSEN processes to request staff / outages via the Control Centre. Long term planning of the tasks required with early engagement to the various departments involved, and backup plans identified should the outages be cancelled due to storms / faults, etc.
33	Issues in arranging a temporary diesel generator to supply power to customers during the	Delays to commissioning mean that it is not possible to commence operation within the timeframes set out in the project programme.	3	-3	-9	Existing SSEN processes to arrange temporary diesel generation. Long term planning of the tasks required with early engagement to the various departments involved, and

	commissioning & live testing period					backup plans identified should the availability of temporary generation be delayed due to storms / faults, etc.
33a	Issues in arranging loadbanks for system commissioning (and potentially for trial operation)	Delays to commissioning mean that it is not possible to commence operation within the timeframes set out in the project programme.	2	-3	-6	Long term planning of the tasks required with early engagement with potential hire companies.
34	Available equipment cannot meet the required specifications	Inability to source equipment suitable for the application of RaaS in accordance with design and specifications impedes full implementation or indicates that RaaS is not a viable solution at present.	3	-4	-12	Two step design process implemented to ensure high quality of design and continuous alignment between SSEN, E.ON and equipment suppliers. Final design specified in cooperation with equipment suppliers to ensure equipment is able to meet specifications. Continuous due diligence from review processes within project partners and wider market.
35	Risk of damaging network assets	Application of the RaaS system results in damage to network assets which has implications for customer supplies, repair costs and/or project delivery.	3	-4	-12	Phase 1 design work must develop a comprehensive understanding of the potential risks to network assets to identify appropriate and cost effective mitigation measures. In the event of a high level of risk, communicate this to inform the Stage Gate decision process and do not proceed to Phase 2 if the risk is unacceptably high. Once installed, closely monitor the trial system during operation and if any issues are identified immediately cease trial operation, investigate, and only re-commence trial operation once the issue is understood and resolved.
36	Risk of customer interruptions	Application of the RaaS system results in an unforeseen operational situation which affects customer supplies.	3	-4	-12	Phase 1 design work must develop a comprehensive understanding of the potential risks to security of supply to identify appropriate and cost effective mitigation measures. In the event of a high level of risk, communicate this to inform the Stage Gate decision process and do not proceed to Phase 2 if the risk is unacceptably high. Once installed, closely monitor the trial system during operation and if any issues are identified immediately cease trial operation, investigate, and only re-commence trial operation once the issue is understood and resolved.

37	Risk of power quality problems	Application of the RaaS system results in an unforeseen operational situation which affects customer supplies.	3	-4	-12	<p>Phase 1 design work must develop a comprehensive understanding of the potential risks to power quality to identify appropriate and cost effective mitigation measures.</p> <p>In the event of a high level of risk, communicate this to inform the Stage Gate decision process and do not proceed to Phase 2 if the risk is unacceptably high.</p> <p>Once installed, closely monitor the trial system during operation and if any issues are identified immediately cease trial operation, investigate, and only re-commence trial operation once the issue is understood and resolved.</p>
38	Operational Safety Processes & Procedures are not understood or complied with	Significant safety implications for staff and contractors.	4	-5	-20	<p>Follow all relevant Operational Safety Processes &amp; Procedures.</p> <p>Ensure appropriate PPE is worn.</p> <p>Ensure that all consultants and contractors involved with the project are aware of SSEN safety requirements.</p> <p>Continue to reinforce the safety message, including:</p> <ul style="list-style-type: none"> <li>- check that all those on site understand their roles, and the level of supervision required</li> <li>- ensure that all Permits-to-Work are comprehensive, complete and communicated to the working party</li> <li>- remind the Senior Authorised Person re appropriately challenging the knowledge, understanding and competence of all Persons in the Working Party</li> <li>- remind the members of the Working Party to challenge anything they believe to be unsafe and use Operational Safety Rule 1.7 if necessary</li> <li>- undertake site audits, including questions about electrical aspects</li> <li>- ask to see safety docs, and ask questions about people’s understanding of the material and whether they have any concerns</li> <li>- if it’s not safe, we don’t do it</li> </ul>

39	Operational staff are unfamiliar with new substation/network operating arrangements	Lack of awareness of processes and responsibilities leads to safety risks and/or issues with network operation affecting customer supplies and/or assets.	4	-4	-16	Training and briefings to be provided to all relevant individuals (as identified by senior managers), with new procedures/processes/technical guides created and issued where necessary.
<b>Monitoring &amp; Analysis of Trial Sites</b>						
40	Inconsistent or insufficient data available to complete suitable analysis	Lack of data means that the project cannot draw robust conclusions or make recommendations regarding the wider application of RaaS, resulting in poor quality deliverables submitted to Ofgem and shared with other DNOs.	3	-3	-9	<p>The project will use existing data capture systems and install monitoring equipment as required to capture relevant data.</p> <p>When scoping deliverables and/or commissioning work from external parties, include tasks which focus specifically on monitoring and data collection requirements.</p> <p>Good practice in trial design regarding number of trial events, including the planned ~2 month commissioning period with customers supplied by a diesel genset to allow network faults to be replicated and assess the RaaS response.</p> <p>Data will be reviewed at multiple points throughout the project to ensure suitable data is being captured.</p> <p>Incorporate clauses relating to data monitoring requirements within the revisions to the CA.</p>
41	Monitoring equipment cannot be installed within timeframes that coincide with commencement of the project trials	Delays to data collection capabilities impact the trial schedule and subsequent activities.	3	-3	-9	Early identification of the requirements for monitoring equipment and timely procurement activities, accessing additional resource if necessary.
42	Failure in data management system or loss or corruption of data	Lack of data means that the project cannot draw robust conclusions or make recommendations regarding the wider application of RaaS, resulting in poor quality deliverables submitted to Ofgem and shared with other DNOs.	2	-3	-6	<p>Existing SSEN &amp; E.ON data storage and back up systems.</p> <p>Good practice in trial design regarding data collection and information security.</p> <p>The trials will be designed to include a number of trial events over a suitable period of operation to provide data for analysis even where there is a failure in data collection for some events, and data will be stored via SEPD's existing</p>

						<p>data storage and security systems and processes or using approved alternative systems.</p> <p>Incorporate clauses relating to data monitoring requirements within the revisions to the CA.</p>
<b>Knowledge Dissemination</b>						
43	Insufficient engagement with external stakeholders	Failure to engage with relevant stakeholders may affect potential market. This could also have repercussions during procurement stages of the project.	2	-3	-6	<p>Identify all relevant stakeholders and create a stakeholder engagement plan which identifies what is relevant to each stakeholder and the best approaches to use when seeking their views.</p> <p>Continue to adapt and refine the stakeholder engagement plan in light of project learning and in response to wider industry developments.</p>
44	Insufficient project dissemination activities	By failing to disseminate project information the project will not be publicised and the potential impact of the project would be reduced.	2	-3	-6	<p>Identify all suitable routes for disseminating project activities and carefully tailor what's presented to suit the different audiences and hold their interest.</p>
45	Inadequate quality of Project Deliverables, Project Progress Reports or the Closedown Report	Submission of poor quality formal deliverables to Ofgem could harm the reputation of the project partners and may weaken future funding opportunities.	2	-3	-6	<p>Previous examples of project deliverables to Ofgem, Project Progress Reports and Closedown Reports are available as a guide to what is expected and required.</p> <p>SSEN has established peer review processes for innovation project deliverables to be submitted to Ofgem, which will apply to the RaaS project.</p> <p>SSEN will also ensure that sufficient time is incorporated into the project programme for the review of project deliverables by project partners prior to the SSEN internal review process.</p>