

# Project Progress Report 2021



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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, 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 has 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, to inform a decision during 2021 on whether to proceed with the deployment and operation of a RaaS system at the chosen site 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 second reporting period from December 2020 to December 2021.

The pandemic has continued to influence the approach taken to project engagement, with project meetings and stakeholder engagement events remaining online over the course of the year. High levels of engagement within the project team and with external parties have ensured the project continues to progress well, and draws out all relevant ideas and viewpoints required to develop the RaaS concept.

Key achievements during the reporting period include:

- completion of the Front End Engineering Design (FEED) work, and, together with the Site Selection report completed during the previous reporting period, submission of Project Deliverable 1 (PD1) 'Site Selection and FEED'<sup>1</sup>
- detailed modelling and technical design work for both the DNO (SSEN/Smarter Grid Solutions/WSP) and BESS (E.ON) aspects of the RaaS Solution for application at the chosen trial site of Drynoch on the Isle of Skye, leading to submission of PD2 'Detailed Design'<sup>2</sup>
- the use of Request for Information (RfI) and Request for Proposals (RfP) processes by E.ON to engage with potential BESS suppliers to evaluate equipment capabilities, supporting the detailed design of the solution
- development of a methodology for DNO valuation of a RaaS solution at individual sites, based on both Interruption Incentive Scheme (IIS) savings and Value of Lost Load (VoLL) impacts on customers
- definition of three Product Design Scenarios for use in the RaaS Service Provider revenue stacking evaluation, which reflect different levels of granularity of RaaS service requirements specification

<sup>1</sup> PD1 'Site Selection & Front End Engineering Design', <https://ssen-innovation.co.uk/wp-content/uploads/2021/10/RaaS-PD1-Overview.pdf>

<sup>2</sup> PD2 'Detailed Design', <https://ssen-innovation.co.uk/wp-content/uploads/2021/11/RaaS-PD2-Overview.pdf>

- work to develop the Investor Business Case for the RaaS Service Provider by E.ON/Cornwall Insight, including an assessment of the potential for revenue stacking through participation in other markets and flexibility services
- an evaluation of potential payment structure options for RaaS, with consideration to the balance of risk, the incentives and rewards alongside contractual obligations, and the development of a product which is attractive to potential RaaS Service Providers
- a review of the future potential of RaaS within the wider GB and international microgrid/battery markets to indicate the potential scope of the concept
- consideration of the complexities of the future evolution of the RaaS market structure to include a wider supply chain of investors, Distributed Energy Resource (DER) owners/operators, aggregators, Demand Side Response (DSR) providers, site hosts, and others
- a series of 4 online industry stakeholder engagement events to disseminate RaaS findings to date, present plans for Phase 2 of the project (subject to a positive Stage Gate decision), invite questions, and elicit stakeholder feedback to inform the Stage Gate review and the future of the project

The Stage Gate review process, which will determine whether the project progresses to Phase 2 of the project with the installation and demonstration of a RaaS trial scheme at Drynoch primary substation, is now underway. A decision on whether or not to proceed is expected in January 2022.

Finally, restructuring within E.ON means there has been a transfer of responsibility for the RaaS project from German business unit E.ON Business Solutions GmbH to UK entity E.ON UK Heat Limited. This has not impacted on project delivery, and key staff have remained involved with the project.

## 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](http://www.project-raas.co.uk) - and made available to all interested parties.

During the reporting period, a wide range of stakeholder engagement and dissemination activities have been undertaken. Stakeholders engaged with during the reporting period include:

- all GB DNOs
- National Grid ESO
- members of the Stakeholder Advisory Board for RaaS - comprising BEIS, Citizens Advice, ENA, Minginish Community Council, National Grid ESO, Northern Powergrid, Ofgem, Scottish Government, Sustainability First
- project teams from a wide range of other relevant electricity network innovation projects and initiatives; with particular focus on colleagues from National Grid ESO and Scottish Power Electricity Networks engaged on the Distributed Restart project, and with Northern Powergrid on the NIA project Microresilience
- SSEN colleagues in business-as-usual design and operational roles
- potential RaaS supply chain participants, including aggregators and potential investors
- academic institutions and consultancies
- community organisations and local media
- non-energy related stakeholders who might become involved in the provision of RaaS, or have similar opportunities for RaaS technology or business models, including water & transportation industries and the Defence Sector
- the regulator, Ofgem, and national & regional government

One key aspect of the engagement over this reporting period was a series of four online industry stakeholder engagement events held from 2<sup>nd</sup> to 5<sup>th</sup> November 2021 to disseminate RaaS findings to date, present plans for Phase 2 of the project (subject to a positive Stage Gate decision), invite questions, and elicit stakeholder feedback to inform the Stage Gate review and the future of the project. Each event covered a different aspect of RaaS - Overview, Technical Design, Business Case, and Market Structure & Procurement - and the project team were very pleased with the level of participation, interaction and support for the project.

RaaS has also been invited to attend and present at external events hosted by other organisations to support wider industry consideration of the potential future for local resilience. Examples here include Delta-EE, Utility Week and GridCell events, in addition to the Energy Networks Innovation Conference 2021 (ENIC), and the SSEN event held as part of SSE's COP26 activities.

## 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 mode, 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.

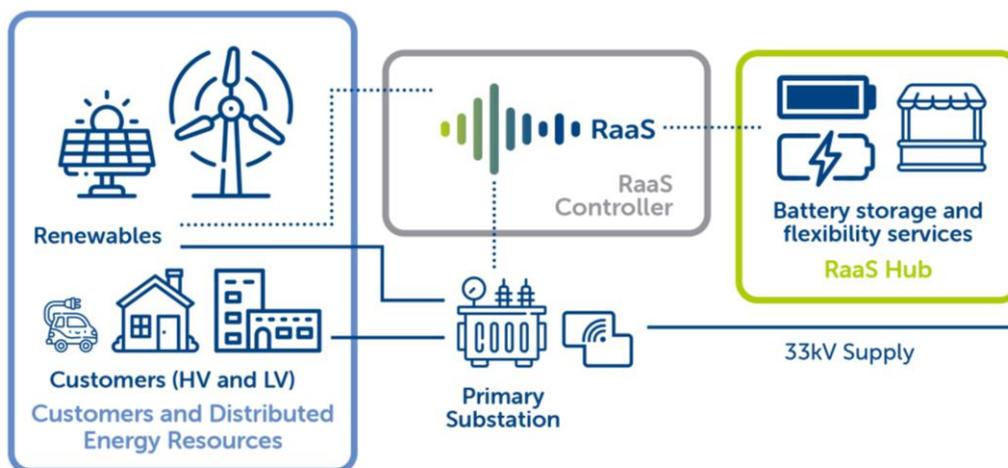


Figure 1 - Topology of the RaaS technical solution

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 with options for revenue stacking in other flexibility services markets.

The first phase of the project has focused on site selection, system design for the chosen demonstration site, and refinement of the business case for RaaS. This stage will validate the technical feasibility and financial viability of the concept, and provide an understanding of the level of support from stakeholders. The conclusions will inform a decision on whether to proceed with the deployment and operation of a RaaS system at the chosen site for a trial period of up to two years.

### Project Management

Recognising the benefits of agile approaches used in software development and Lean manufacturing processes, in a change to the initial approach to project team engagement of monthly formal meetings for the Project Delivery Board, in May the project team adopted thrice-weekly 'stand-up' meetings, each involving key project personnel across the wider project team amongst all partners. This has supported an environment where progress and emerging issues are shared more quickly, and facilitates more rapid decision-making.

The Project Steering Board (PSB) continues to sit quarterly, and comprises senior managers from SSEN, E.ON and Costain.

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 complement 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

During the reporting period, the responsibility for E.ON's role in the project has been transferred from their German entity E.ON Solutions GmbH, to UK subsidiary E.ON UK Heat Limited, bringing UK specific expertise on storage and flexibility markets. This change has not impacted project delivery.

### Stakeholder Advisory Board

As part of the project governance plans, the Stakeholder Advisory Board (SAB) for RaaS was established following project initiation and sat for the first time in September 2020. The role of the SAB is to provide 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 second meeting of the Stakeholder Advisory Board was held on 9 March 2021. The third meeting of the Stakeholder Advisory Board was due to be held in October 2021, however as this was within a few weeks of the planned Stage Gate consultation events, the Board agreed to defer the meeting until after the Stage Gate events had been held, with the re-scheduled meeting held on 1 December 2021.

### Key Issues

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

- a shift to the project schedule due to the time required for detailed engagement with third parties such as potential suppliers
- delivery of the project during the continuing Covid-19 pandemic
- the business case for RaaS based on the original product design concept

These factors will each be considered in detail by the Project Steering Board during the Stage Gate review.

### Shift to the project schedule

During the first reporting period the project incurred a significant delay due to the Covid-19 pandemic. A further shift to the project programme has been experienced due to the time necessary for detailed engagement with potential suppliers, including their own modelling work, when developing the detailed design for the proposed demonstration scheme at Drynoch.

In response to this, the project programme has been reviewed and reassessed, and the resulting shifts to the submission dates for the Project Deliverables have been communicated with the PSB and Ofgem. The changes in Project Deliverable dates are presented in Figure 2, and more information is given in the [Project Deliverables](#) section of this report.

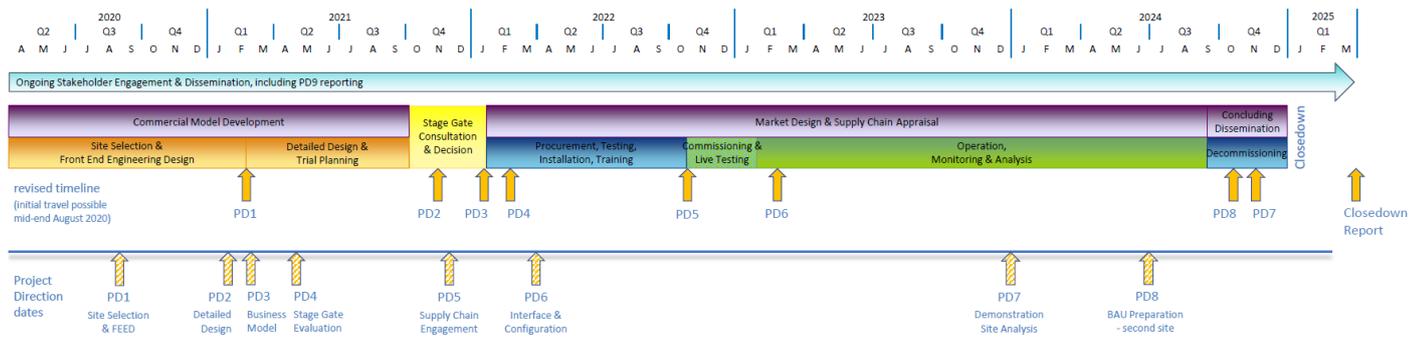


Figure 2 - Project timeline with original and revised deliverable submission dates

### Delivery of the project during the continuing Covid-19 pandemic

As reported in the previous Project Progress Report, the early stages of the pandemic, including the first lockdown, delayed the site selection process due to travel restrictions preventing the completion of site visits required to fully assess each of the shortlisted sites. During this reporting period, the UK saw a further substantial period of lockdown, resulting in the project team continuing online engagement with no face-to-face meetings. Further, at times the pandemic has impacted on the availability of key members of the project team.

Over the current reporting period this has had no material impact on project delivery, with issues managed by the project team and colleagues and partner organisations remaining very supportive of staff. However, this remains an ongoing risk to delivery, and the situation will continue to be monitored over the next reporting period.

### The business case for the original RaaS concept and proposed demonstration scheme

As described in the Business Case Update section, the project has drawn together the DNO and RaaS Service Provider business cases developed over this reporting period. From this assessment, it is apparent that based on current prices for BESS schemes of the ~4MW/4MWh size, and the original ‘RaaS product concept’ of reserving sufficient capacity to cover the significant majority of faults though with little granularity in a DNO’s specification of service requirements over the course of a year (equating to a higher proportion of battery capacity reserved for RaaS), the assessment for the Drynoch site indicates that there is currently a gap between what the DNO would be Willing to Pay for a RaaS service, and what the RaaS Service Provider is likely to be Willing to Accept.

An important point to note here, however, is that that gap is ‘at present’, and based on the original RaaS product concept. Accordingly, while working on the project and considering the business case, the project team have identified a range of factors that will act to better align these figures and support the future application of RaaS, including:

- evolving energy storage technologies and data capabilities
- things that will act to influence costs
- potential variations to the RaaS product design
- additional drivers for installing a battery capable of providing a RaaS service, including the application of flexible solutions driven by load related constraints

Subject to a positive Stage Gate decision, each of these factors would be investigated further during Phase 2 of the project. Alongside these commercial considerations, Phase 2 would also provide the opportunity for learning and experience from the technical application of RaaS, which will offer additional insight for the future development and application of other dynamic and flexible solutions and use cases.

## 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 moved from monthly planned Project Delivery Board meetings to 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 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 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.

The Work Package was completed during this reporting period with the submission of Project Deliverable 1 'Site Selection and FEED' in February 2021.

Key parameters of the technical solution for Drynoch identified through the FEED studies include the following points (some of which have been subsequently updated as part of WP3):

- 5 MVA Battery inverter to deliver fault currents and to black start the local 11 kV network
- 4.2 MWh battery size expected to cover 90% of 4 hour outages at Drynoch
- 3 MVA battery transformer with higher (6 MVA) 3 second rating during fault & black start conditions
- additional protection requirements for the network required when running in island mode

To help ensure that what's developed through the project is as broadly applicable as possible across different networks, the FEED report was circulated for peer review 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. The project team were delighted with responses from around a dozen organisations and individuals who provided highly relevant comments, queries and feedback which gave us confidence in the proposals and informed development of the Detailed Design for the scheme. A positive response was received to the project itself and the work undertaken in development of the FEED, and some of the comments can be seen in Figure 3.

“Many thanks for making the RaaS FEED report available to us. It strikes me as a helpful document that sets out the thorough engineering work undertaken so far.”

“it's a very comprehensive report and an exciting project ... looking forward to seeing how the system will be tested and eventually deployed”

“The project is very exciting ... the level of detail was certainly there regarding operation, protection and hierarchy of command protocol”  
“I look forward to the follow up documentation”

“There are parallels with the ESO's Distributed ReStart project, but these are overlaps not duplications. Both projects are timely and relevant to addressing the Net Zero challenge and I would expect there to be mutual benefits.”

“Congratulations, I can see a lot of good work is being put into the RaaS project”

Figure 3 - Examples of high level feedback from the FEED external peer review process

The extensive peer review of the FEED provided the project team and PSB with confidence in the proposed scheme design.

### 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.

As with the FEED, the detailed design has focused on the selected trial of Drynoch on Skye, however the scheme has been developed with the intention that it can be readily adapted for application to other sites for the future roll out of RaaS.

To support the design work, E.ON have led engagement with potential BESS equipment suppliers, issuing a Request for Information (RfI) followed up by a Request for Proposals (RfP), with a shortlist of two suppliers contributing detailed BESS modelling work the E.ON's design activities<sup>3</sup>. Subsequently, suppliers have been invited to respond to a high level Request for Quotations (RfQ) during December 2021. This engagement has been formed to support a full tender process which would commence at the start of Phase 2, subject to a positive Stage Gate decision from the PSB.

Key learning points from the detailed modelling and design work include:

- support for the view that it is technically possible to apply a RaaS solution that can swiftly and safely respond to a fault and maintain supply to customers
- battery capacity could be reduced to 3 MWh as long as it could sustain 6 MW for a period of 3s during a fault
- it is possible to maintain compliance with all relevant codes and standards through the different RaaS operating modes, however due to the absence of prior experience and supporting data associated with this

<sup>3</sup> 'Request for Proposal - Functional Requirements for RaaS Controls, BESS and Electrical Integration', E3a.3, <https://ssen-innovation.co.uk/wp-content/uploads/2021/10/RaaS-WP3-RFP-document-E3a.3.pdf>

novel application of a BESS, some uncertainties remain with regard to the capability of the BESS to transition seamlessly from grid connected to islanded operation after a fault particularly close to the substation busbar, and the capability of the BESS to withstand the potential inrush current during black start - such potential risks and mitigation measures would be evaluated in detail during the testing stages of the trial phase of the project

- additional systems, such as Point On Wave and sequential switching, will be considered where necessary to minimise any risks identified during the different stages of testing and development during Phase 2
- in BESS only mode existing system on HV and LV network provide adequate protection coordination, however some modification might be required to achieve optimal operation
- close cooperation between DNO and BESS system experts is needed to develop a common understanding of a proposed solution and to consider all relevant site specific aspects associated with the application of RaaS

The outputs of WP3 form PD2 'Detailed Design'<sup>4</sup>.

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

WP4 has been developing operational schedules for the BESS which optimise the provision of RaaS and participation in other flexibility markets. This has included defining three scenarios for the design of the RaaS product (representing different levels of granularity in the specification of 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 explore the implications of reserving different levels of battery capacity to provide RaaS service. This work has been delivered by Cornwall Insight, a consultancy with high levels of knowledge of flexibility markets and associated modelling capability. This work has then informed the business modelling activities within WP5.

Key conclusions associated with this work are that:

- of the three Product Design Scenarios developed - with RaaS availability contracted based on (i) seasonal requirements, (ii) EFA blocks or (iii) dynamic availability - more refined granularity and forecasting capability significantly enhances the commercial optimisation of a RaaS service
- to achieve the most cost effective RaaS fee, the RaaS asset must be allowed to maximise participation in all flexibility markets and services that it is able to comply with
- to maximise revenue, a RaaS Service Provider must maximise the number of available MWs that the battery can offer to other markets

#### **WP5 - Business Model**

WP5 brings together the technical design, the product designs, the optimised operational schedules and stakeholder input to develop the business model for potential RaaS suppliers.

During the current reporting period:

- the investor business case (IBC) for RaaS providers has been developed
- an Investor Risk Evaluation was undertaken, informed by engagement with different potential investors to ensure stakeholder views were represented

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

The objective of WP6 is to ensure that RaaS scales from a single demonstration into business as usual (BAU) across all GB DNOs. 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

<sup>4</sup> 'PD2 - Detailed Design' <https://ssen-innovation.co.uk/wp-content/uploads/2021/11/RaaS-PD2-Overview.pdf>

customers to be fully realised. Whilst the majority of WP6 is planned for delivery following a positive Stage Gate decision, two early tasks have been carried out:

- the wider potential of RaaS in GB has been assessed, identifying opportunities for the application of RaaS at other voltage levels within GB networks, and use of RaaS across non-rural locations
- potential future market structures for RaaS have been explored, identifying key issues to be addressed in later parts of WP6 to shape the future evolution of RaaS and incorporation of a wider range of participants

### WP7 - Demonstration Site Construction and Optimisation

WP7 will see the procurement, construction, installation and commissioning of a RaaS system at the selected trial site, with detailed testing and a live operational period of up to 2 years, based upon the detailed design created in WP3. This WP will begin during Phase 2 of the project, subject to a positive Stage Gate decision.

### 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:

- engagement with Minginish Community Council, Skye Climate Action, and other stakeholders and customers local to Drynoch, including coverage in local media (Highland Times and Radio Skye) prior to the issuing of a customer survey to seek the view of the local community
- poster presentations at the Energy Networks Innovation Conference (ENIC), as well as attendance at other events and webinars such as Utility Week Future Networks
- regular engagement with the team from the Distributed Restart NIC project as well as other DNOs
- poster at the SSEN event for COP26 in Glasgow
- stakeholder briefing meetings or calls to organisations with potentially similar needs to RaaS, including meetings during the delivery of task C6.1
- conference calls with Ofgem
- briefings with other local, regional and national government stakeholders, such as Midlands Energy Hub
- a series of four Stage Gate Stakeholder Consultation events to share progress and gather feedback, as summarised in Table 2.

Table 2 - Details of Stage Gate Consultation Events

	Date	Time	Topic	Total Attendance
1	2 <sup>nd</sup> November	10.30am	<b>Overview</b> - an introduction to the RaaS project, the work undertaken in Phase 1, and considerations for Phase 2	<b>34</b>
2	3 <sup>rd</sup> November	10.30am	<b>Technology</b> - detail on the design of the RaaS solution and its integration into the distribution network	<b>30</b>
3	4 <sup>th</sup> November	10.30am	<b>Business Case</b> - considering both the DNO and Service Provider perspectives on the value of RaaS and benefits of a reduction in loss of supply events	<b>26</b>
4	5 <sup>th</sup> November	10.30am	<b>Market Structure &amp; Procurement</b> - sharing thinking and gathering feedback on how DNOs might tender for RaaS, the potential participants in a scheme, and associated market arrangements that should underpin delivery	<b>21</b>

The events were well attended, with a mix of participants including other network operators, technology companies and potential supply chain participants, consultancies, academia and local government. The sessions were interactive, with a range of questions posed to attendees via Slido polls to seek feedback and included the opportunity for Q&A with the project team.

Feedback has been both useful and highly positive, and the detail of the Stage Gate consultation and decision process will be reported in PD4 'Stakeholder Feedback Event (Stage Gate)'.

### Outlook for Next Reporting Period

PD3 'Business Case for Potential RaaS Suppliers' is currently under preparation and is expected to be submitted early into the next reporting period.

The Stage Gate review process will also be completed during the early stage of the next reporting period, with the Project Steering Board taking a decision on whether or not to proceed to a physical demonstration of RaaS at Drynoch in Scotland. The Stage Gate decision will constitute PD4 to be submitted in early 2022.

Subject to a positive Stage Gate decision, WP7 will commence, which will include:

- a formal, detailed Request for Quotations (RfQ) process, to be led by E.ON as part of their tender and procurement process for the RaaS BESS and EMS
- development and testing of the technical scheme for RaaS
- staff training
- installation and commissioning of the trial scheme at Drynoch
- live trial of the RaaS scheme at Drynoch
- planning for BAU roll out of RaaS

Alongside this, WP6 will undertake activities to develop the market model and supply chain for RaaS. Based on the findings so far, and stakeholder feedback, it is expected that areas for focus will include the development of a RaaS Enterprise structure that optimises alignment of DNO, RSP and other organisations critical to the delivery of RaaS, such as host organisations, and operators of other DERs within the RaaS Zone.

WP8 will continue to engage with external stakeholders to share project findings and invite feedback. Amongst other events, the project intends to provide a further update on the project at the Energy Networks Innovation Conference (ENIC), which is expected to be in October 2022.

Aspects of both WP6 & WP8 will lead to the delivery of PD5 'Supply Chain Engagement'.

The project team will continue to follow national guidance, and that of respective partner organisations, relating to Covid-19 to ensure continued safe working. Any impacts from changes to Covid-19 regulations or guidance that may impact elements of the project, such as the construction of the RaaS asset, will be escalated to partners' senior managers, the PSB, the SAB and Ofgem at the earliest opportunity.

If the Stage Gate Decision is not to proceed, then following the submission of PD4, this decision will be communicated to relevant parties, and the project will be closed down.

## Business Case Update

The work undertaken during Phase 1 of the project indicates that at present the business case for the Drynoch site, and by extension, for the RaaS model as initially envisaged, is challenging. This analysis was based on the original RaaS concept of a 4 hour RaaS service at Drynoch which is available 100% of the time, and the conclusions from this assessment indicate a gap between the amount that it would be cost effective for a DNO to offer for the service ('Willingness to Pay'), and the amount that a RaaS Service Provider would seek to offer the service ('Willingness to Accept').

Once identified, this finding was discussed with both the PSB and with the Ofgem Project Officer for RaaS, together with the project team's thoughts on what could be done to better align the figures, and other things that will act to influence costs, or act as additional drivers for installing a battery capable of providing a RaaS service.

Further, the methodologies developed to value the RaaS service from a DNO perspective, and to evaluate the revenue stacking income and RaaS business case from a RaaS Service Provider perspective, in addition to the conclusions from this work, were presented to stakeholders during the Stage Gate stakeholder engagement events, with an introduction given in the 'Overview' session and detail given in the 'Business Case' session.

PD3 'Business Case for Potential RaaS Suppliers' will present the detail of this work, however a summary of the findings for the Drynoch site based on the original 'RaaS product concept' are given below.

### DNO Valuation for Drynoch - 4 hour RaaS service

The DNO valuation methodology developed by TNEI for SSEN indicates that at Drynoch it would be reasonable for a DNO to aim to pay around £23,000 a year for a 4-hour RaaS service based on the saving in Interruption Incentive Scheme (IIS) penalties associated with Customer Interruptions (CI) and Customer Minutes Lost (CML) that could be expected by avoiding outages of less than 4 hours, based on the Monte Carlo simulation of faults.

This analysis demonstrates a range of benefits across the sites assessed by TNEI, as illustrated in Figure 4, and therefore as another example shown in Table 3, a 4 hour RaaS service at Kinloch primary substation on the Isle of Mull could merit an annual payment of £245,000 per year based on the Value of Lost Load (VoLL) benefit to customers<sup>5</sup>.

Table 3 - IIS & VoLL valuations of a 4-hour RaaS solution

Drynoch 4 hr duration service		Kinloch 4 hr duration service	
IIS value	£23.15k p.a.	IIS value	£60.3k p.a.
VoLL	£13.9k p.a.	VoLL	£244.97k p.a.

<sup>5</sup> the project has drawn on ENWL's innovation project 'Value of Lost Load to Customers', [www.enwl.co.uk/go-net-zero/innovation/smaller-projects/network-innovation-allowance/enwl010--value-of-lost-load-to-customers](http://www.enwl.co.uk/go-net-zero/innovation/smaller-projects/network-innovation-allowance/enwl010--value-of-lost-load-to-customers)

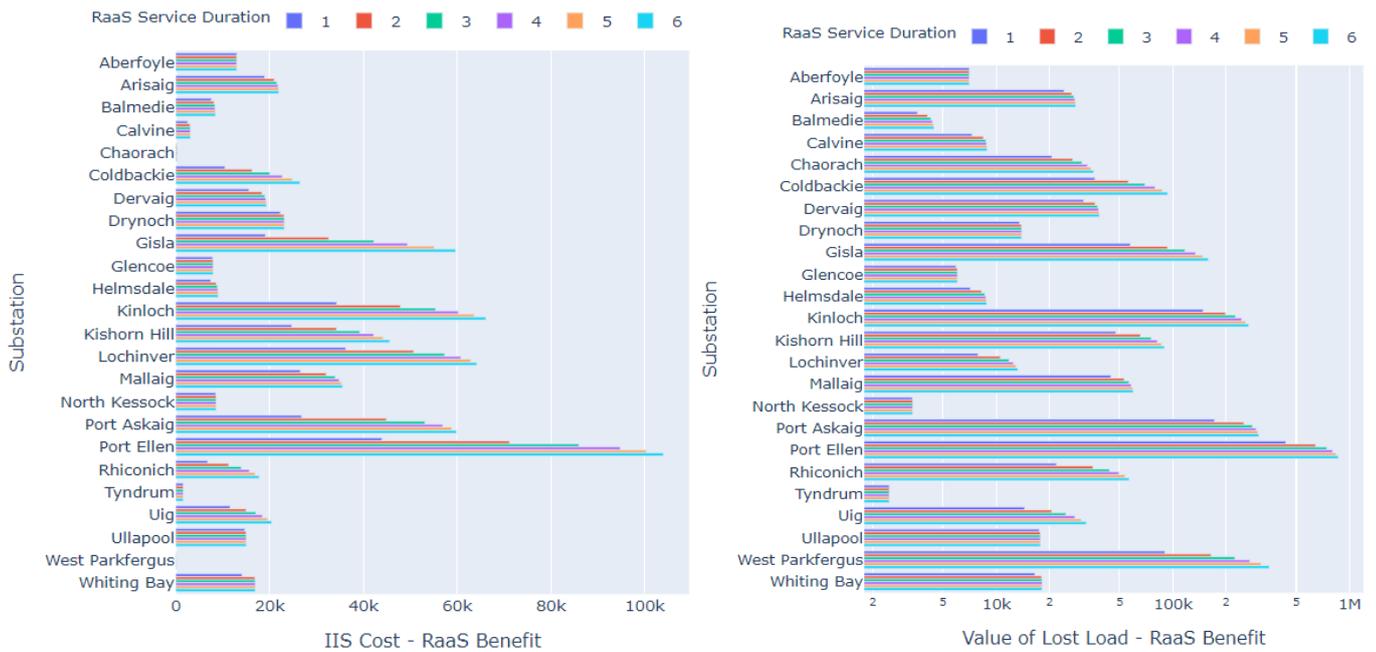


Figure 4 - Examples of DNO valuation of RaaS for service durations of 1 to 6 hours, based on IIS (CIs/CMLs) and VoLL

### RaaS Service Provider assessment - 4 hour RaaS service

Considering the RaaS Service Provider’s perspective, as noted above Cornwall Insight’s work on the potential income from using the available ‘headroom capacity’ to participate in other markets has been entered into E.ON’s business case model to evaluate the fee that may be required from RaaS under each of the Product Design Scenarios to achieve the rate of return of sought.

Their conclusion from this specific application of RaaS, i.e. offering a 4 hour RaaS service at Drynoch which is available 100% of the time, the fee that they would require to make a reasonable return based on current battery prices would be around £450,000 per year for a 10 year RaaS contract, rising to £740,000 per year for a 5 year RaaS contract, as shown in Table 4<sup>6</sup>.

Table 4 - RSP valuation of RaaS, assuming BESS is solely for providing RaaS

	5 Year RaaS Contact		10 Year RaaS Contact	
	Year 1 RaaS fee	% of total revenue stack	Year 1 RaaS fee	% of total revenue stack
4% IRR	£630,000	75%	£366,000	64%
8% IRR	£740,000	78%	£455,000	69%

<sup>6</sup> the figures provided here are for a 4 hour RaaS service at Drynoch, based on Product Design Scenario 1 (seasonal requirements), with the following key assumptions:

- Cornwall Insight ‘Central’ wholesale price scenario
- BESS Capex £3m, Opex 1% of Capex p.a. inflated by CPI
- 10 year participation of the battery in other flexibility markets
- Aggregator (managing participation in other flexibility markets) paid 10% of other flexibility market revenues
- 25% tax rate, 18% written down allowances
- fixed annual inflation of RaaS fee by 2%

## Factors that will act to influence the Business Case for RaaS

In response to the findings from the business case assessment, the project team have identified a range of factors that will act to support the future application of RaaS, including evolving technologies and data capabilities, things that will influence system costs, and variations to the 'RaaS product'. Subject to a positive Stage Gate decision these commercial aspects will be investigated further in Phase 2 of the project, as well as Phase 2 providing the opportunity for gaining experience from the technical application of RaaS, with associated learning for other flexible solutions and use cases too. The factors identified, together with key points to explore during Phase 2, are listed below, with further detail provided in PD3 'Business Case for Potential RaaS Suppliers', and represented in PD4 'Stakeholder Feedback Event (Stage Gate)'.

## Factors that will provide additional drivers for RaaS and/or influence future costs

The project work and stakeholder engagement activities undertaken through Phase 1 of the project have drawn out the following considerations which represent additional drivers for RaaS, or may influence future costs:

- SSEN ED2 Worst Served Customers (WSC) aspirations, similarly Ofgem expectations for service to vulnerable consumers (beyond consideration of VoLL or CIs/CMLs), as illustrated in Figure 5
- external impact - avoiding the visual impact of an OHL (alternatively accepting the high cost of undergrounding)
- battery costs reducing - economies of scale, potential reuse of former EV batteries, etc.
- future availability of other cost effective storage technologies with grid forming capability - e.g. hydrogen fuel cell schemes, flywheels, etc.
- implementing RaaS using BESS assets installed for other purposes
- future market structure - the trial would be focused on a specific application of RaaS in the context of the present day - i.e. supporting a primary substation in a rural location using a battery together with existing generating capacity - however there are many ways in which the market structure for RaaS could adapt to incorporate new technologies and capabilities over time; examples here include the incorporation of Vehicle to Grid (V2G) capability, or increasing Demand Side Response (DSR) capability, and in each case participation could be supported by an Aggregator, or through automated microgrid management & settlement technologies - this potential for incorporating a much wider range of participants, or 'actors', to deliver local resilience brings some interesting considerations with regard to different terms and interactions between participants, and to what extent this may add complexity or simplify the operation of a RaaS scheme in the context of other dynamic network operation solutions and flexibility markets
- potential evolution of RaaS - similarly, the successful application of RaaS through this project provides a foundation for the RaaS concept to evolve - which could include potential use on non-rural distribution networks, or at higher or lower voltage levels of the distribution network, or potential adoption by other industries or commercial customers for their own site's use but also with the capability to support the DNO network in the local area - therefore by trialling this initial solution, the project can provide learning to pave the way for such future adaptation of the Resilience as a Service concept
- wider policy context - RaaS is also well placed to support wider policy and strategy aims, both through a low carbon approach to improving network resilience, and through the potential for a RaaS asset to support a range of other activities, and examples of key documents published since the RaaS project commenced which the project team believe RaaS could support include:
  - Scottish Government's plans for an inclusive energy transition supported by strong collaboration at local community level<sup>7</sup>

<sup>7</sup> [www.gov.scot/publications/local-energy-policy-statement](http://www.gov.scot/publications/local-energy-policy-statement)

- the independent Electricity Engineering Standards review which recommends a customer focused resilience standard, and approaches to using distributed resources to supply customers in islanded mode under outage conditions<sup>8</sup>
- the National Infrastructure Commission's recommendations about using flexibility services to keep options open as energy demands change, and applying managed approaches to proactively and incrementally adapt<sup>9</sup>

## 2.5 OUR OVERALL RELIABILITY REGULATORY OUTPUTS

Table 9 below outlines the key Reliability outputs in our RIIO-ED2 business plan submission.

Table 9 – Our RIIO-ED2 Reliability Outputs

Output	Output type	RIIO-ED2 target	Costs
Reliability – Interruptions Incentive Scheme (IIS)	ODI-F	Reduce the frequency and duration of power interruptions by 20%.	£23.5m
Guaranteed Standards of Performance (quality of supply)	LC	We will minimise the number of customers experiencing an outage greater than 12 hours.	N/A
Reliability – Reduce number of Worst Served Customers	PCD	By 2028 we will improve the network performance for at least 75% of customers that are deemed worst served. <sup>1</sup>	£37.8m

LC - licence condition; PCD - price control deliverable; ODI – output delivery incentive (F – Financial, R = Reputational), SSE Networks (SSEN) Goal – company goal

Figure 5 - Excerpt from SSEN RIIO-ED2 business plan relating to reliability and Worst Served Customers

### Key points to explore during Phase 2

Phase 1 of the project has provided evidence that it is possible to apply the proposed technical solution safely and effectively for RaaS. Phase 2 would allow this to be fully demonstrated, providing learning for the future application of RaaS, and for a range of other potential technical solutions for dynamic network operation. With the potential future evolution of RaaS and the wider policy context in mind, the project team have identified a range of key points to be explored further in Phase 2, as summarised below:

- proving the technical solution for fault response and local resilience, and gaining experience from the integration of RaaS with existing networks assets to provide a flexible option for network management
- the approach to DNO requirements specification for procurement, including moving from the original concept of ‘meeting 90% of 4 hr faults’ to the concept of RaaS being a ‘locational signal’ for a battery, still cost-effectively bringing benefits to customers
- the role of forecasting, including:
  - demand - to inform DNO requirements specification and reserved capacity for RaaS over different periods of time
  - interruptions - to inform DNO decisions re ‘standing down’ a RaaS service at certain points in time
  - income from other flexibility markets - to inform RSP battery sizing decisions, RaaS fees, and potential ‘opt out’ options for RSPs

<sup>8</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/943685/Electricity\\_Engineering\\_Standards\\_Review.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943685/Electricity_Engineering_Standards_Review.pdf)

<sup>9</sup> <https://nic.org.uk/app/uploads/Anticipate-React-Recover-28-May-2020.pdf>

- the implications of different RaaS fee structures - e.g. fixed / availability / utilisation payments, contract vs incentives - rewards / penalties
- participation in ESO markets that currently require commitment - e.g. Dynamic Containment
- the possible concept of 'double booking' capacity
- potential for 'bundling' with additional DNO flexibility services - for example CMZs (Constraint Managed Zones) which form a key aspect of DNO plans for the RIIO-ED2 price control period - where appropriate
- the concept of 'transportable RaaS', where the BESS asset may, for example, provide RaaS in one area during winter, and provide enhanced resilience at a different location with high tourism during summer together with support for higher levels of EV charging
- potential value to distributed generation through increasing MEC limits in place due to constraints on the higher voltage network upstream of the primary substation
- developing our understanding of the supply chain for RaaS / other flexible solutions, and how it can be grown

In addition to supporting the development of RaaS, each of these points offers the potential for technical & flexibility market learning for other electricity network and energy system use cases.

## Progress Against Plan

### Summary of Progress

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

The pandemic has continued to influence the approach taken to project engagement, with project meetings and stakeholder engagement events remaining online over the course of the year. High levels of engagement within the project team and with external parties has ensured the project continues to progress well, and draws out all relevant ideas and view points required to develop the RaaS concept.

As described within the Project Manager's Report section, the time necessary for detailed engagement with potential suppliers when developing the detailed design for the proposed demonstration scheme at Drynoch, has, however, led to a further shift against the original project programme.

The Stage Gate review process, which will determine whether the project goes ahead to the physical demonstration of RaaS at Drynoch, is now underway, commencing with a series of four external stakeholder engagement events in November 2021. A decision from the Project Steering Board on whether or not to proceed to Phase 2 of the project is expected in January 2022.

The project timeline indicating original and updated Project Deliverables dates is shown in Appendix 1, with the planned dates presented in the Project Deliverables section of this report.

### Focus of this Reporting Period

Key achievements during this reporting period include:

- completion of the Front End Engineering Design (FEED) work, and, together with the Site Selection report completed during the previous reporting period, submission of Project Deliverable 1 (PD1) 'Site Selection and FEED'
- detailed modelling and technical design work for both the DNO (SSEN/Smarter Grid Solutions) and BESS (E.ON) aspects of the RaaS solution for application at the chosen trial site of Drynoch on the Isle of Skye, leading to submission of PD2 'Detailed Design'
- the use of Request for Information (RfI) and Request for Proposals (RfP) processes by E.ON to engage with potential BESS suppliers to evaluate equipment capabilities, supporting the detailed design of the solution
- development of a methodology for DNO valuation of a RaaS solution at individual sites, based on both Interruption Incentive Scheme (IIS) savings and Value of Lost Load (VoLL) impacts on customers
- definition of three Product Design Scenarios for use in the RaaS Service Provider revenue stacking evaluation, which reflect different levels of granularity of RaaS service requirements specification
- work to develop the Investor Business Case for the RaaS Service Provider by E.ON/Cornwall Insight, including an assessment of the potential for revenue stacking through participation in other markets and flexibility services
- an evaluation of potential payment structure options for RaaS, with consideration to the balance of risk, the incentives and rewards alongside contractual obligations, and the development of a product which is attractive to potential RaaS Service Providers
- a review of the future potential of RaaS within the wider GB and international microgrid/battery markets to indicate the potential scope of the concept
- consideration of the complexities of the future evolution of the RaaS market structure to include a wider supply chain of investors, Distributed Energy Resource (DER) owners/operators, aggregators, Demand Side Response (DSR) providers, site hosts, and others

- a series of 4 online industry stakeholder engagement events to disseminate RaaS findings to date, present plans for Phase 2 of the project (subject to a positive Stage Gate decision), invite questions, and elicit stakeholder feedback to inform the Stage Gate review and the future of the project

### Key Activities for the Next Reporting Period

Activities in the next reporting period include the following Phase 1 activities:

- finalisation of the business case assessment and submission of PD3 'Business Case for Potential RaaS Suppliers'
- completion of the Stage Gate review process, and submission of PD4 'Stakeholder Feedback Event (Stage Gate)' documenting the supporting information and activities that informed the Stage Gate decision

If the Stage Gate decision is to proceed with the implementation of a trial system at the chosen demonstration site of Drynoch, the following Phase 2 activities are also expected in the next reporting period:

- commencement of Phase 2 of project
- submission of Project Deliverables 5-9 (as described in the Project Deliverables section)
- activities associated with the items identified under 'Key points to explore during Phase 2' above

If the Stage Gate decision is to halt the project, project close-down activities will commence.

### 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.

The key items raised during the current reporting period are reflected in the 'Key points to explore during Phase 2' subsection above.

## Progress Against Budget

Table 5 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 5 - Summary of Project Budget

Cost Category	Total Budget (Project Direction)	Expenditure to Date (phased)		Variance	
		Expected (original budget)	Actual	£	%
Labour	£1,489,316	£837,457	£372,118	£-465,339	-56%
Equipment	£3,308,967	£2,652,087	£840	£-2,651,247	-100%
Contractors	£5,262,815	£4,039,226	£1,197,607	£-2,841,619	-70%
Travel and Expenses	£513,671	£266,100	£2,298	£-263,802	-99%
Decommissioning	£356,338	£0	£0	£-0	-
<b>Total</b>	<b>£10,931,107</b>	<b>£7,794,870</b>	<b>£1,572,862</b>	<b>£-6,222,008</b>	<b>-80%</b>

### Comments around variance

As reported in the December 2020 PPR, the key initial cause of the project underspend related to the shift in project timeframes experienced in response to the Covid-19 pandemic, including travel restrictions which resulted in delays to the planned site visits, which impacted trial site selection and subsequent work on the Front End Engineering Design. As reported in the Project Manager's Report section of this report, over this reporting period the time necessary for detailed engagement with potential suppliers, including their own modelling work, when developing the detailed design for the proposed demonstration scheme at Drynoch has further shifted the project programme. These factors have resulted in a change to expected payment milestones, however no significant change to the overall project expenditure on Labour, Equipment, Contractors or Decommissioning is anticipated at present.

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 2 (confidential).

## Project Deliverables

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

As described within the Project Manager's Report section, the time necessary for detailed engagement with potential suppliers when developing the detailed design for the proposed demonstration scheme at Drynoch, coupled with impacts from the pandemic during both current and previous reporting periods, has led to a shift in the project programme, and therefore the original submission dates for Project Deliverables.

The project has now formally submitted PD1 and PD2 to Ofgem.

Deliverables PD3 and PD4 are expected to be submitted shortly, as described in the table below, with PD5 to follow later in 2022. In the event that any changes are identified which may represent a 'Material Change' as defined within the NIC project governance<sup>10</sup>, the necessary material change process will be initiated.

Table 6 - RaaS Project Deliverables

Deliverable	Description	Due	Evidence	Status
PD1	Front End Engineering Design (FEED) (WP2)	Project Direction: Aug 2020 Submitted: 25 Feb 21	<ul style="list-style-type: none"> <li>Report detailing the selected site for demonstration and proposed Use case(s) for the RaaS demonstration.</li> <li>External peer review of FEED.</li> </ul>	Completed
PD2	Detailed Design (WP3)	Project Direction: Jan 2021 Submitted: 17 Nov 21	<ul style="list-style-type: none"> <li>Detailed design of controls, electrical integration, available DER and the BESS complete.</li> <li>Publish Trial Programme on SSEN RaaS webpage.</li> </ul>	Completed
PD3	Business Model for Potential RaaS Suppliers (WP5)	Project Direction: Feb 2021 Revised: Jan 2022	<ul style="list-style-type: none"> <li>Construct investment business case for RaaS supplier.</li> <li>Produce draft Heads of Terms for RaaS method.</li> </ul>	On target for revised dates.
PD4	Stakeholder Feedback Event (Stage Gate)	Project Direction: Apr 2021 Revised: Feb 2022	<ul style="list-style-type: none"> <li>Stakeholder feedback event to disseminate and gather feedback on outputs.</li> </ul>	On target for revised dates.
PD5	Supply Chain Engagement (WP6)	Project Direction: Nov 2021 Revised: Oct 2022	<ul style="list-style-type: none"> <li>Publish Commercial Strategy on SSEN RaaS webpage.</li> <li>Present Enterprise design for Resilience as a Service on SSEN website</li> </ul>	On target for revised dates.

<sup>10</sup> 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 v.3.0', 30 June 2017

Deliverable	Description	Due	Evidence	Status	
PD6	Network Adaptation and Acceptance Testing (WP7)	Project Direction: Mar 2022 Revised: Feb 2023	<ul style="list-style-type: none"> <li>Produce interface and configuration specifications and commissioning reports.</li> </ul>	On target for revised dates.	
PD7	Trial 1 - Demonstration at first site complete (WP7)	Project Direction: Dec 2023 Revised: Nov 2024	<ul style="list-style-type: none"> <li>Publish Demonstration analysis results on SSEN RaaS webpage covering both technical and commercial aspects.</li> <li>Stakeholder dissemination event showcasing learnings.</li> </ul>	On target for revised dates.	
PD8	BAU Preparation	Project Direction: Jun 2024 Revised: Oct 2024	<ul style="list-style-type: none"> <li>Technical design to support second demonstration site.</li> <li>Consultation with potential RaaS market for second demonstration site.</li> </ul>	On target for revised dates.	
PD9	Comply with knowledge transfer requirements of the Governance Document.	End of project	<ul style="list-style-type: none"> <li>Annual Project Progress Reports which comply with the requirements of the Governance Document.</li> <li>Completed Close Down Report which complies with the requirements of the Governance Document.</li> <li>Evidence of attendance and participation in the Annual Conference as described in the Governance Document.</li> </ul>	2021 Project Progress Report on schedule for submission in December 2021.	
<b>Key</b>					
	Completed (Deliverable met)		Emerging issue, remains on target		Deliverable completed late
	On target		Unresolved issue, off target		Not completed and late

As may be expected, the key challenge over the next reporting period relates to the ongoing Covid-19 situation, and its potential impact on both the timing of project activities and the availability of individual members of the project team, colleagues and consultants. Other key 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-020, Revision 1.00<sup>11</sup>.

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

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<sup>11</sup> this link will download the PR-NET-ENG-020 document from the SSEN website - [www.ssen.co.uk/WorkArea/DownloadAsset.aspx?id=14258](http://www.ssen.co.uk/WorkArea/DownloadAsset.aspx?id=14258)

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

#### Technical aspects

The modelling and design aspects of Work Packages 2 and 3 have led to the creation of a detailed technical design for the RaaS solution, including the battery and its control system, and DNO side aspects of the scheme for integration with existing distribution network assets and control system, to ensure the safe and effective application of RaaS. The technical functionality incorporated into the system includes planned & unplanned transition to islanded mode, black starting the local network, and transition back to conventional grid connection.

The outputs of WP2 & WP3 provide confidence that the RaaS solution is technically viable.

#### Commercial aspects

Work Packages 4 and 5 have developed methodologies to assess the business case for RaaS from both the DNO and RaaS Service Provider perspectives.

The DNO methodology provides a means to value a RaaS service at any site of interest, based on both CIs/CMLs and VoLL, representing the DNO 'Willingness to Pay' for a RaaS Service.

Three RaaS Product Design Scenarios have also developed and assessed to evaluate the income achievable by using the headroom capacity available from the BESS to participate in other markets. This revenue stacking analysis has then been used to determine the potential fee required to offer a RaaS service at Drynoch, representing the RaaS Service Provider 'Willingness to Accept' value to generate the required rate of return for the BESS asset.

Further information is given in the Business Case Update section of this report.

### **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**

Work Package 3 has created the detailed design for a RaaS solution, including the integration of the third party owned BESS scheme with the DNO distribution network assets and control systems. This has included the identification and evaluation of modifications to the local distribution network and protection schemes that may be needed for the safe and effective operation of RaaS. Work Packages 2 and 3 have also defined and clarified the responsibilities associated with, and information exchanges necessary between, the DNO and RaaS Service Provider.

Work Package 6 has explored the wider potential market structure for RaaS, and the potential roles of other actors/participants in a RaaS scheme, e.g. DER operators, and how they may interact with a RaaS Service Provider to support the provision of RaaS.

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

The commercial optimisation analysis undertaken in Work Package 4 has evaluated 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. Work Package 5 then used that assessment to develop the Investor Business Case for RaaS, with specific consideration to the Drynoch site.

This work has shown that more dynamic models of RaaS capacity reservation and release could help to minimise the cost of RaaS, and this will be explored further during Phase 2 of the project, subject to a positive stage gate decision. Similarly the benefits of enhanced forecasting capability in areas such as demand patterns, likelihood of faults, and electricity prices, will also be considered during Phase 2.

### **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.

The outcomes from Work Packages 4 and 5 relating to the business case for RaaS have emphasised the need to understand the trade-off between having the energy storage capacity committed to RaaS at all times, and more dynamic RaaS availability, which lowers the cost of RaaS provision though accepting some risk associated with lower availability of the service.

It is clear that full use of existing assets, e.g. local DER schemes, will also support the optimum delivery of RaaS by enabling either the RaaS asset to be smaller and/or the RaaS asset to have greater headroom capacity available for other revenue streams. Work Package 6 will continue to explore the market structure for RaaS and potential engagement of the RaaS Service Provider with a range of other actors and assets.

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

During this reporting period, Work Package 6 has considered wider opportunities created by the RaaS model, including application at different voltage levels, across other industries, and in other countries. This work indicates the potential scope of the RaaS concept, demonstrating opportunities for the supply chain in developing associated technologies and capabilities.

Work Package 6, and associated stakeholder engagement activities, are also continuing to explore the participation of other potential actors and existing assets in the provision of RaaS, to ensure cost effective delivery.

### Disseminate Project results within the industry

The project team has worked hard during 2021 to disseminate the findings of the project to a diverse group of stakeholders. This has included:

- the Stakeholder Advisory Board for RaaS
- four Stage Gate consultation events in November 2021
- dissemination through participation in events, such as ENIC, COP26 and Utility Week
- regular meetings with other DNOs and National Grid ESO, specifically the Distributed Restart project team
- engagement with the local community via Minginish Community Council, Skye Climate Action and through local media
- bilateral discussions between members of the project team and organisations including potential RaaS supply chain, diverse industry sectors and public sector with an interest in electrical resilience

## 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

### Risk Management Plan

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 December 2020 PPR, 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 review by the Project Delivery Board to address project risks on an ongoing basis, and promote a clear understanding of risks from the differing perspectives of the project partners.

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 3, and a snap shot of the refined risk register which is now used for ongoing project management is provided as Appendix 4.

## Material Change Information

In accordance with Ofgem's 'Electricity Network Innovation Competition Governance Document v.3.0', the project confirms that no Material Change has occurred within the 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 16/12/2021**

## Appendices

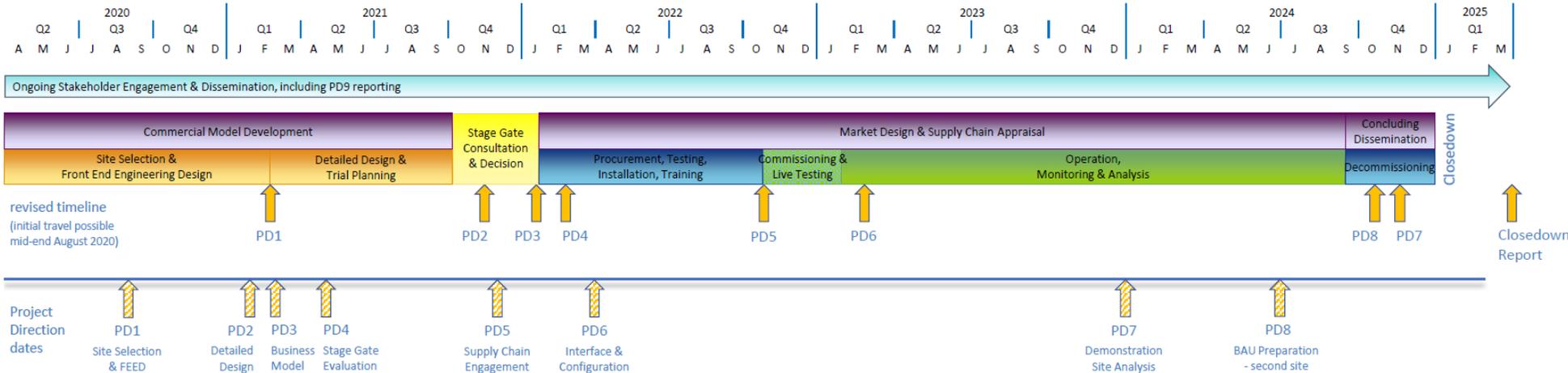
Appendix 1 - Revised Project Timeline

Appendix 2 - Project Bank Account (confidential)

Appendix 3 - Original Risk Register

Appendix 4 - Revised Risk Register

Appendix 1 - Revised Project Timeline



## Appendix 2 - Project Bank Account

Please see accompanying file (confidential).

## Appendix 3 - 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 4 - 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. Risk 01 'Delays in agreeing and/or signing the RaaS Collaboration Agreement' has also been closed as that task has been completed.

Risk ID	Risk Item	Potential Impact	Probability of Risk Occurring	Impact if Risk Occurs	Risk Rating	Mitigation / Contingency
<b>Project Management</b>						
02	Difficulties resourcing the RaaS project internally within the SSEN Future Networks team	Lack of sufficient input to the project results in the design & implementation of a system which does not fulfil the objectives of the RaaS concept, and/or results in the production of poor quality deliverables.	2	-3	-6	An SSEN Project Manager and Project Engineer have been assigned to the project.  Detailed introduction and/or handover processes to be used to ensure continuity & consistency where new individuals join the project team.
03	Difficulties resourcing the RaaS project or ensuring consistency internally within Costain	Key members of the RaaS project team move on from Costain leaving knowledge gaps within the organisation.	2	-3	-6	Project team members will be expected to develop a broader understanding of the whole project rather than just their own role to ensure knowledge 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.
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. (reference to Phases 1 & 2 removed)	3	-5	-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>
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.	3	-5	-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>
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, and provide input into any associated consultations.</p> <p>Review the project scope if necessary, and communicate issues to Ofgem.</p>

11	Delays to project activities due to Covid-19	The ongoing 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.	3	-4	-12	<p>Costain to track project progress closely to ensure early identification &amp; 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> <p>RaaS Project Delivery Board to communicate issues to the Project Steering Board/Stakeholder Advisory Group as appropriate.</p> <p>SSEN Project Manager to communicate issues to Ofgem.</p>
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.
13	Issues in agreeing the amendments to the Collaboration Agreement required for Phase 2	Without appropriate and timely <sup>12</sup> revisions to the CA, the project cannot proceed to completion of Phase 2.	3	-4	-12	The project programme includes activities relating to both the Heads of Terms for a generic RaaS contract and the CA revisions required for the project trial.
<b>Site Selection</b>						
With the completion of site selection process, and submission of PD1, all associated risks have been closed.						
<b>FEED</b>						
With the completion and Peer Review of the FEED, and submission of PD1, all associated risks have been closed.						
<b>Detailed Design</b>						
With the completion of the detailed technical design, and submission of PD2, all associated risks have been closed.						

<sup>12</sup> in accordance with Collaboration Agreement clause 3.4, amendments to the CA must be agreed and approved by the Project Steering Board within 6 months of completion of the last Phase 1 Project Deliverable, otherwise SSEN is required to approach Ofgem re project termination

Phase 1 Conclusions						
22	Initial learning from Phase 1 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	The project does not progress to the trial stage.	2	-5	-10	The project programme includes a Stage Gate decision process prior to proceeding to the trial stage such that if the learning concludes that there is not a sufficient balance of benefits, costs & risks, the project can be halted to avoid further expenditure.
23	The BAU commercial model for RaaS is not sufficient to attract a supply chain for wider deployment across GB	The project does not progress to the trial stage.	2	-5	-10	The project programme includes a Stage Gate decision process prior to proceeding to the trial stage such that if the learning concludes that there is not a sufficient balance of benefits, costs & risks, the project can be halted to avoid further expenditure.
24	Support not obtained from external stakeholders for the project to proceed to Phase 2	The project does not progress to the trial stage.	2	-5	-10	The project team <b>has presented</b> the findings from Phase 1 and proposals for Phase 2 to external stakeholders as part of the Stage Gate decision process, allowing discussion to ensure a good understanding to address any potential concerns. <b>A clear indication of external support has been received, and this has been presented to the Project Steering Board to help inform the Stage Gate decision.</b>
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	The project team will conduct a thorough review of how a system wide approach and Project 13 principles can be used for the market design. This will include gathering learning from other projects where Project 13 has been implemented.  We will engage with a broad selection of stakeholders to ensure the insights captured are representative and sufficient to give the level of detail required for the commercial strategy and market/value propositions.

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.
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 within the timeframes set out in the project programme.	3	-3	-9	Existing SSEN processes to request staff / outages via the Control Centre.  Long term planning of the tasks required with early engagement to the various departments involved, and backup plans identified should the outages be cancelled due to storms / faults, etc.
33	Issues in arranging a temporary diesel generator to supply power to customers during the 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.
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.
36	Risk of customer interruptions	Application of the RaaS system results in an unforeseen operational situation which affects customer supplies.	3	-4	-12	Phase 1 design work must develop a comprehensive understanding of the potential risks to security of supply to identify appropriate and cost effective mitigation measures. In the event of a high level of risk, communicate this to inform the Stage Gate decision process and do not proceed to Phase 2 if the risk is unacceptably high.

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>
38	Operational Safety Processes & Procedures are not understood or complied with	Significant safety implications for staff and contractors.	4	-5	-20	<p>Follow all relevant Operational Safety Processes &amp; Procedures.</p> <p>Ensure appropriate PPE is worn.</p> <p>Ensure that all consultants and contractors involved with the project are aware of SSEN safety requirements.</p> <p>Continue to reinforce the safety message, including:</p> <ul style="list-style-type: none"> <li>- check that all those on site understand their roles, and the level of supervision required</li> <li>- ensure that all Permits-to-Work are comprehensive, complete, and effectively communicated to the working party</li> <li>- remind the Senior Authorised Person re appropriately challenging the knowledge, understanding and competence of all Persons in the Working Party</li> <li>- remind the members of the Working Party to challenge anything they believe to be unsafe and use Operational Safety Rule 1.7 if necessary</li> <li>- undertake site audits, including questions about electrical aspects</li> <li>- ask to see safety docs, and ask questions about people's understanding of the material and whether they have any concerns</li> <li>- if it's not safe, we don't do it</li> </ul>
39	Operational staff are unfamiliar with new substation/network operating arrangements	Lack of awareness of processes and responsibilities leads to safety risks and/or issues with network operation affecting customer supplies and/or assets.	4	-4	-16	<p>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.</p>

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	<p>Early identification of the requirements for monitoring equipment and timely procurement activities, accessing additional resource if necessary.</p>
42	Failure in data management system or loss or corruption of data	Lack of data means that the project cannot draw robust conclusions or make recommendations regarding the wider application of RaaS, resulting in poor quality deliverables submitted to Ofgem and shared with other DNOs.	2	-3	-6	<p>Existing SSEN &amp; E.ON data storage and back up systems.</p> <p>Good practice in trial design regarding data collection and information security.</p> <p>The trials will be designed to include a number of trial events over a suitable period of operation to provide data for analysis even where there is a failure in data collection for some events, and data will be stored via SEPD's existing 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>