

Project Progress Report 2022



Document Control

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Version Control

Version	Date	Owner	Status
1.0	15/12/2021	Ben Clague	Final version for submission following internal SSEN review and sign-off

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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 procured from a local Battery Energy Storage System together with local Distributed Energy Resources.

The key benefits of this approach in providing cost effective local network resilience will include an improved service to customers, together with a lower carbon solution than the conventional option of transporting a temporary diesel generator to site.

The project is a partnership between Scottish and Southern Electricity Networks (SSEN), E.ON and Costain, and has been awarded funding of £10.9m through Ofgem's Network Innovation Competition (NIC).

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 with the deployment and operation of a RaaS system at Drynoch primary substation for a trial period of up to two years.

Overall Project Progress

The project commenced in early 2020 and this Project Progress Report covers the third reporting period from December 2021 to December 2022.

Key achievements during the reporting period include:

- submission of Project Deliverable 3 (PD3) 'Business Model'¹ which introduces the work undertaken to provide an assessment of the business case for RaaS from a DNO's perspective, evaluate the investment business case from a RaaS Service Provider's perspective, and review the potential Heads of Terms associated with a RaaS solution
- conclusion of the project Stage Gate review process which resulted in the decision to proceed to the second phase of the project with demonstration of RaaS at the proposed trial site of Drynoch primary substation on Skye²
- submission of Project Deliverable 4 (PD4) 'Stakeholder Engagement & Stage Gate Decision'³, which describes the Stage Gate review process and the approach taken to allow the Project Steering Board to make a decision on the second phase of the project
- negotiation, agreement and signing of a Variation to the Collaboration Agreement for Phase 2 of the project, to incorporate additions and amendments relevant to the delivery of the second phase of the project and implementation of the planned trial scheme

¹ PD3 'Business Model', <https://ssen-innovation.co.uk/wp-content/uploads/2022/01/RaaS-PD3-Overview.pdf>

² the trial site selection process is documented in RaaS E2a.1 'Site Selection Report', E.ON, February 2021

³ PD4 'Stakeholder Engagement & Stage Gate Decision', <https://ssen-innovation.co.uk/wp-content/uploads/2022/02/RaaS-PD4-Overview.pdf>

- engagement with the local authority for Drynoch, including submission of a Pre-application enquiry to understand the information that would be required for a full planning application to construct the RaaS trial scheme on land adjacent to the Drynoch primary substation compound
- commencement of the BESS tender process, building on the Request for Information (RfI) and Request for Proposals (RfP) processes used by E.ON to engage with potential BESS suppliers when developing the detailed design for the trial solution
- commencement of the DNO side equipment tender process using SSEN's standard procurement processes and with support from associated design and operational technology colleagues
- completion of a ground investigation and topography survey of land adjacent to the Drynoch primary substation compound to provide information to support a decision on the preferred location of the BESS trial scheme and associated civils works
- submission of a Material Change request to Ofgem regarding an extended project timeline and revised dates for submission of the remaining Project Deliverables and project completion, as described in the **Material Change Information** section of this report
- submission of a regulatory Sandbox application⁴ to Ofgem, in recognition of the fact that the conventional new connection assessment process presents issues for the installation of a BESS of the size planned, for the RaaS trial scheme at this point in time due to existing network constraints
 - Sandbox support which offers capability to demonstrate the RaaS concept in full 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
- review of the costs quoted through the tender processes, together with review of the scope of planned project partner milestone deliverables to reflect learning from the first phase of the project and ensure continued relevance, allowing the available project budget to be evaluated

The review of the project budget is important due to the current global political situation and its impact on market prices for materials, equipment, etc. The project team continue to keep this under consideration as information from potential suppliers is provided, and to communicate with both the Project Steering Board and Ofgem Project Officer for RaaS, to ensure that the project has sufficient funds to progress with the build phase and that it remains appropriate to proceed.

Key Challenges Encountered

Key challenges encountered during the reporting period include:

- extended supply chain delivery timeframes for the BESS and DNO equipment - the impact of the global political situation on supply chains and delivery timeframes has resulted in quoted delivery dates that are notably longer than the expected timeframes built into the original project programme
- increased costs and price volatility for key items of equipment - again, the impact of the current situation on material and equipment prices has resulted in quotes higher than originally budgeted for, with certain material costs also being indexed linked

⁴ 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

- issues related to grid connection - it became apparent through conversations regarding the BESS connection application for the trial scheme that constraints at transmission system level are currently holding up the connection of new generation at distribution level, and that the modelling undertaken when assessing the capacity available for new connections to the distribution network indicates that under certain operational conditions related to the wider network loading profile, the level of demand (import) or generation (export) that could be accommodated by the distribution network at the site would be limited - with this, conventional new connection assessment processes present issues for the installation of a BESS system of the size planned for the RaaS trial, also it would not be possible for the RaaS BESS to receive a standard generation connection ahead of prior applicants currently awaiting a generation connection
- prolonged procurement processes - identifying a need for further information (e.g. ground investigation surveys) when forming requirements to issue the tender for BESS scheme procurement, together with time necessary for detailed engagement with potential suppliers (including supplier modelling work) when evaluating proposals, have acted to improve cost estimates and reduce associated uncertainty and risk (including the risk of significant cost variance during construction), however have added time to the procurement processes

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. As these are completed, they are being published on the project website - 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:

- issuing of a RaaS press release 'Green light for project to trial low carbon energy network resilience' noting the decision to progress Phase 2 of the project, in January 2022
- an interview with Utility Week on electricity networks' responses to extreme weather events, which contributed to the article 'The eye of the storm: How technology can supercharge utilities', April 2022
- holding the biannual RaaS Stakeholder Advisory Board meetings
- presentations about RaaS, including learning from the first phase of the project, at a varied range of relevant external events
- participation in other external events to continue learning from and seeking synergies with other innovation projects and initiatives
- regular meetings with other DNOs and National Grid ESO, specifically the Distributed ReStart project team

Alongside the industry focused engagement detailed above, during this reporting period the project has received responses to the SSEN Community Survey issued in December 2021 to customers connected to the electricity grid served by Drynoch primary substation. This survey introduced SSEN's role as a Distribution Network Operator, provided information on the RaaS project, explained the purpose of the survey, and set out a series of questions regarding the impact of power cuts and potential benefits of enhanced network resilience.

The 115 responses received have been used to inform the project Stage Gate decision and decisions regarding the implementation of RaaS, with support for proceeding with the trial being strongly positive.

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

Project Manager's Report

Project Summary

The Resilience as a Service (RaaS) Network 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 uses services provided by a Battery Energy Storage System (BESS) together with local Distributed Energy Resources (DER) to swiftly, automatically, restore power to customers in the event of a fault (illustrated in Figure 1). Through temporary operation of the network in islanded mode⁵, RaaS bridges the period required for a DNO to repair the fault or to dispatch a conventional diesel generator to site for a longer-term issue.

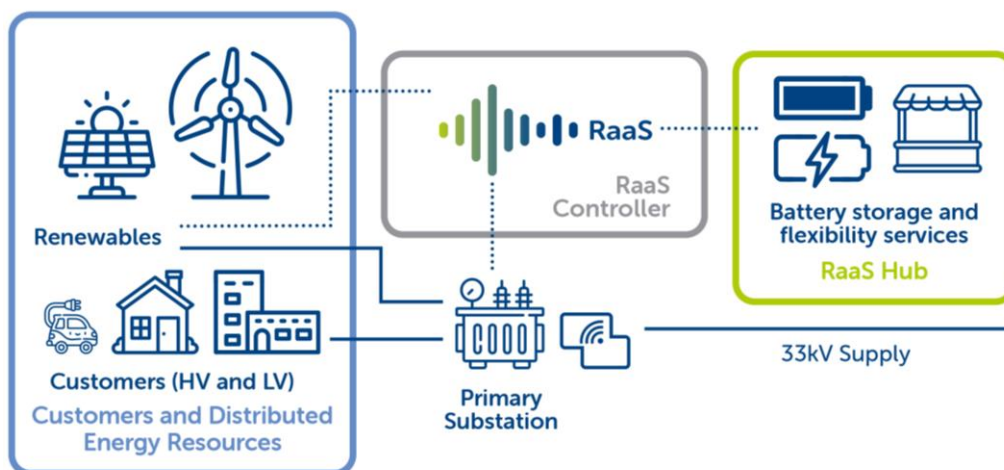


Figure 1 - Topology of the Primary RaaS solution

The RaaS concept would deliver low carbon, cost effective network resilience to improve security of supply for communities in areas susceptible to power outages, supporting the UK's transition to Net Zero. The project is a partnership between SSEN, E.ON and Costain, and has been awarded funding through Ofgem's Network Innovation Competition (NIC).

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 (RSP) 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. 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 in January 2022 to proceed with the deployment and operation of a RaaS system at the Drynoch primary substation site for a trial period of up to two years.

Project Management

The project team have continued with the thrice-weekly 'stand-up' meetings which have supported an efficient decision-making environment where progress and emerging issues are shared and actioned quickly.

⁵ in islanded mode, an area of the network is disconnected from the main electricity grid and operates independently

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, Minginish Community Council, National Grid ESO, Northern Powergrid, Ofgem, Scottish Government, Sustainability First.

The fourth Stakeholder Advisory Board meeting was held in June 2022, with the next meeting to be held following the submission of this Project Progress Report.

Key Challenges Encountered

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

- impacts on the supply chain due to the current global political situation
 - extended supply chain delivery timeframes for the BESS and DNO equipment
 - increased costs and price volatility for key items of equipment
- prolonged procurement processes
- issues related to grid connection

These factors are being closely evaluated and managed by the project team, and considered in detail by the Project Steering Board.

Impacts on the supply chain due to the current global political situation

The impact of the global political situation on supply chains and delivery timeframes has resulted in quoted delivery dates for the BESS and DNO equipment that are notably longer than the expected timeframes built into the original project programme. Further, the impact on material and equipment prices has resulted in quotes higher than originally budgeted for, with certain material costs also being indexed linked.

Prolonged procurement processes

Identification of the need for further information (e.g. ground investigation surveys) when forming requirements to issue the tender for BESS scheme procurement, and the time necessary for detailed engagement with potential suppliers (including supplier modelling work) when evaluating proposals, have acted to improve cost estimates and reduce associated uncertainty and risk, however have added time to the procurement processes.

Grid connection

It became apparent through conversations regarding the BESS connection application for the trial scheme that constraints at transmission system level are currently holding up the connection of new generation at distribution level. It is understood that at present a queue of over 130 MW of generation is waiting to connect to the Dunvegan distribution network, which serves Drynoch primary substation and the wider network area. 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 an Ofgem Initial Needs Case consultation concluded earlier this year⁶.

Further, the modelling undertaken when assessing the capacity available for new connections to the distribution network indicates that under certain operational conditions related to the wider network loading profile, the level of demand (import) or generation (export) that could be accommodated by the distribution network for a BESS installation at this location would be limited.

Given the size of the system planned for the RaaS trial⁷, conventional new connection assessment processes would therefore present issues for the installation of the project demonstration scheme at Drynoch, also it would not be possible for the RaaS BESS to receive a standard generation connection ahead of prior applicants currently awaiting a generation connection.

Activities to address these challenges

As it became clear that the combination of prolonged procurement engagement processes and extended equipment delivery timeframes, following on from initial delays associated with the COVID-19 pandemic as reported in the 2020 & 2021 PPRs, will delay the achievement of the remaining Project Deliverables and the Project end-date by more than one year, in line with NIC project governance⁸ a Material Change request has been submitted to Ofgem, as set out in the [Material Change Information](#) section of this report.

⁶ [Isle of Skye project - Initial Needs Case consultation](#) - the Skye 132 kV Reinforcement project would replace the existing single 132kV overhead line spanning 160km between the Fort Augustus 400kV substation on the mainland to Ardmore on the Isle of Skye, at the time of consultation the estimated completion date would be mid-2026

⁷ The scheme planned for the RaaS trial would have 3 MWh capacity battery with nominal/continuous power output of 3 MW, which is sized to provide a suitable resilience response when operating in islanded mode. The system will also incorporate inverters that have a power rating of 6 MVA to allow the BESS to provide up to 6 MW of fault current for 3 seconds when required, as the modelling work undertaken during Phase 1 of the project demonstrated that this fault current capability is necessary for the existing network protection schemes at Drynoch to operate safely in islanded mode (i.e. with the network protection schemes responding to issues as they would during normal grid connected operation). These battery sizing requirements are directly linked to the approach to be trialled through the RaaS innovation project, however conventional new connection assessment processes present issues for the installation of a system of this size at this point in time because of the network constraints and how associated assessments (distribution and transmission level) consider overall/rated capacity.

The costs quoted through the tender processes, also the scope of the planned project partner milestone deliverables with consideration to learning from the first phase of the project, are under review to allow the available project budget to be evaluated. The project team continue to keep this under consideration, and to communicate with both the PSB and Ofgem Project Officer for RaaS.

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 has been submitted to Ofgem.

If granted, Sandbox support would allow the project team to explore new approaches for managing import and export to operate the scheme within current network capacity limits, working with SSEN Transmission and National Grid ESO.

A limited and managed connection working within agreed parameters will be beneficial to the project for trial purposes, allowing demonstration of the RaaS concept during short intervals over the course of the trial period, and avoiding periods when there are risks of constraints on the transmission or distribution systems.

RaaS Work Packages

The project has been divided into 8 Work Packages (WP) which are summarised in Table 1. A brief description of each Work Package is given below together with an update on the progress of each to date. A fuller description of the tasks performed to date can be found in the Progress Against Plan section of this report.

Table 1 - Overview of the RaaS Work Packages

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

WP1 - Project Coordination

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

The project team have continued with three shorter, agile, 'stand-up' meetings each week which cover discussion of current and upcoming tasks, progress against plan, potential risks, and any additional points identified. The project has also hosted four quarterly and two intervening Project Steering Board meetings, and two Stakeholder Advisory Board meetings over this reporting period.

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

⁸ the definition of a Material Change requiring Ofgem's approval is provided in Appendix 1 and associated Section 8.23 of Ofgem's 'Electricity Network Innovation Competition Governance Document v3.0', 30 June 2017

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 includes the 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 & responsibilities. Plans have also been drawn up for the various stages of testing required during development and commissioning of the RaaS scheme.

To support the design work, E.ON engaged with potential BESS equipment suppliers, issuing a Request for Information (RfI), Request for Proposals (RfP), and high-level Request for Quotations (RfQ) documents. This work provided the basis for the full BESS tender process which forms part of WP7.

WP4 - Planning for Operational Commercial Optimisation

WP4 developed operational schedules for the BESS which optimise the provision of RaaS and participation in other flexibility markets. This included defining three scenarios for the design of the RaaS product (representing different levels of granularity in RaaS service level requirements), and modelling participation of the headroom battery capacity in a range of other markets and flexibility services to evaluate the potential income from other revenue streams. The different scenarios explored the implications of reserving different levels of battery capacity to provide RaaS service, and this work then informed the business modelling activities within WP5.

The conclusions from the first phase of the project will be further explored alongside operation of the RaaS trial scheme.

WP5 - Business Model

WP5 brought together the technical design, the product design scenarios, the optimised operational schedules and stakeholder input to consider the business model for potential RaaS suppliers. This included an investor business case (IBC) for RaaS providers, and an Investor Risk Evaluation which was informed by engagement with different potential investor types to ensure stakeholder views were represented.

Again, findings and conclusions from this work will be reviewed and refined during the second phase of the project.

WP6 - Supply Chain Engagement

The objective of WP6 is to ensure that RaaS is scalable from a single pilot scheme into business as usual (BAU) across all suitable GB DNO sites. WP6 aims to support development of broad and vibrant competition in the supply chain for the provision of RaaS, supporting efficient and cost-effective application of RaaS, allowing the benefits to customers to be fully realised.

Building on the engagement undertaken during Phase 1, a number of WP6 deliverables will be completed during the second phase of the project and will feed into PD5 'Supply Chain Engagement', which is due to be submitted in April 2024.

WP7 - Demonstration Site Construction and Optimisation

WP7 comprises the procurement, construction, installation and commissioning of a RaaS system at the Drynoch primary substation trial site, with detailed testing and a live operational period of up to 2 years.

This work commenced following the positive Stage Gate decision, with initiation of the full tender processes for the BESS and DNO side equipment.

The key challenges experienced over this reporting period, as set out above, have each related 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:

- issuing of a RaaS press release ‘Green light for project to trial low carbon energy network resilience’ noting the decision to progress Phase 2 of the project, in January 2022 - this was issued to a variety of media outlets including Utility Week, The Energyst, Current News, Energy Live News and Electric Energy Online, and also shared via project partner websites and social media pages such as LinkedIn and Twitter
 - www.current-news.co.uk/news/battery-storage-to-boost-rural-energy-resilience-in-ssen-pilot-scheme
 - <https://utilityweek.co.uk/innovation-round-up-spring-launches-innovation-challenge-ssen-and-eon-resilience-as-a-service-pilot>
 - <https://utilityweek.co.uk/ssen-and-eon-to-pilot-resilience-as-a-service-project>
- an interview with Utility Week on electricity networks’ responses to extreme weather events, which contributed to the article ‘The eye of the storm: How technology can supercharge utilities’, April 2022
 - <https://utilityweek.co.uk/the-eye-of-the-storm-how-technology-can-supercharge-utilities-responses-to-extreme-weather>
- presentations about the RaaS project to:
 - the Utility Week Live event in Birmingham, May 2022, during a session on ‘Delivering smart energy networks: the DSO transition and local flexibility’
 - the Energy Forecasting Innovation Conference at Kings College London, May 2022
 - the 3rd Grid-Scale Battery Storage 2022 conference, June 2022
 - SSEN & UKPN’s innovation partnership event ‘Creating Better Networks’, IET London, July 2022
 - the International Community for Local Smart Grids (ICLSG) Monthly Partner Meeting, September 2022 - ICLSG partners present included representatives from the University of Oxford (UK), Ausgrid (Australia), CORENA (Australia), Enel Foundation (Italy), ESB Networks (Ireland), Oxford Low Carbon Hub (UK), TEPCO Power Grid (Tokyo Electric Power Company (Japan), WEL Networks (New Zealand)
 - <https://communitysmartgrids.org>
- contributing to a research discussion with the University of Oxford in relation to their first ICLSG research topic ‘Network Resilience’, July 2022; with subsequent participation in their ‘Technical Meeting on Open Challenges for Network Resilience’ event to inform development of the associated report, November 2022
- participation in other external events to continue sharing thoughts, learning from and seeking synergies with other innovation projects and initiatives by attending:
 - T&D World’s ‘Reimagined Microgrids’ webinar, March 2022
 - National Grid ESO’s Distributed ReStart project ‘The Demonstration Stage’ webinar, May 2022
 - SSEN Future Network’s ‘Our plans for Flexibility Services and how to get involved’ webinar, July 2022
 - a visit to the HVDC Centre for testing of the Distributed ReStart DRZ Controller, Cumbernauld, August 2022

- the Energy Institute’s Powering Net Zero breakfast briefing ‘The value of system services - what does it mean for a net zero system?’, September 2022
- the Energy Innovation Summit (the ENA’s annual innovation event), Glasgow, September 2022
- GridCell’s ‘Community Energy Trading’ project workshop, October 2022
- a Resilience & Microgrids call with Ausgrid following the prior ICLSG Monthly Partner Meeting presentation, October 2022
- National Grid ESO’s Distributed ReStart project Closedown Event, November 2022

Alongside the industry focused engagement detailed above, during this reporting period the project has received responses to the SSEN Community Survey issued in December 2021 to customers connected to the electricity grid served by Drynoch primary substation. This survey introduced SSEN’s role as a Distribution Network Operator, provided information on the RaaS project, explained the purpose of the survey, and set out a series of questions regarding the impact of power cuts and potential benefits of enhanced network resilience. The questions presented were relevant to inform the development of RaaS and to make sure that what’s proposed through the project is beneficial to customers and well designed for use at different network locations across Great Britain.

The 116 responses received (110 by post, 6 online) have been used to inform the project Stage Gate decision and decisions regarding the implementation of RaaS. Table 2 indicates that support for proceeding with the trial is strongly positive. Of the two negative responses received to this question, the sole comment provided raised a concern around visual intrusion from construction of the battery.

The project team reiterate thanks to Minginish Community Council and Skye Climate Action for their support in both formulating the survey and identifying the most effective means of reaching customers to provide information on RaaS and promote participation.

Table 2 - Responses to RaaS Community Survey question regarding the trial phase of the project

Q8 Are you generally supportive of the project going ahead with developing and trialling a RaaS scheme ?	
Yes	81%
No	2%
not sure / don’t mind	17%

The responses to the Community Survey and the useful and highly positive feedback from the four Stage Gate Stakeholder Consultation events undertaken in the previous reporting period are presented in PD4 ‘Stakeholder Engagement & Stage Gate Decision’.

Outlook for Next Reporting Period

Early into the next reporting period decisions are expected from Ofgem regarding both the NIC Material Change request, which is required to acknowledge acceptance of the revised project timeline, and the regulatory Sandbox application, with the outcome from the Sandbox application then influencing further discussions and decisions regarding the BESS connection.

The project team also continue to keep the budget under close review to ensure that the project has sufficient funds to progress with the build phase and that it remains appropriate to proceed.

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

- supplier appointment for the RaaS BESS and EMS
- assembly, development and testing of the technical scheme for RaaS
- commencement of installation and commissioning of the trial scheme at Drynoch
- staff training
- evaluation and management of the key issues identified over the current reporting period, responding to further information or developments as necessary

Alongside this, WP6 focuses on further activities and stakeholder engagement to develop the market model and supply chain for RaaS. Building on the market structure and supply chain work undertaken during the first phase of the project, this will further explore the roles of different participants in the provision of RaaS.

WP8 continues engagement with external stakeholders to share project findings and invite feedback.

Business Case Update

Conclusions of Phase 1 Business Case assessment

The first phase of the project included a review of the Business Case for RaaS, and a summary of the approaches taken and conclusions from this work was provided in the December 2021 PPR. The associated Project Deliverable - PD3 'Business Model'⁹ - was submitted in January 2022 at the start of this reporting period.

The PD3 overview document introduces the work undertaken to evaluate the investment business case from a RaaS Service Provider's perspective, and reviews the potential Heads of Terms associated with a RaaS solution, in accordance with the Project Direction. As an enhancement to the original scope, this deliverable also provides an assessment of the business case for RaaS from a DNO's perspective. These corresponding views provide an understanding of how the RaaS Investor and DNO business cases currently align and support the evaluation of options that could improve the attractiveness of RaaS to both parties.

Drawing together the RaaS Service Provider and DNO business cases, it was recognised that the assessments based on the original RaaS concept of reserving sufficient capacity to cover the significant majority of faults with little granularity in the DNO's specification of service requirements, currently indicates a gap between what the RaaS Service Provider Willing to Accept and the DNO would be Willing to Pay for some sites that would benefit from a RaaS scheme. However, in light of those findings, and drawing on key stakeholder engagement activities¹⁰, the project team has identified a range of factors that will act to better align these figures and support the future application of RaaS. These address such considerations as variations to the 'RaaS product design', evolving technologies and data capabilities, and developments that will influence the costs and benefits of RaaS.

The findings and conclusions from the first phase of the project and the factors that will provide additional drivers for RaaS and/or influence future costs will be further explored and refined during the second phase of the project.

Emergent factors

Within this reporting period, two further challenges relevant to the business case, and project budget, have been identified, as set out in the **Project Manager's Report** section.

Firstly, the impact of the current global political situation on supply chains and market prices has resulted in quotes for key items of equipment higher than originally budgeted for. The implications of this on the longer term business case for RaaS are uncertain, and will need to be considered in line with market developments.

In the short term, this also raises considerations for the project budget. The costs quoted through the tender processes, also the scope of the planned project partner milestone deliverables with consideration to learning from the first phase of the project, are under review to allow the available project budget to be evaluated. The project team continue to keep this under consideration, and to communicate with both the Project Steering Board and Ofgem Project Officer for RaaS, to ensure that the project has sufficient funds to proceed with the build phase.

Secondly, constraints on the distribution and transmission systems in different regions are currently holding up the connection of new generation or demand schemes - where these constraints exist in areas that would benefit from RaaS, they may delay or prevent the connection of schemes sized to provide a resilience service, and/or may limit the extent to which an asset can participate in other markets to stack revenues, which could have implications for the overall economics of a scheme.

Again, the project team will investigate this finding in more detail to draw conclusions on the implications of connections issues, and potential solutions or approaches that would support the future roll out of RaaS.

⁹ PD3 'Business Model', <https://ssen-innovation.co.uk/wp-content/uploads/2022/01/RaaS-PD3-Overview.pdf>

¹⁰ the Phase 1 conclusions regarding the business case for RaaS were presented during the RaaS Stage Gate stakeholder consultation events held in November 2021, and presented to both the RaaS Stakeholder Advisory Board and Ofgem

Progress Against Plan

Summary of Progress

The project commenced in early 2020 and this Project Progress Report covers the third reporting period from December 2021 to December 2022.

The project Stage Gate review process concluded early into this reporting period with a positive decision from the Project Steering Board to proceed to the trial stage of the project.

As set out in the **Project Manager's Report** section, a number of factors have impacted the timeframes associated with project activities. This has led to the submission of a Material Change request to Ofgem regarding an extended project timeline and revised dates for submission of the remaining Project Deliverables and project completion, 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 procurement activities, and to discuss, evaluate and identify resolutions for the key challenges that have become apparent over this reporting period.

Focus of this Reporting Period

Key achievements during this reporting period include:

- submission of Project Deliverable 3 (PD3) 'Business Model'¹¹ which introduces the work undertaken to provide an assessment of the business case for RaaS from a DNO's perspective, evaluate the investment business case from a RaaS Service Provider's perspective, and review the potential Heads of Terms associated with a RaaS solution
- conclusion of the project Stage Gate review process which resulted in the decision to proceed to the second phase of the project with demonstration of RaaS at the proposed trial site of Drynoch primary substation on Skye¹²
- submission of Project Deliverable 4 (PD4) 'Stakeholder Engagement & Stage Gate Decision'¹³, which describes the Stage Gate review process and the approach taken to allow the PSB to make a decision on the second phase of the project
- negotiation, agreement and signing of a Variation to the Collaboration Agreement for Phase 2 of the project, to incorporate additions and amendments to the Collaboration Agreement relevant to the delivery of the second phase of the project and implementation of the planned trial scheme
- engagement with the local authority for Drynoch including submission of a Pre-application enquiry to understand the information that would be required for a full planning application to construct the BESS trial scheme on land adjacent to the Drynoch primary substation compound
- commencement of the BESS tender process, building on the Request for Information (Rfi) and Request for Proposals (RfP) processes used by E.ON to engage with potential BESS suppliers when developing the detailed design for the trial solution
- commencement of the DNO side equipment tender process using SSEN's standard procurement processes and with support from associated design and operational technology colleagues

¹¹ PD3 'Business Model', <https://ssen-innovation.co.uk/wp-content/uploads/2022/01/RaaS-PD3-Overview.pdf>

¹² the trial site selection process is documented in RaaS E2a.1 'Site Selection Report', E.ON, February 2021

¹³ PD4 'Stakeholder Engagement & Stage Gate Decision', <https://ssen-innovation.co.uk/wp-content/uploads/2022/02/RaaS-PD4-Overview.pdf>

- completion of a ground investigations and topography survey of the land adjacent to the Drynoch primary substation compound to provide information to support a decision on the preferred location of the BESS trial scheme and associated civils works
- submission of a Material Change request to Ofgem regarding an extended project timeline and revised dates for submission of the remaining Project Deliverables and project completion, as described in the **Material Change Information** section of this report
- submission of a regulatory Sandbox application to Ofgem in recognition of the fact that the conventional connection assessment process presents issues for the installation of a BESS of the size planned for the RaaS trial scheme at this point in time due to existing network constraints - Sandbox support which offers capability to demonstrate the RaaS concept in full 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, and 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
- review of the costs quoted through the tender processes, together with review of the scope of the planned project partner milestone deliverables to ensure continued relevance and reflect learning from the first phase of the project, allowing the available project budget to be evaluated

The review of the project budget is important due to the current global political situation and its impact on market prices for materials, equipment, etc. The project team continue to keep this under consideration as information from potential suppliers is provided, and to communicate with both the PSB and Ofgem Project Officer for RaaS, to ensure that the project has sufficient funds to progress with the build phase and that it remains appropriate to proceed.

Key Activities for the Next Reporting Period

Key project activities planned for the next reporting period include:

- continuation of WP7, including supplier appointment for the RaaS BESS and EMS; assembly, development and testing of the technical scheme for RaaS; commencement of installation and commissioning of the trial scheme at Drynoch; and staff training
- progression of WP6 activities to further develop the market model and supply chain for RaaS
- ongoing WP8 engagement with external stakeholders to share project findings and invite feedback
- aspects of both WP6 & WP8 will lead to the delivery of PD 5 'Supply Chain Engagement', which is due to be submitted in April 2024

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

Additional Considerations

Internal discussions and engagement with stakeholders over the course of the project continue to highlight a range of factors that it will be important to consider and address. These items complement the original project plans by ensuring that thoughts triggered by ongoing project activities and stakeholder 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 suitable feedback is provided to stakeholders.

Progress Against Budget

Table 3 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 3 - Summary of Project Budget

Cost Category	Total Budget (Project Direction)	Expenditure to Date (phased)		Variance	
		Expected (original budget)	Actual	£	%
Labour	£1,489,316	£1,196,371	£680,352	-£516,019	-43%
Equipment	£3,308,967	£3,308,967	£840	-£3,308,127	-100%
Contractors	£5,262,815	£4,571,816	£2,295,374	-£2,276,442	-50%
Travel and Expenses	£513,671	£409,388	£3,942	-£405,446	-99%
Decommissioning	£356,338	£0	£0	£0	-
Total	£10,931,107	£9,486,542	£2,980,508	-£6,506,034	-69%

Comments around variance

As set out in the **Project Manager's Report** section, a number of factors have impacted the timeframes associated with project activities. These have accordingly resulted in changes to expected payment milestones.

The 'Travel and Expenses' cost category has continued to experience significant 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. It is expected that this will continue to influence expenditure on this cost category over the course of the RaaS project.

Project Bank Account

A copy of the current project bank account statement is provided in Appendix 1 (confidential).

Project Deliverables

The RaaS Project Direction defines nine Project Deliverables, as presented in Table 4.

Over this reporting period the project has submitted PD3 and PD4 to Ofgem. All Project Deliverables and supporting reports are available via the documents section of the RaaS website - <https://ssen-innovation.co.uk/raas/project-docs>.






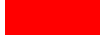
As described within the **Project Manager's Report** section of this report, over this reporting period it has become clear that the combination of prolonged procurement engagement processes and extended equipment delivery timeframes, following on from initial delays associated with the COVID-19 pandemic as reported in the 2020 & 2021 PPRs, will delay the achievement of the remaining Project Deliverables and the Project end-date by more than one year. Accordingly, in line with NIC project governance¹⁴ a Material Change request has been submitted to Ofgem, as set out in the **Material Change Information** section of this report.

The table below reflects both the original Project Direction dates and the revised dates included in the Material Change request.

Table 4 - 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"> Report detailing the selected site for demonstration and proposed Use case(s) for the RaaS demonstration. External peer review of FEED. 	Completed
2	Detailed Design (WP3)	Project Direction: Jan 2021 Submitted: 17 Nov 21	<ul style="list-style-type: none"> Detailed design of controls, electrical integration, available DER and the BESS complete. Publish Trial Programme on SSEN RaaS webpage. 	Completed
3	Business Model for Potential RaaS Suppliers (WP5)	Project Direction: Feb 2021 Submitted: 18 Jan 22	<ul style="list-style-type: none"> Construct investment business case for RaaS supplier. Produce draft Heads of Terms for RaaS method. 	Completed
4	Stakeholder Feedback Event (Stage Gate)	Project Direction: Apr 2021 Submitted: 25 Feb 22	<ul style="list-style-type: none"> Stakeholder feedback event to disseminate and gather feedback on outputs. 	Completed
5	Supply Chain Engagement (WP6)	Project Direction: Nov 2021 Revised: Apr 2024	<ul style="list-style-type: none"> Publish Commercial Strategy on SSEN RaaS webpage. Present Enterprise design for Resilience as a Service on SSEN website 	On target for revised dates.

¹⁴ the definition of a Material Change requiring Ofgem's approval is provided in Appendix 1 and associated Section 8.23 of Ofgem's 'Electricity Network Innovation Competition Governance Document v3.0', 30 June 2017

Deliverable	Description	Due	Evidence	Status	
6	Network Adaptation and Acceptance Testing (WP7)	Project Direction: Mar 2022 Revised: Nov 2024	<ul style="list-style-type: none"> Produce interface and configuration specifications and commissioning reports. 	On target for revised dates.	
7	Trial 1 - Demonstration at first site complete (WP7)	Project Direction: Dec 2023 Revised: Apr 2026	<ul style="list-style-type: none"> Publish Demonstration analysis results on SSEN RaaS webpage covering both technical and commercial aspects. Stakeholder dissemination event showcasing learnings. 	On target for revised dates.	
8	BAU Preparation	Project Direction: Jun 2024 Revised: Aug 2025	<ul style="list-style-type: none"> Technical design to support second demonstration site. Consultation with potential RaaS market for second demonstration site. 	On target for revised dates.	
9	Comply with knowledge transfer requirements of the Governance Document.	End of project	<ul style="list-style-type: none"> Annual Project Progress Reports which comply with the requirements of the Governance Document. Completed Close Down Report which complies with the requirements of the Governance Document. Evidence of attendance and participation in the Annual Conference as described in the Governance Document. 	Ongoing	
Key					
	Completed (Deliverable met)		Emerging issue, remains on target		Deliverable completed late
	On target		Unresolved issue, off target		Not completed and late

The key challenges moving into the next reporting period relate to impacts on the supply chain due to the current global political situation and the grid connection for the BESS, as described in the [Project Manager’s Report](#) section. Other challenges are within the normal scope of NIC project management activities.

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-020¹⁵.

For further information please email future.networks@sse.com.

¹⁵ 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

As reported in the December 2021 PPR, Project Deliverable 2 (PD2) 'Detailed Design'¹⁶ provides information on the detailed modelling and technical design work for both the DNO and BESS aspects of a RaaS solution. This detailed design work informed the requirements incorporated into the tender processes commenced during this reporting period.

The wider suite of Work Package 7 activities within Phase 2 of the project centre on the implementation and demonstration of a trial RaaS scheme.

Commercial aspects

As set out in the **Business Case Update** section of this report, the first phase of the project included a review of the Business Case for RaaS, and the associated Project Deliverable - PD3 'Business Model'¹⁷ - was submitted in January 2022 at the start of this reporting period.

The PD3 overview document introduces the work undertaken to evaluate the investment business case from a RaaS Service Provider's perspective, and reviews the potential Heads of Terms associated with a RaaS solution, in accordance with the Project Direction. As an enhancement to the original scope, this deliverable also provides an assessment of the business case for RaaS from a DNO's perspective. These corresponding views provide an understanding of how the RaaS Investor and DNO business cases currently align and support the evaluation of options that could improve the attractiveness of RaaS to both parties.

Further, whilst the majority of Work Package 6 activities are planned for delivery during the second phase of the project, during Phase 1 the project looked at:

- the wider potential of RaaS in GB, identifying opportunities for the application of RaaS at other voltage levels within GB networks, and use of RaaS across non-rural locations¹⁸

¹⁶ PD2 'Detailed Design', <https://ssen-innovation.co.uk/wp-content/uploads/2022/01/RaaS-PD2-Overview.pdf>

¹⁷ PD3 'Business Model', <https://ssen-innovation.co.uk/wp-content/uploads/2022/01/RaaS-PD3-Overview.pdf>

¹⁸ RaaS C6.1 'Investigation into the Wider Potential of RaaS', Costain, November 2021

- potential future market structures for RaaS, identifying key issues to be addressed in subsequent WP6 activities to shape the future evolution of RaaS and incorporation of a wider range of participants

Subsequently, however, as set out in the [Project Manager's Report](#) section, within this reporting period two further challenges relevant to the business case, and project budget, have been identified.

Firstly, the impact of the current global political situation on supply chains and market prices has resulted in quotes for key items of equipment higher than originally budgeted for.

Secondly, constraints on the distribution and transmission systems in different regions are currently holding up the connection of new generation or demand schemes - where these constraints exist in areas that would benefit from RaaS, they may delay or prevent the connection of schemes sized to provide a resilience service, and/or may limit the extent to which an asset can participate in other markets to stack revenues, which could have implications for the overall economics of a scheme.

The project team will further review and refine the findings and conclusions from the Phase 1 business case assessment and factors that will provide additional drivers for RaaS or influence future costs; work to understand the implications of present supply chain issues on the longer term business case for RaaS; and aim to draw conclusions on the implications of network constraints, and potential solutions or approaches that would support the future roll out of RaaS.

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

As reported in the December 2021 PPR, PD2 'Detailed Design' provides information on the detailed modelling and technical design work for both the DNO and BESS aspects of a RaaS solution. This work built on the prior 'Front End Engineering Design (FEED)' report¹⁹ and the responses to the FEED peer review that was contributed to by a range of innovation, network operation and flexibility services people from across the industry, as well as operational and design colleagues from within SSEN.

This work provides confidence that the RaaS solution is technically viable, and can be implemented with clear boundaries between DNO and RaaS Service Provider assets and systems.

As set out above, the wider suite of Work Package 7 activities within Phase 2 of the project centre on the implementation and demonstration of a trial RaaS scheme.

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 an evaluation of the potential for revenue stacking from other markets based on the different Product Design Scenarios that represent differing levels of granularity in the specification of RaaS requirements, and used that assessment to develop the Investor Business Case for RaaS, with specific consideration to the Drynoch site.

This work has shown that measures which allow more capacity to be released for participation in other markets, such as more dynamic models of RaaS capacity reservation, and enhanced forecasting capability in areas such as demand patterns, likelihood of faults and electricity prices, can be expected to bring benefits that will improve the economics of a resilience solution. The Phase 1 work also identified a range of other factors that will provide additional drivers for RaaS and/or influence future costs, as set out in Project Deliverable 4 (PD4) 'Stakeholder Engagement & Stage Gate Decision'²⁰.

¹⁹ 'Front End Engineering Design (FEED) report', https://ssen-innovation.co.uk/wp-content/uploads/2021/10/RaaS-FEED-E2a.2_lr.pdf

²⁰ PD4 'Stakeholder Engagement & Stage Gate Decision', <https://ssen-innovation.co.uk/wp-content/uploads/2022/02/RaaS-PD4-Overview.pdf>

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.

Activities planned as part of Work Package 6 are focused on further exploring the roles and relationships of the RaaS concept to ensure that the resilience service is commercially viable for all participants.

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

Building on the market structure and supply chain work undertaken during the first phase of the project, Work Package 6 and associated stakeholder engagement activities include consideration of appropriate procurement and tender process aligned with wider industry flexibility procurement frameworks, such as those being developed through the ENA's Open Networks project²¹.

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 and flexibility services. This has included:

- biannual Stakeholder Advisory Board meetings - board members comprise representatives from BEIS, Citizens Advice, ENA, Minginish Community Council, National Grid ESO, Northern Powergrid, Ofgem, Scottish Government, Sustainability First
- issuing of a RaaS press release 'Green light for project to trial low carbon energy network resilience' noting the decision to progress Phase 2 of the project, in January 2022 - this was issued to a variety of media outlets including Utility Week, The Energyst, Current News, Energy Live News and Electric Energy Online, and also shared via project partner websites and social media pages such as LinkedIn and Twitter
 - www.current-news.co.uk/news/battery-storage-to-boost-rural-energy-resilience-in-ssen-pilot-scheme
 - <https://utilityweek.co.uk/innovation-round-up-spring-launches-innovation-challenge-ssen-and-eon-resilience-as-a-service-pilot>
 - <https://utilityweek.co.uk/ssen-and-eon-to-pilot-resilience-as-a-service-project>
- an interview with Utility Week on electricity networks' responses to extreme weather events, which contributed to the article 'The eye of the storm: How technology can supercharge utilities', April 2022
 - <https://utilityweek.co.uk/the-eye-of-the-storm-how-technology-can-supercharge-utilities-responses-to-extreme-weather>
- presentations about RaaS, including learning from the first phase of the project, to:
 - the Utility Week Live event in Birmingham, May 2022, during a session on 'Delivering smart energy networks: the DSO transition and local flexibility'
 - the Energy Forecasting Innovation Conference at Kings College London, May 2022
 - the 3rd Grid-Scale Battery Storage 2022 conference, June 2022
 - SSEN & UKPN's innovation partnership event 'Creating Better Networks', IET London, July 2022
 - the International Community for Local Smart Grids (ICLSG) Monthly Partner Meeting, September 2022 - ICLSG partners present included representatives from the University of Oxford (UK), Ausgrid (Australia), CORENA (Australia), Enel Foundation (Italy), ESB Networks (Ireland), Oxford Low Carbon Hub (UK), TEPCO Power Grid (Tokyo Electric Power Company (Japan), WEL Networks (New Zealand)
 - <https://communitysmartgrids.org>

²¹ ENA Open Networks project, www.energynetworks.org/creating-tomorrows-networks/open-networks/flexibility-services

- contributing to a research discussion with the University of Oxford in relation to their first ICLSG research topic 'Network Resilience', July 2022; with subsequent participation in their 'Technical Meeting on Open Challenges for Network Resilience' event to inform development of the associated report, November 2022
- participation in other external events to continue sharing thoughts, learning from and seeking synergies with other innovation projects and initiatives by attending:
 - T&D World's 'Reimagined Microgrids' webinar, March 2022
 - National Grid ESO's Distributed ReStart project 'The Demonstration Stage' webinar, May 2022
 - SSEN Future Network's 'Our plans for Flexibility Services and how to get involved' webinar, July 2022
 - a visit to the HVDC Centre for testing of the Distributed ReStart DRZ Controller, Cumbernauld, August 2022
 - the Energy Institute's Powering Net Zero breakfast briefing 'The value of system services - what does it mean for a net zero system?', September 2022
 - the Energy Innovation Summit (the ENA's annual innovation event), Glasgow, September 2022
 - GridCell's 'Community Energy Trading' project workshop, October 2022
 - a Resilience & Microgrids call with Ausgrid set up following the prior ICLSG Monthly Partner Meeting, October 2022
 - National Grid ESO's Distributed ReStart project Closedown Event, November 2022
- regular meetings with other DNOs and National Grid ESO, specifically the Distributed ReStart project team

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, including review during the monthly Project Delivery Board meetings.

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 1 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 snap shot of the refined risk register which is now used for ongoing project management is provided as Appendix 3.

Material Change Information

In accordance with Ofgem's 'Electricity Network Innovation Competition Governance Document v3.0', the RaaS project has submitted a Material Change request to Ofgem.

The request relates to an extended project timeline and submission dates for the remaining Project Deliverables. The revised PD submission dates are set out in the [Project Deliverables](#) section of this report, and the revised project completion date (as referenced in Section 7 'Project Implementation' of the Project Direction) would be 30 April 2026.

The requirement for this Material Change request relates to the following factors:

- impacts associated with the COVID-19 pandemic which delayed early project activities, such as the site visits required to evaluate substations and select the site to be taken forward to the design stage
- the time necessary for detailed engagement with potential suppliers, including their own modelling work, through Request for Information, Request for Proposals, and Request for Quotations stages when developing the detailed design for the proposed demonstration scheme at Drynoch and forming requirements to issue the tender for BESS scheme procurement.
- delivery timeframes reported by suppliers in their responses to E.ON's tender for the RaaS Battery Energy Storage System (BESS) - the impact of the global political situation on both material prices and delivery timeframes has resulted in quoted delivery dates that are notably longer than the expected timeframes built into the original project programme

Whilst the first two points above resulted in delays to submission of the first four Project Deliverables, the revised dates were within a year of the dates set out in the RaaS Project Direction. The third point that has subsequently become apparent, however, will delay the achievement of the remaining Project Deliverables and the Project end-date by more than one year. Accordingly, a Material Change request is required.

The request was submitted to Ofgem on 14 September 2022, and a decision is expected soon into the next reporting period.

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 Costain as the Programme Manager for RaaS
- Review by the Project Delivery Board members
- Review by the Project Steering Board
- Standard SSEN internal review process, including Senior Managers and the Data Assurance and Regulation teams
- Approval by the SSEN 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 15/12/2022

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 file (confidential).

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
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

Appendix 3 - Revised Risk Register

A snapshot of the project risk register is given below. Revisions from the table included with the December 2020 PPR are shown in blue, and revisions from the table included with the December 2021 PPR are shown in teal.

Risk 01 'Delays in agreeing and/or signing the RaaS Collaboration Agreement', Risk 13 'Issues in agreeing the amendments to the Collaboration Agreement required for Phase 2', and Risk 24 'Support not obtained from external stakeholders for the project to proceed to Phase 2' have also been closed as the associated tasks have concluded.

Risk ID	Risk Item	Potential Impact	Probability of Risk Occurring	Impact if Risk Occurs	Risk Rating	Mitigation / Contingency
Project Management						
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.

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 Collaboration Agreement identifies Costain as the lead party for WP1 'Project Coordination', and Costain's C1.1 milestone deliverable includes responsibility for 'timeline management'.
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.	2	-4	-8	Early engagement with potential consultants/suppliers to raise awareness of the project and potential opportunities. Develop tender documents which detail all aspects of the work but set out the requirements in defined work packages, allowing different suppliers to express an interest in different elements and ensure that the most appropriate mix of skills, expertise and experience can be drawn on. Standard SSEN procurement processes.
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.	2	-4	-8	Early engagement with potential suppliers to raise awareness of the project and potential opportunities. Use of E.ON's wide network and long-term partnerships with a broad variety of potential suppliers. Early start of procurement process with RFI, RFP, RFQ phases. Links to risk 9.
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	Work undertaken by consultant/suppliers will be closely tracked by E.ON to maintain focus, promote quality and ensure timely delivery. Material created by consultants or provided by suppliers will be reviewed by the project team prior to being finalised/accepted. 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 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>
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 3	-5	-20 15	<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 & 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 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 3	-5	-25 15	<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</p>

						<p>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 & 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> <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.</p> <p>Communicate issues to Ofgem and other industry forums as relevant.</p>
11	Delays to project activities due to Covid-19	The Covid-19 situation results in delays to project activities and deliverables by one project partner, which then have implications for the completion of deliverables by other project partners or submission of PDs to Ofgem.	4	-4	-16	<p>Costain 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.</p>

						RaaS Project Delivery Board to communicate issues to the Project Steering Board/Stakeholder Advisory Group 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	Costain will monitor political landscape to ensure the project team are informed on any news which may impact the project team.
Site Selection						
With the completion of site selection process, and submission of PD1, all associated risks have been closed.						
FEED						
With the completion and Peer Review of the FEED, and submission of PD1, all associated risks have been closed.						
Detailed Design						
With the completion of the detailed technical design, and submission of PD2, all associated risks have been closed.						
Phase 1 Conclusions						
With the completion of Phase 1 and the conclusions from the Stage Gate decision, the associated risks have been closed.						
Phase 2 Conclusions						
22a	Learning during Phase 2 indicates that the benefits of RaaS (including both improved resilience for the DNO and revenue stacking for the RaaS service provider) will be too low, or that the costs or risks will be too high	An attractive proposition can't be offered to the market until any barriers identified have been addressed.	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 Ofgem Project Officer for the project, and all relevant external parties.
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 until any barriers identified have been addressed.	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 supply chain, and communicate these with the Project Steering Board, the Ofgem Project Officer for the project, and all relevant external parties.

Market Design & Supply Chain Appraisal						
25	The MBSE system model and Project 13 enterprise design do not provide the expected insight to draw up a commercial strategy and market/value propositions	Project design could be impacted which would impact the roll out of RaaS as business as usual.	2	-3	-6	<p>The project team will conduct a thorough review of how a system model approach and Project 13 principles can be used for RaaS market design prior to proceeding, to ensure that there will be value in undertaking these activities. This will include gathering learning from other projects where Project 13 has been implemented.</p> <p>The team will engage with a broad selection of stakeholders to ensure that insights captured are representative and sufficient to give the level of detail required for developing the commercial strategy and market/value propositions.</p>
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	Costain will 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"> - BESS costs, equipment price volatility, equipment delivery timeframes - delays to project delivery & submission of PDs beyond 12 months necessitating a Material Change request - generation constraints at transmission level & associated connection queue - potential import constraints at distribution level <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 & delivery of the trial site.</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.
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	Costain will 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	Costain will 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	Costain will monitor and report to the PSB any effects on the programme.
30	Delays in shipping & delivering equipment	Not possible to commence construction within the timeframes set out in the project programme.	3	-3	-9	Costain will monitor and report to the PSB any effects on the programme.
31	Delays in testing, installation or commissioning of each aspect of the RaaS system	Not possible to commence operation within the timeframes set out in the project programme.	3	-4	-12	Costain 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/Stakeholder Advisory Group 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	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

		within the timeframes set out in the project programme.				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 commissioning & live testing period	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 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.

						<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>
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 & 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"> - check that all those on site understand their roles, and the level of supervision required - ensure that all Permits-to-Work are comprehensive, complete and communicated to the working party - remind the Senior Authorised Person re appropriately challenging the knowledge, understanding and competence of all Persons in the Working Party - remind the members of the Working Party to challenge anything they believe to be unsafe and use Operational

						<p>Safety Rule 1.7 if necessary</p> <ul style="list-style-type: none"> - undertake site audits, including questions about electrical aspects - ask to see safety docs, and ask questions about people's understanding of the material and whether they have any concerns - if it's not safe, we don't do it
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.
Monitoring & Analysis of Trial Sites						
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 & 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 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>
Knowledge Dissemination						
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	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.
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	Identify all suitable routes for disseminating project activities and carefully tailor what's presented to suit the different audiences and hold their interest.
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>Costain will start the process of report writing with enough time to write reports, disseminate to project team for feedback and make changes to provide confidence in final submission.</p>