



Work Package 5

Heads of Terms: Supporting Information (E5.4)

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Key Contributors

Name	Company	E-Mail
Daniel Radburn	E.ON	daniel.radburn@eonenergy.com
Sofia Rahman	E.ON	sofia.rahman@eon.com
Inigo Berazaluce	E.ON	inigo.berazaluce-minodo@eon.com
Gerrard Elliott	E.ON	gerrard.elliott@eon.com
Daniel Jerwood	E.ON	daniel.jerwood@eon.com

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The report represents views and conclusions of E.ON, and not necessarily those of SSEN or Costain.

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List of Abbreviations

BESS	Battery Energy Storage System
CMZ	Constraint Managed Zone
DC	Dynamic Containment
DER	Distributed Energy Resources
DM	Dynamic Moderation
DNO	Distribution Network Operator
DR	Dynamic Regulation
DSR	Demand Side Response
DSO	Distribution System Operator
FEED	Front End Engineering Design
EFA	Electricity Forward Agreement
EMS	Energy Management System
ENA	Energy Networks Association
EV	Electric Vehicle
FSSA	Flexibility Services Standard Agreement
NG ESO	National Grid Electricity System Operator
NIC	Network Innovation Competition
Ofgem	Office of Gas and Electricity Markets
RaaS	Resilience as a Service
ROI	Return on Investment
SSEN	Scottish and Southern Electricity Networks
ToU	Time of Use tariffs
V2G	Vehicle to Grid
WP	Work Package

1 Executive Summary

This report presents a review of key considerations associated with the Heads of Terms that may be required for the implementation of Resilience as a Service (RaaS).

Section 2 provides an overview of the project and sets out the purpose of this report, to provide context.

Section 3 details a review of the Energy Networks Association's (ENA) Flexibility Services Standard Agreement (FSSA)¹ undertaken to identify any additions and revisions that may be necessary to ensure the suitability of its use for RaaS. Descriptions of the proposed changes are also given, together with explanations. Further, a copy of v1.2 of the Flexibility Services Standard Agreement marked up with the proposed changes accompanies this report as Appendix 1.

The majority of changes required are comparatively minor, however are important to correctly reflect a RaaS product, and make key distinctions from other DNO flexibility products. The key changes are as follows:

- The set of Definitions needs to be updated to include “RaaS Requirement” and “RaaS Activation”. Under definitions “Power Requirement” and “Service Requirement” are the terms currently used to describe the service required, and a distinction would be appropriate for RaaS. Similarly, “Utilisation Instructions” is the term currently used to describe the call to enact a service, whereas RaaS will provide an automated response when an outage on the network is detected.
- There are no DNO Company Obligations included within the agreement. RaaS will require the DNO to undertake specific activities for both the installation and operation of RaaS, for example providing the interface to the DNO aspects of the RaaS scheme and existing assets and control systems, and evaluating and making necessary changes to existing protection schemes.
- Additions to the Schedules will be needed to reflect the factors unique to RaaS. For example, Schedule 1 will need updating to reflect the capacity to be reserved over the different Service Windows e.g. season, working/non-working day, and/or time of day.
- The agreement currently allows the DNO to amend the Service Windows and Power Requirement (akin to RaaS Requirement) to be delivered by the Provider. A RaaS Service Provider's business case may be based on defined Service Windows and RaaS requirements which allow the RaaS Service Provider to evaluate the revenues that could be achieved from using the available headroom capacity to participate in other Flexibility Services, determine the optimal battery size, and/or make a business decision to investment in a RaaS asset. Any changes to the Service Windows or Requirement over the course of a contract may adversely affect the RaaS Service Provider's business case, representing a risk which may deter participation in RaaS. In the case of RaaS the option to vary the service will have to be optional to/in agreement with the Provider.

Subject to a positive Stage Gate decision for the RaaS project, these points will be raised with the ENA Open Networks project during Phase 2 of RaaS, and discussed with the Flexibility Workstream to reach an industry consensus which ensures that the standard agreement will be suitable for the future BAU roll out of RaaS.

Section 4 then explores potential contractual relationships with a range of other parties that a RaaS Service Provider may enter into to deliver a RaaS service. An understanding of this wider context is important when considering the future application and evolution of the RaaS concept.

¹ Standard Agreement for Procuring Flexibility Services, ENA Open Networks project, www.energynetworks.org/creating-tomorrows-networks/open-networks/flexibility-services

The key contractual themes identified across the different parties identified were:

- Availability – parties must be accountable for ensuring the availability of their technology to deliver RaaS, particularly where failure to do so would impact on the RaaS Service Provider revenues.
- Termination – if a party is failing to fulfil their obligations or is otherwise in breach of the agreement, the other party must have a right to terminate the agreement, and/or be recompensed for and costs or losses due to the fault of the other party.
- Warranties and Liabilities – it is appropriate for the RaaS Service Provider to hold partners accountable for the repair or replacement of items not performing as specified.
- Contract duration – in some instances, the RaaS Service Provider will need to enter long term contracts (such as with Landowners) to ensure the BESS can operate for the duration required to meet business case expectations, and in other instances the RaaS Service Provider may seek shorter term contracts to be able to monitor the operation of a system and/or performance of other parties (e.g. Aggregators).
- Payment – mechanisms for relevant parties to receive appropriate payment for participation in RaaS.

Finally, Section 5 provides a summary of the findings and conclusions.

As the RaaS concept continues to develop through the remainder of the project the learnings will further feed and support the proposals put forward in this report.

2 Project Overview and Report Purpose

2.1 Project Overview

The RaaS - Resilience as a Service - project is funded by the Network Innovation Competition (NIC) of the UK's Office of Gas and Electricity Markets (Ofgem). It is being delivered by three partners; Scottish and Southern Electricity Networks (SSEN), E.ON and Costain. SSEN are the Distribution Network Operator (DNO) for the project, evaluating the technical feasibility and financial viability from a DNO perspective; E.ON are an energy solutions provider who are leading the technical delivery of the battery system and developing the investor business case; Costain are a management consultancy acting as programme managers and providing input to the market design assessment.

The aim of the project is to investigate the technical application and commercial opportunities associated with the provision of a new market-based flexibility service that could be used by DNOs to improve network resilience in remote or rural areas. This service would use a Battery Energy Storage System (BESS) together with local Distributed Energy Resources (DER) to supply customers in the event of a fault on the network.

The project will determine how network resilience can be improved in a cost-effective manner for customers in areas susceptible to power outages, where traditional reinforcement or use of DNO owned standby generation to improve security of supply would be prohibitively costly. This can be achieved by a DNO procuring RaaS from a third-party service provider, who may also stack revenues through participation in other flexibility markets. In addition to developing the technical solution, the project seeks to evaluate the financial case from a DNO perspective while giving insight to RaaS service providers on the investment case, and optimal flexibility markets to operate in.

The first phase of the project focuses on site selection, system design for the chosen demonstration site, and refinement of the business case. This stage will validate whether the concept is technically feasible and financially viable, to inform a Stage Gate 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.

The second phase of the project comprises the delivery, installation, commissioning, and operation of the system in a demonstration due to commence in late 2022. This will include monitoring and evaluation of the system's technical performance together with the examination and appraisal of participation in different combinations of additional markets and flexibility services.

The RaaS concept offers a market-based solution to improve operational reliability and provide customers with a low carbon, cost effective and secure electricity supply.

The project is structured with the eight working packages described below.

WP1 – Project Coordination

WP1 comprises all core project management activities carried out by each partner, with Costain responsible for the overall coordination.

WP2 – Front End Engineering Design

This work package develops the initial design for the RaaS BESS and associated EMS, including external peer review of the proposals to provide a validated foundation for creating the detailed design for the scheme.

WP2 includes the following key tasks:

- Demonstration site selection and requirements capture
- Initial network modelling and analysis
- Creation of the Front End Engineering Design (FEED) for the RaaS BESS and associated EMS

WP3 – Detailed Design

The Detailed Design work package concentrates on the full technical design of the RaaS scheme and its interaction with existing network assets to meet all requirements for safe and effective operation.

WP3 includes the following key tasks:

- Detailed network modelling to understand potential impacts and requirements associated with such things as inrush currents during islanded energisation procedures, and protection and earthing schemes.
- Detailed design of the operational controls, electrical integration, and communication systems necessary to apply RaaS and incorporate available Distributed Generation (DG) schemes into islanded operation, including the BESS Energy Management System (EMS) and DNO side control system
- Identification and qualification of potential equipment suppliers
- Development of the construction, integration, commissioning, and testing plans for the demonstration site
- Formation of the proposed trial programme

WP4 – Planning for Operational Commercial Optimisation

This work is focused on evaluating the range of additional potential flexibility markets that a RaaS BESS could participate in and using this to inform development of an operational schedule for the BESS over the demonstration period at the proposed trial site.

WP4 includes the following key tasks:

- Analysis of existing, and future, flexibility markets that a RaaS BESS could also participate in
- Techno-economic modelling of potential operational strategies to participate in those other markets
- Development of the proposed operational principals for the trial site

WP5 – Business Model

The project considers the RaaS concept from the perspectives of both the DNO and the RaaS Service Provider, and this work package assesses the potential business case for RaaS service providers, in the context of DNO RaaS requirements.

WP5 includes the following key tasks:

- Construction of the investment business case for a RaaS Service Provider
- Development of draft Heads of Terms for BAU application of RaaS for consultation
- Evaluate options for revenue stacking in other flexibility markets

WP6 – Supply Chain Engagement

This work package aims to build the foundations for RaaS market development by ensuring that DNOs and potential market participants have the skills, tools and confidence to procure or provide RaaS solutions.

WP6 includes the following key tasks:

- Deep dive investigation into the potential applications of the RaaS across Great Britain
- Creation of a system model and enterprise design for the RaaS market
- Development of a commercial strategy for RaaS and defining value structures
- Engagement and consultation with potential RaaS Service Providers and supply chains
- Optimisation of commercial, delivery and operational models for RaaS

WP7 – Demonstration Site Construction and Operation

Subject to a successful stage gate decision, WP7 will see the implementation and demonstration of a RaaS scheme on SSEN’s network. The project will install and operate RaaS at the selected trial site, and following successful demonstration will develop plans for a second site to be implemented beyond the conclusion of the project.

WP7 will include the following key tasks:

- Procurement of required equipment and services
- Obtaining all relevant permits and approvals
- Construction of the RaaS scheme and integration with the network
- Testing and commissioning
- Training
- Operation, monitoring and optimisation
- Conclusion of the trial via decommissioning of assets or transfer to business as usual and ongoing operation

WP8 – Dissemination

WP8 covers dissemination and consultation activities to raise awareness of the project and share learning with all stakeholders.

A range of approaches will be used, with presentations, publications, and events tailored to the relevant project stakeholders. Dissemination will be carried out in line with key stages of the project, and in conjunction with other relevant innovation projects and the ENA’s Open Networks project where appropriate.

2.2 Report Purpose

This report forms part of Work Package 5 and provides a view of the key contractual terms (‘Heads of Terms’) that would be required between a RaaS Service Provider and DNO. For brevity, within this report the RaaS Service Provider is represented as the owner of the BESS, though it is recognised that in some cases the RaaS Service Provider may be a distinct entity to the BESS owner and investor. Further, where reference is made to ‘BESS’ for conciseness, it is recognised that other forms of energy storage system may also provide a suitable RaaS solution.

When scoping the project for the original NIC Bid Submission this piece of work had been intended to create the draft terms of a contract for RaaS. However, since commencement of the RaaS project the Energy Networks Association’s Open Networks project has developed a Standard Agreement for

procuring Flexibility Services² as a common contract for use by all DNOs to provide consistency which will support increased engagement by third parties with DNO flexibility services. Accordingly, it is appropriate that this should also be adopted (and adapted where necessary) for the future procurement of RaaS.

One key aspect of this report, therefore, is to provide a review of the Open Networks Flexibility Services Standard Agreement and identify any changes necessary to ensure the suitability of its use for RaaS. Section 3 of the report sets out the proposed additions and revisions, with explanations given.

The report also explores other contractual relationships that a RaaS Service Provider may enter into to deliver the RaaS service, as it is useful to have an understanding of this context when considering the future application and evolution of the RaaS concept. Section 0 of the report indicates the range of other parties that a RaaS Service Provider interact with, and explores the roles and responsibilities, data exchanges, and key contractual terms that may be required.

In summary, the report aims to:

- identify revisions to the Flexibility Services Standard Agreement in anticipation of RaaS being a functioning product for DNOs to procure
- enable potential RaaS Service Providers, other DNOs, and other industry stakeholders to review the proposed amendments to the Flexibility Services Standard Agreement to understand and provide views on the commitments, obligations, and requirements associated with a RaaS product
- enable potential participants in RaaS to understand the nature of different relationships and contracts that may be used to deliver RaaS as the concept evolves and opens up to additional contributors

² Standard Agreement for Procuring Flexibility Services, ENA Open Networks project, www.energynetworks.org/creating-tomorrows-networks/open-networks/flexibility-services

3 Incorporating RaaS within the Flexibility Services Standard Agreement

3.1 Introduction to the Open Networks Flexibility Services Standard Agreement

The Open Networks project was launched in 2017 as a collaborative industry initiative to support the transition to a smart, flexible system that will deliver Great Britain’s net zero targets.

Flexibility Services are a key contributor to achieving those targets, and the Open Networks Flexibility Workstream³ aims to consolidate and standardise Flexibility Services products, and the associated procurement processes, across the DNOs. The Flexibility Services Standard Agreement has been developed through this workstream and a standard contract for DNOs to use when procuring Flexibility Services.

Please note that version 1.2 of the Flexibility Services Standard Agreement has been used for the purpose of this report. Any subsequent versions of or proposed changes to the FSSA would require further review by the RaaS project team, and wider industry through Open Networks consultation activities, to understand their implications.

3.2 Summary of key revisions to the FSSA required for RaaS

This section of the report summarises the key items identified by the RaaS project team that would need to be incorporated into the FSSA. Section 3.3 then provides specific detail of the proposed additions.

3.2.1 Definitions

The set of Definitions needs to be updated to include “RaaS Requirement” and “RaaS Activation”. Under definitions “Power Requirement” and “Service Requirement” are the terms currently use to describe the service required, and a distinction would be appropriate for RaaS. Similarly, “Utilisation Instructions” is the term currently used to describe the call to enact a service, whereas RaaS will provide an automated response when an outage on the network is detected.

3.2.2 Company Obligations

There are no DNO Company Obligations included within the agreement. RaaS will require the DNO to undertake specific activities for both the installation and operation of RaaS, for example providing the interface to the DNO aspects of the RaaS scheme and existing assets and control systems, and evaluating and making necessary changes to existing protection schemes.

3.2.3 Additions to Schedules

Additions to the Schedules will be needed to reflect the factors unique to RaaS. For example, Schedule 1 will need updating to reflect the capacity to be reserved over the different Service Windows e.g. season, working/non-working day, and/or time of day.

3.2.4 Variation to Service Windows or RaaS Requirement

The agreement currently allows the DNO to amend the Service Windows and Power Requirement (akin to RaaS Requirement) to be delivered by the Provider. A RaaS Service Provider’s business case may be

³ Open Networks WS1A Flexibility Services

www.energynetworks.org/creating-tomorrows-networks/open-networks/flexibility-services

based on defined Service Windows and RaaS requirements which allow the RaaS Service Provider to evaluate the revenues that could be achieved from using the available headroom capacity to participate in other Flexibility Services, determine the optimal battery size, and/or make a business decision to investment in a RaaS asset. Any changes to the Service Windows or Requirement over the course of a contract may adversely affect the RaaS Service Provider’s business case, representing a risk which may deter participation in RaaS. In the case of RaaS the option to vary the service will have to be optional to/in agreement with the Provider.

3.3 Detailed review of additions required in the FSSA for RaaS

The table below lists each of the proposed additions and revisions to the FSSA. Each item is numbered to provide a reference to the marked up copy of the FSSA provided as Appendix 1. In keeping with the FSSA, here the DNO is referred to as the “Company” and the RaaS Service Provider as the “Provider”.

These points will be raised with the ENA Open Networks project during Phase 2 of RaaS, and discussed with the Flexibility Workstream to reach an industry consensus which ensures that the standard agreement will be suitable for the future BAU roll out of RaaS.

Ref.	FSSA Clause	Current (or <i>proposed</i>) FSSA Text	Description of Proposed Revision
1.	1 Definitions & Interpretations	<i>proposed new definition</i> “RaaS Activation” means the automated process by which the service is enacted by the DER. This would be in response to a signal sent automatically from the DNO RaaS Controller owned and operated by the Company which identifies a fault on the network. The end of a RaaS Activation will be identified by the DNO RaaS Controller signalling a return to normal grid operation which again will be automatically detected and responded to by the DER to cease delivery of the service.	Add the definition “RaaS Activation” to make a clear distinction between RaaS, which is triggered automatically, and a “Utilisation Instruction” which may be a manual instruction by the Company
2.	1 Definitions & Interpretations	<i>proposed new definition</i> “RaaS Requirement” means the service required by the Company in terms of the minimum energy to be reserved, together with other technical requirements relating to fault level currents, voltage and frequency compliance, as specified in Schedule 1	Add the definition “RaaS Requirement” to correctly reflect the service RaaS provides, as distinct from “Power Requirement” associated with other Flexibility Services, and “Service Requirement” (should the BESS also be used to provide other DNO services)
3.	2.3 Duration & Term	The Company may give the Provider reasonable notice in writing prior to the Expiry Date that the Term is extended. Extensions of the Term pursuant to Clause Error! Reference source	Allow the extension of the term to be ‘in agreement with the Provider’ - it is recognised that there may be technical or commercial reasons why a Provider would not be able to

		not found. shall be limited in number and duration as set out in Error! Reference source not found.	accept an extension
4.	3.2 Scope of Flexibility Services	The Company may request from the Provider, subject to the Provider's Availability Status, the provision of the Flexibility Services for Service Periods by issuing a Utilisation Instruction in accordance with Clause Error! Reference source not found.	Include "RaaS Activation" in addition to "Utilisation Instruction", to distinguish between a "Utilisation Instruction" and the automatic activation of RaaS in the event of an outage
5.	3.3 Scope of Flexibility Services	This Agreement is not a guarantee of Utilisation Instructions and does not constitute a contract for the exclusive provision of Flexibility Services. The Company reserves the right to contract with other providers for the type of services covered by this Agreement.	Include "RaaS Activation" in addition to "Utilisation Instruction", to distinguish between a "Utilisation Instruction" and the automatic activation of RaaS in the event of an outage
6.	3.5 Scope of Flexibility Services	Where, and to the extent that a Provider is Available, the Company may request Flexibility Services from the Provider by sending a Utilisation Instruction in accordance with Schedule 4	Include "RaaS Activation" in addition to "Utilisation Instruction", to distinguish between a "Utilisation Instruction" and the automatic activation of RaaS in the event of an outage
7.	3.6 Scope of Flexibility Services	The Company may: 3.6.1 withdraw any Utilisation Instruction by providing notice to the Provider at any time before the Provider has provided a response under and in accordance with Clause 3.7; and/or 3.6.2 issue a Stop Instruction to the Provider in accordance with Schedule 4.	Exclude RaaS from compliance with this clause as RaaS is not activated in this way - a RaaS response will trigger and stop automatically, not via a "Utilisation Instruction" or "Stop Instruction"
8.	3.8 Scope of Flexibility Services	Where the Provider receives a Utilisation Instruction and subject to receipt of any Stop Instruction or has issued an Unavailability Notice, the Provider shall provide the Flexibility Services to the Company using the DER in accordance with the terms in Schedule 1.	Include "RaaS Activation" in addition to "Utilisation Instruction", to distinguish between a "Utilisation Instruction" and the automatic activation of RaaS in the event of an outage
9.	5.1 Monitoring & Equipment	Subject to Schedule 5, the Company shall be entitled to, at its sole discretion, monitor, meter and determine the Provider's	Include that for RaaS this will have to be in agreement with the Provider, rather than just being at the DNO's sole discretion, due to

		provision of the Flexibility Services using such data collection and systems as the Company deems appropriate and which may, without limitation, utilise minute by minute metering data analysis techniques for each active DER	the monitoring requirements associated with RaaS
10.	Company Obligations	<p><i>Subclauses that would need to be added include:</i></p> <ul style="list-style-type: none"> • <i>providing the interface to the DNO aspects of the RaaS scheme and existing assets and control systems</i> • <i>evaluating and making necessary changes to existing protection schemes</i> • <i>supporting commissioning activities</i> 	There is currently no Clause defining Company Obligations, and RaaS would require specific activities from the DNO for both the installation and operation of RaaS
11.	7.1.4 Provider's Obligations	The Provider shall: remedy any Defect of the Flexibility Services with Good Industry Practice and to the satisfaction of the Company	Include "as reasonably required", to prevent the Company from overstating the remedy required at unnecessary cost to the Provider
12.	8.2.7 Representations & Warranties	if, at any time during the Term, the provision of Flexibility Services would cause the Provider to be in breach or non-compliance as described in Clauses 8.1.3 and 8.2.10, the Provider will not accept or comply with any Utilisation Instruction and will provide notification to the Company as required by Schedule 4;	Include "RaaS Activation" in addition to "Utilisation Instruction", to distinguish between a "Utilisation Instruction" and the automatic activation of RaaS in the event of an outage
13.	10 Termination	<p><i>proposed new subclause regarding recompense to the either party in the event that the other party terminates a RaaS agreement before the end of the contract duration, as currently permitted by clause 10.2</i></p> <p>Either Party may terminate this Agreement at any time by providing ninety (90) days written notice to the other Party</p>	For RaaS, the Provider's business case for investing in a new RaaS asset, or choosing to locate their scheme where it can also provide RaaS, will be influenced by the revenue from RaaS, likewise a DNO would need to invest to provide the DNO side assets to interface with the third party RaaS scheme, therefore the early termination of a RaaS contract will impact on the investor's business case and/or the DNO's business case, and so this risk must be recognised and addressed within the FSSA - this subclause should refer to a table

			called “RaaS Termination Compensation” proposed for inclusion in Schedule 7 Special Requirements
14.	11 Service Failure and Material Breach	<i>Make this clause reciprocal so that it applies to the Company as well</i>	As the DNO also has roles and responsibilities in the provision of RaaS, this clause should be reciprocal
15.	13.2 Indemnity, Liability & Insurance	Notwithstanding any other provision in this Agreement, the aggregate total liability of either Party to the other Party under or in connection with this Agreement whether in contract tort or delict or howsoever arising shall not exceed in aggregate the greater of (i) £250,000, and (ii) an amount equal to the total charges payable and already paid to the Provider under this Agreement	Both parties may want to exclude RaaS from (ii) and amend the value of (i) depending on the value of the RaaS contract
16.	13.4 Indemnity, Liability & Insurance	The Provider shall procure (and on request provide evidence to the Company of) appropriate insurances as required by law to cover the liabilities set out in this Clause 13, with a reputable insurance company. Where possible the Provider shall add the Company as a named party on its insurance policies	Make the clause reciprocal to ensure the Company can cover its liabilities
17.	13.6 Indemnity, Liability & Insurance	The Provider’s liabilities under this Agreement shall not be deemed to be released or limited by the Provider taking out the insurance policies referred to in Clause 13.4.	Make the clause reciprocal to include the Company
18.	17 Company Property	17.1 Each Party shall retain its rights in its own physical property used for the purposes of this Agreement. Any equipment, tools, drawings, specifications, data and other materials supplied by or on behalf of the Company to the Provider: 17.1.1 shall at all times be and shall remain the exclusive property of the Company; 17.1.2 shall be held by the Provider in safe custody at its own risk and maintained and kept	Make the clause reciprocal to include the Provider’s property

		<p>in good condition by the Provider until returned by the Company;</p> <p>17.1.3 shall be marked visibly by the Provider as the property of the Company; and</p> <p>17.1.4 shall not be disposed of other than in accordance with the written instructions of the Company nor used otherwise than as authorised by the Company in writing.</p>	
19.	Schedule 1 Service Parameters	Contracted Service Capacity (MW/MVAR)	<p>Add MWh to the units in the brackets, as a RaaS BESS may be required to reserve a minimum energy capacity (state of charge) to provide a RaaS response if called upon</p> <p>Further, as this may vary depending on the season, month, day, hour this field should refer to a table called "RaaS Service Parameters" proposed for inclusion in Schedule 7 Special Requirements</p>
20.	Schedule 1 Service Parameters	Contracted Service Windows (if specified)	As this may vary depending on the season, month, day, hour this field should refer to a table called "RaaS Service Parameters" proposed for inclusion in Schedule 7 Special Requirements
21.	Schedule 1 Service Parameters	Contracted Response Time (if specified)	This field is currently populated with "Up to 12 hours" - this would need to be omitted or replaced with something suitable for RaaS and an automated response
22.	Schedule 1 Service Parameters	Service Recovery Time (if specified)	This field is currently populated with "2 hours" - this would need to be omitted or replaced with something suitable for RaaS
23.	Schedule 1 Service Parameters	Service Minimum run-time (if specified)	As the RaaS requirements specified by a DNO would be associated with energy requirements, a minimum run-time would not be specified
24.	Schedule 1 Service Parameters	Maximum Utilisations (per Service Window)	This field is currently populated with "2" - this would need to be omitted or replaced with something suitable for RaaS
25.	Schedule 1 Service Windows	Delivery Season Service Window 1 From Service Window 1 To	As there may be numerous Service Windows associated with different seasons, months, days

			or hours, this section should refer to a table called “RaaS Service Parameters” proposed for inclusion in Schedule 7 Special Requirements
26.	Schedule 1 Service Requirements	The flexible facilities making up the DER shall be connected and capable of exporting to or importing from the area of the Network asset(s) subject to the limitation (represented by the zone) during intact and under first circuit outage of that network asset(s).	Amend to “intact grid operation or under first circuit outage of that network asset(s)”, with the ‘or’ used in recognition that some RaaS networks may not have N-1 capability
27.	Schedule 1 Service Requirements	The DER shall be able to deliver on instruction a reduction or increase in import or export, from or onto the Network.	Include “RaaS Activation” in addition to “instruction”, as a distinction which acknowledges the automated response, also allow the tailoring of “reduction or increase in import or export”, e.g. as RaaS would represent export only, and may be a switch from grid connected import to islanded export (rather than ‘increase in export’)
28.	Schedule 1 Service Requirements	The flexible MW is the volume of additional consumption or generation that can be adjusted flexibly relative to a defined baseline level. It shall be from one or more facilities making up the DER, can be delivered reliably and in full, is fixed for the duration of the service period, and must be within the conditions of each Facility’s connection agreement.	Add an option that generation can be adjusted variably up to the agreed capacity (rather than being fixed for the duration) and with reference to a table called “RaaS Service Parameters” proposed for inclusion in Schedule 7 Special Requirements
29.	Schedule 1 Service Requirements	The DER shall have a single set of capability parameters, and shall be a single point of communication and control.	Insert “excluding RaaS”, and after the sentence include “For RaaS the DER will provide the resilience service in islanded mode, acting as a grid forming voltage and frequency source with a set of electric parameters and local control. While in grid parallel mode, the DER may operate in grid following conditions and with a remote control to provide other Flexibility Services.”

30.	Schedule 1 Variation to Service Windows	The Company may, with prior written agreement from the Provider, make single or marginal variations to individual Service Windows or power injection requirements within the following boundaries	Insert “excluding RaaS”, and add an additional subclause 1.1.5 to say that for RaaS any proposed variations must be agreed by the Provider on an ad hoc basis and reflected in a table called “RaaS Service Parameters” proposed for inclusion in Schedule 7 Special Requirements - such changes may significantly influence the Provider’s business case for investing in a RaaS asset, and/or their strategy for optimizing participation in other Flexibility Services
31.	Schedule 2 Flexibility Service Charges 1.4 Payment Terms	In the event that (where relevant) the Provider's best and final offer price for the Flexibility Services in a Zone in its response to a relevant invitation to tender issued by the Company was higher than the applicable Utilisation Cost and Arming Fee or Availability Fee (each as defined in Schedule 2), then the Provider will (unless the Company determines otherwise at its discretion) be despatched in accordance with the 'price order despatch' principles (which are available at https://www.flexiblepower.co.uk/downloads/178) where the Company's MW Demand Response system needs for the Flexibility Service in a Zone exceed the relevant availability declarations from other contractors with lower best and final offer tender prices	Insert “excluding RaaS” - if the Provider is successful in a RaaS tender they will have secured the provision of services for a fixed price / period in which they do not need to retender, and their asset would not present an option for dispatch in price order
32.	Schedule 4 Communications Utilisation Instructions	The Utilisation Instruction must specify for a DER: <ul style="list-style-type: none"> • the Zone to which the Utilisation Instruction relates; • the Requested Start Time; • the Requested End Time; and • the Requested MW. 	Insert “excluding RaaS”, and insert a new column in the table called “RaaS Activation” to explain the process applicable to the automated RaaS response
33.	Schedule 4 Communications Acceptance of Instructions	The Provider may accept the instruction by responding (by any method as approved by the Company) to the Utilisation Instruction within [thirty (30)	Insert “excluding RaaS” - RaaS will activate automatically upon an outage, and the Company will not need to provide an instruction, nor the Provider accept it

		<p>minutes] from the time of the request, setting out:</p> <ul style="list-style-type: none"> • the Accepted Start Time, which cannot be earlier than, but must be no later than [thirty (30) minutes] from, the Requested Start Time; • the Accepted End Time, which can be no later than the Requested End Time but otherwise has to be at least [thirty (30) minutes] from the Accepted Start Time; and • the Accepted MW, [which shall be at least [0.1MW]] [which shall be at least [•] % of the Requested MW] and can be no greater than the Requested MW. 	
34.	Schedule 4 Communications Acceptance of Instructions	<p>The Provider may accept the Discretionary Utilisation Request by responding (by any method as approved by the Company) to the Discretionary Utilisation Request within [fifteen (15) minutes] from the time of the request, setting out:</p> <ul style="list-style-type: none"> • the Accepted Start Time, which cannot be earlier than, but must be no later than [fifteen (15) minutes] from, the Requested Start Time; • the Accepted End Time, which can be no later than the Requested End Time but otherwise has to be at least [fifteen (15) minutes] from the Accepted Start Time; and • the Accepted MW, [which shall be at least [0.1MW]] [which shall be at least [•] % of the Requested MW] and can be no greater than the Requested MW 	<p>This section can apply to RaaS where the Company is requesting the service due to maintenance rather than in response to an outage, however the specified response times would need to be changed, e.g. this could be up to 24 hours to accommodate the Providers commitments for other Flexibility Services</p>
35.	Schedule 6 Despatch systems/technical Requirements	Technical Glossary	<p>In the Technical Glossary amend terms such as “Contracted Capacity” and “Maximum Capacity” (or add new terms) to reflect MWh (as well as MW), as a RaaS BESS may be required to reserve a minimum energy capacity (state of charge) to provide a RaaS response if called upon</p>

36.	Schedule 7 Special Requirements	<i>proposed addition - RaaS Service Parameters table</i>	Insert a “RaaS Service Parameters” table in Schedule 7 which will detail the minimum energy capacity to be reserved and available for RaaS depending on season, month, day, hour, as defined by the DNO
37.	Schedule 7 Special Requirements	<i>proposed addition - RaaS Termination Compensation table</i>	Insert a “RaaS Termination Compensation” table in Schedule 7 which will detail the payments that would be due by either party in the event of the other party terminating for convenience

4 Overview of other contracts a RaaS Service Provider may enter into

This section of the report considers contractual relationships with other parties that a RaaS Service Provider may enter into, both at present and as RaaS becomes more widely deployed and the market evolves to incorporate increasing numbers of participants and smart, sustainable energy technologies. A description of the potential parties is provided, and the roles and responsibilities, data exchanges, and key contractual terms that may be required are explored.

4.1 Description of Parties

The table below describes a number of other the parties that a RaaS Service Provider may contract with, as identified through project work and external stakeholder engagement. It is acknowledged that this is a non-exhaustive list, and other actors may participate, particularly as the RaaS concept evolves. Further, where reference is made to ‘BESS’ below for conciseness, it is recognised that other forms of energy storage system may also provide a suitable RaaS solution.

It is relevant to note that as the RaaS project aims to develop and trial a first implementation of RaaS to demonstrate the concept, the scope of the trial scheme will not extend to the inclusion of all of these participants. Rather, it has become clear during the project that the future rollout of RaaS and deployment at other sites will allow the concept to develop and open up to other suitable participants.

Party	Description
Aggregator	A company appointed to manage use of the headroom battery/energy storage capacity for participation in other Flexibility Services and markets to generate revenues for the RaaS Service Provider. The Aggregator may share in the revenue or margin it generates from these activities, or may have some other payment structure. A RaaS Service Provider will not need an Aggregator if they have the capability to manage their own participation.
Battery Supplier	The company who will supply the battery to be installed on site to deliver RaaS.
BESS Installer	The company who will install the BESS and provide the associated electrical, comms and control integration works. In some instances, the BESS Installer may also be the Battery Supplier.
BESS Operation and Maintenance (O&M) Provider	The company who will maintain the operational capabilities of the BESS over its lifetime. This is expected to include remote monitoring for performance assessment, maintenance, repairs and parts replacement. In some instances, the BESS Installer or Battery Supplier may also provide these services to the RaaS Service Provider.
Energy Management System (EMS) Suppliers	The company who will provide the control system used to manage BESS provision of RaaS and other Flexibility Services, and the control system’s interface with the DNO network assets

	and control systems. In some instances, the Battery/Storage Scheme Supplier may also be the EMS Supplier.
Energy Suppliers	The energy retailer that the RaaS Service Provider/Aggregator enters into a suitable contract with for access to energy supplies, participation in the wholesale market, etc.
Individual Domestic or Commercial Customers	Household or business customers who have DER technologies (e.g. solar PV, or domestic energy storage), DSR capability (e.g. smart appliances), or an EV with smart charging or Vehicle to Grid (V2G) capability. As communication and control capabilities develop, it may be possible for such technologies to participate in the provision of RaaS through export to grid or through demand reduction. This capability may be managed as part of the customer's electricity supply arrangement, for example where they are signed up to an Aggregator, or may merit a direct agreement with a RaaS Service Provider.
Landowners	The RaaS Service Provider must find a suitable location to install the BESS, which is likely to require land purchase or lease land from a Landowner.
Local Distributed Energy Resources (DER)	For this definition we exclude domestic households who are considered separately. This definition applies to larger scale DER generation or storage such as wind turbines, hydro schemes, solar PV panels, combined heat and power units (reciprocal or fuel cell) and batteries which are connected to the RaaS network. Whilst local DER will receive a direct benefit from RaaS in that the network would remain available for e.g. accepting electricity exports at times when low carbon generation (and associated income for the DER) would have been lost as the network would have been unavailable due to a fault, it may be that in time, and depending on the scale of local DER in a RaaS area, there could be a more direct role for local DER, meriting a contract with the local RaaS Service Provider.
National Grid ESO or Distribution Network Operator	Either the RaaS Service Provider (if they manage their own Flexibility Services participation) or the Aggregator will enter contracts with the NG ESO or DNO to provide other Flexibility Services. Examples of other Flexibility Services at present include Balancing Mechanism and Dynamic Containment.

4.2 Explanation of key contractual considerations with Parties

The section below explores the possible contractual relationships with each of the parties listed in Section 4.1. This includes consideration of the roles and responsibilities, data exchanges, and key contractual terms that may be required. Again, where reference is made to 'BESS' below for conciseness, it is recognised that other forms of energy storage system may also provide a suitable RaaS solution.

4.2.1 Aggregator

Roles and Responsibilities

RaaS Service Provider

- Ensure operational availability of the BESS to participate in the Flexibility Services as agreed with the Aggregator.
- Ensure technical capabilities to meet Flexibility Service requirements as specified by NG ESO or DNO such as power requirement or duration.
- Install the necessary monitoring and control systems requested by NG ESO or DNO to be able to demonstrate performance of a service for qualification and payment.
- Provide site access for the Aggregator to maintain their equipment which controls the BESS when participating in Flexibility Services.

Aggregator

- Optimise the BESS in the Flexibility Services to maximise the revenue generated, including bidding and pricing strategy.
- Contract with NG ESO, DNO and/or Energy Supplier as required to enable battery charging and discharging and participation in other markets.
- Manage qualification of the BESS to enable participation in the relevant Flexibility Service.
- Provide the RaaS Service Provider with the equipment to connect the BESS to the Aggregators communication platform for management of participation in other Flexibility Services.
- Manage the settlement of transactions with NG ESO/DNO and payment to the RaaS Service Provider.
- Settlement of electricity supply payments, and any PPA, under the standard processes of the appointed supplier.

Key Contractual Terms

- Contract duration – the RaaS Service Provider must choose how long it wants to enter into a contract with the Aggregator for. Typically, for other services, this is 3 to 4 years to enable the asset owner to 'shop around', however that timeframe may represent a risk as at renewal the Aggregator could demand a larger share of the revenue/margin, impacting the RaaS Service Provider's business case.
- Payment arrangement – the parties must agree what share of the revenue/margin the Aggregator will receive. As a cost to the RaaS Service Provider, and depending upon when this fee is agreed, this may impact the RaaS Service Provider's business case and/or influence the RaaS fee sought from the DNO.

- Asset/system failure – definition of roles and processes to be followed in the event of a failure of the BESS or other systems, including investigation, remediation and terms of any compensation which may be due from the responsible party to the other party, e.g. for lost revenue.
- Termination – both parties must have the opportunity to terminate the contract if either default on or breach their obligations, this clause will include details of any compensation due to either party.

Data Sharing

- To qualify for participation in a Flexibility Service the RaaS Service Provider will have to perform tests, and provide asset information and monitoring/metering data, which the Aggregator can then use to demonstrate technical capability and secure participation in Flexibility Services.
- Depending on the Flexibility Service(s) in question, the RaaS Service Provider will need to monitor and provide information such as meter readings, response times, power delivered, duration of service, etc., to the Aggregator.
- The Aggregator will provide the RaaS Service Provider with a regular (e.g. monthly or quarterly) statement of the services delivered and the revenue generated and received from the NG ESO / DNO / wholesale market.

4.2.2 Battery Supplier

Roles and Responsibilities

RaaS Service Provider

- Provide battery technical functionality specification.

Battery Supplier

- Provide a battery to the required specification.
- Provide evidence of testing and quality control measures.
- Deliver battery to site safely and by agreed date.

Key Contractual Terms

- Completion date – a date agreed between both parties as to when the battery will be delivered to site. This is to enable the BESS Installer to complete the installation and ultimately enable the RaaS Service Provider to enter into Flexibility Services contracts including RaaS. If the Battery Supplier does not deliver the battery to the agreed date the RaaS Service Provider could incur delay charges from the BESS Installer, and they will forfeit the planned Flexibility Services revenues. The contract should allow the RaaS Service Provider to levy delay fines against the Battery Supplier, typically based on a daily rate.
- Warranties and Defects – on purchase, the Battery Supplier will provide a specification as to how long the battery should last and how it should perform operationally, e.g. capacity, response time, degradation, etc. The RaaS Service Provider should obtain a warranty from the Battery Supplier to ensure the battery meets this specification for the life of the battery. This means if there are any defects with the battery or it is not performing to specification the Battery Supplier will be obliged to remedy the problem at their cost, and in a timely manner.

- Liabilities and Indemnities – the Battery Supplier will be required to accept liabilities associated with delivering the battery to site, including any risk of injury or property damage, in addition to liabilities associated with other factors such as fraud and breach of Law on their part. The liability cap agreed with the Battery Supplier must be set at an appropriate level.
- Termination – the RaaS Service Provider should ensure they have the right to terminate the contract prior to delivery of the BESS to site. This could be for various reasons such as excessive delays or breach of contract by the BESS Supplier, force majeure events which make it uneconomical or unfeasible to go ahead with the installation of the BESS, or circumstances within the RaaS Service Provider’s business that make it unviable to proceed. This should make allowance for any payment appropriately due to the BESS Supplier for works undertaken.

Data Sharing

- To monitor the ongoing performance and operation of the battery, access to real-time (or close to real-time) data should be available, e.g. via a remote online portal which both parties have secure, and purpose specific, access to.

4.2.3 BESS Installer

Roles and Responsibilities

RaaS Service Provider

- Provide battery physical and technical functionality specification(s).
- Procure land for BESS to be installed on.
- Procure battery and its delivery to site.

BESS Installer

- Design installation and commissioning of the battery based on the RaaS Service Provider specification.
- Arrange any necessary civils works.
- Install the battery to design specification including interfaces to DNO network assets/control systems.
- Commission the BESS system, including its interaction with DNO assets/control systems.

Key Contractual Terms

- Completion date - a date will be agreed between both parties as to when the battery will be installed, commissioned and operational by. If the BESS Installer does not complete the installation to the agreed date the RaaS Service Provider will forfeit the planned Flexibility Services revenues. The contract should allow the RaaS Service Provider to levy delay fines against the BESS Installer, typically based on a daily rate.
- Warranties and Defects – unless they manufacture any of the items installed the BESS Installer will pass on any warranties received from manufacturers to the RaaS Service Provider. The warranties will vary in length depending on the type of equipment. The RaaS Service Provider should ensure the BESS Installer provides a defects liability period. This is the period within which the BESS Installer will return to site to repair a problem at their cost. For example, this could be for two years after the BESS has been installed.

- Liabilities and Indemnities – the BESS Installer will be required to accept liabilities associated with their activities on site, including any risk of injury or property damage, in addition to liabilities associated with other factors such as fraud and breach of Law on their part. The liability cap agreed with the BESS Installer must be set at an appropriate level.
- Termination – the RaaS Service Provider should ensure they have the right to terminate the contract prior to the completion of the BESS installation. This could be for various reasons such as excessive delays or breach of contract by the BESS Installer, force majeure events which make it uneconomical or unfeasible to complete the installation of the BESS, or circumstances within the RaaS Service Provider’s business that make it unviable to proceed. This should make allowance for any payment appropriately due to the BESS Installer for works undertaken.

Data Sharing

- The BESS Installer will provide ‘as built’ drawings to the RaaS Service Provider for their use and/or to pass on to the BESS O&M provider as appropriate.
- The BESS Installer will pass on all warranties to the RaaS Service Provider.

4.2.4 BESS Operation and Maintenance Provider

Roles and Responsibilities

RaaS Service Provider

- Maintain access to the site to enable the BESS O&M Provider to safely fulfil their obligations.
- Maintain the site to enable the BESS O&M Provider to safely fulfil their obligations.

BESS O&M Provider

- Monitor performance of the BESS to ensure it continues to meet the required specification.
- Maintain the BESS to prevent breakdowns and ensure reliability.
- Repair the BESS if it breaks down.

Key Contractual Terms

- Key Performance Indicators (KPIs) – the BESS O&M Provider’s objective is to ensure the availability of the BESS in line with the required specification, allowing the RaaS Service Provider to meet its Flexibility Services obligations. Therefore a key performance target for the BESS O&M Provider should be the availability of the BESS, for example expressed as a given percentage of time across a year. If the BESS O&M Provider fell below this target, they would have to pay a penalty to the RaaS Service Provider in recognition of and aligned to the Flexibility Services revenues lost. Other KPIs can be agreed as applicable.
- Liabilities and Indemnities – the BESS O&M Provider will be required to accept liabilities associated with their activities on site, including any risk of injury or property damage, in addition to liabilities associated with other factors such as fraud and breach of Law on their part. The liability cap agreed with the BESS Installer must be set at an appropriate level.
- Termination – the RaaS Service Provider should ensure they have the right to terminate the contract during the operational phase of the BESS. This could be for various reasons such as BESS O&M Provider performance related issues, breach of contract, force majeure events which make

it uneconomical or unfeasible to continue operation of the BESS, or circumstances within the RaaS Service Provider's business which make it unviable to continue operating the BESS.

Data Sharing

- The BESS O&M Provider will provide a performance report to the RaaS Service Provider on a regular (e.g. monthly, quarterly, yearly) basis to demonstrate their performance against their KPIs and the BESS O&M Provider will allow the RaaS Service Provider access to data sources and monitoring equipment for the purposes of data auditing.
- The BESS O&M Provider will agree in advance with the RaaS Service Provider when the BESS can be taken out of service to undertake maintenance or carry out repairs - this will also be communicated and agreed with the DNO.

4.2.5 Energy Management System (EMS) Supplier

Roles and Responsibilities

RaaS Service Provider

- Specify the EMS technical specification required

EMS Supplier

- Provide an EMS to the required specification.
- Install the EMS to specification and by agreed date, including interfaces to DNO network assets/control systems.
- Commission the EMS, including its interaction with DNO assets/control systems, and provide evidence of testing and quality control measures.
- Maintain and monitor the EMS to ensure reliability.

Key Contractual Terms

- Key Performance Indicators (KPIs) – As any delays in EMS interface performance or unplanned down time could affect the RaaS Service Provider's ability to deliver its obligations, one key performance target for the EMS Supplier should be the availability of the EMS operating in real-time to control the BESS activities as specified by the RaaS Service Provider, for example expressed as a given percentage of time across a year. If the EMS Supplier fell below this target, they would have to pay a penalty to the RaaS Service Provider in recognition of and aligned to the Flexibility Services revenues lost. Other KPIs can be agreed as applicable.
- Warranties and Defects – the EMS Supplier should provide a warranty to the RaaS Service Provider for any hardware, firmware and software required for the EMS. The RaaS Service Provider should ensure the EMS Supplier provides a defects liability period within which the EMS Supplier will return to site to repair a problem at their cost.
- Completion date – a date agreed between both parties as to when the EMS will be installed and operational from. This is to enable the RaaS Service Provider to enter into Flexibility Services contracts including RaaS. If the EMS Supplier does not complete by the agreed date the RaaS Service Provider could forfeit the planned Flexibility Services revenues. The contract should allow the RaaS Service Provider to levy delay fines against the EMS Supplier, typically based on a daily rate.

Data Sharing

- To monitor the ongoing performance and operation of the battery and EMS, access to real-time (or close to real-time) data should be available, e.g. via a remote online portal which both parties have secure, and purpose specific, access to.

4.2.6 Energy Supplier

In keeping with other BESS and energy storage schemes, a typical contract would be required between the RaaS Service Provider and an Energy Supplier for the supply of energy to charge the BESS, and to export to grid when appropriate, and enable the participation in wholesale market trading.

It is also worth noting that in due course, with the introduction of half hourly metering and Time of Use (ToU) tariffs, the wider industry will need to consider how temporary islanded operation could work with supply tariffs to avoid a situation whereby e.g. during a RaaS event tariffs are particularly low, which may incentivise higher demand, thereby reducing the duration of power cut that the RaaS scheme could cover.

4.2.7 Individual Domestic or Commercial Customers

Roles and Responsibilities

RaaS Service Provider

- Provide the platform which allows domestic and commercial customers to participate directly in RaaS in a coordinated, transparent and data secure way, and provide the functionality to validate participation and calculation the associated contribution based on monitored data.
- Support the electrical and/or comms integration of suitable customer owned technologies into the RaaS scheme.
- Provide appropriate communications to signal a RaaS event, together with any specific level of response required, and to signal the conclusion of the event.
- Set appropriate prices and pay customers for their participation.
- Forecast the availability of RaaS that can be provided from Individual Domestic or Commercial Customer technologies and ensure that any remaining RaaS requirement is covered by other means (e.g. the RaaS BESS).

Individual Domestic or Commercial Customers

- Register to participate based on a clear understanding of the RaaS scheme and its operation.
- Manage any household or commercial systems associated with the relevant asset(s) to ensure settings support a response to a RaaS signal.
- Notify the RaaS Service Provider of any expected periods of unavailability.

Key Contractual Terms

- Contract duration – this must be clear to the Customer and the RaaS Service Provider.
- Availability and response obligations/expectations – this will set out any obligations or expectations associated with participation, including reference to pre-defined or ‘open’ levels of response, expected availability (e.g. 5 to 8pm each evening, summer months only, etc.),

acknowledgement of whether it is acceptable for the asset to be available for other services in parallel to RaaS, etc.

- Payment arrangements – clear definition of the utilisation and/or availability payments associated with participation.
- Termination – the RaaS Service Provider must have the ability to terminate the contract if the Customer is consistently unavailable.
- Additional considerations - depending upon other use cases for the RaaS BESS, and/or energy policy decisions such as the potential future implementation of peer to peer trading, it may also be appropriate to incorporate terms relating to wider energy market activities, for example where the BESS has a role in supporting the direct community use of electricity generated by local community renewable energy schemes, these terms must be made with reference to established relationships with the Energy Supply company/ies of the customer(s) and RaaS Service Provider.

Data Sharing

- The RaaS Service Provider will signal the start and end of a RaaS response to the participating Customer technologies (e.g. via the platform).
- The RaaS Service Provider should provide an option for the Customer to receive a direct notification in the event that a RaaS response has been triggered (subject to the Customer permitting such contact in line with GDPR considerations).
- The Customer should allow the platform used to provide an indication of available energy to the RaaS Service Provider.
- The platform used will inform the Customer of the energy contributed to a RaaS response.

4.2.8 Landowners

Roles and Responsibilities

RaaS Service Provider

- Use the land for the purpose for which it was leased.
- Maintain the land as per the terms of the lease.
- Ensure Landowner's access rights are maintained.

Landowner

- Maintain the land as per the terms of the lease.
- Ensure the RaaS Service Provider's access rights are maintained.

Key Contractual Terms

- Land to be leased – the location and area of the site must be specified, including a site plan that marks out the land to be leased.
- Lease duration – the duration must cover the period the RaaS Service Provider is obligated to provide RaaS and cover any period after the RaaS contract in which it still intends to participate in Flexibility Services.
- Permissions – the contract should set out which party would be responsible for obtaining any permissions or permits necessary for the purpose of RaaS

- Accessibility – both parties must make sure the land is accessible to each other as required under the lease.
- Maintenance – both parties must maintain their element of the land to the agreed standard.
- Rent – the contract will detail the amount of rent due by the RaaS Service Provider to the Landowner during the contract term.
- Permitted use – the lease will document what the RaaS Service Provider can use the land for, and reflect any restrictions on use.
- Grant of easements – details of any Easements or Wayleaves granted by the Landowner so that the RaaS Service Provider can connect the battery to the electricity network (and other utilities if applicable).

Data Sharing

- The RaaS Service Provider will need to provide clear information on the proposed use of the land.
- The RaaS Service Provider may need to provide information on the scheme (equipment, size, layout, etc.) proposed for the site, including a site plan.
- The Landowner will need to provide the RaaS Service Provider with any information they have about the plot of land e.g. surveys, planning obligations, preservation orders, etc.

4.2.9 Local Distributed Energy Resource (DER)

Roles and Responsibilities

RaaS Service Provider

- Provide the platform which allows Local DER together to participate directly in RaaS in a coordinated, transparent and data secure way, and provide the functionality to validate participation and calculation the associated contribution based on monitored data.
- Support the electrical and/or comms integration of suitable Local DER into the RaaS scheme.
- Provide appropriate communications to signal a RaaS event, together with any specific level of response required, and to signal the conclusion of the event.
- Set appropriate prices and pay Local DER for its participation.
- Forecast the availability of RaaS that can be provided from Local DER and ensure that any remaining RaaS requirement is covered by other means (e.g. the RaaS BESS).

Local Distributed Energy Resource

- Register to participate based on a clear understanding of the RaaS scheme and its operation.
- Manage any systems associated with the Local DER to ensure settings support a response to a RaaS signal.
- Ensure availability of the Local DER to participate in RaaS as agreed with the RaaS Service Provider.
- Deliver the RaaS requirements.
- Install any metering and controls necessary to be able to demonstrate performance of service, for qualification and payment.
- Notify the RaaS Service Provider of any expected periods of unavailability.

Key Contractual Terms

- Contract duration – this must be clear to both parties, and the RaaS Service Provider may wish to link this to the period it has contracted with the DNO for, or may choose a shorter period to allow a review of the participation of the Local DER before then extending commitment, further, contract length may also depend on the remaining life of the DER depending on its age.
- Availability and response obligations/expectations – this will set out any obligations or expectations associated with participation, including reference to pre-defined or ‘open’ levels of response, expected availability (e.g. certain months/seasons, etc.), acknowledgement of whether it is acceptable for the asset to be available for other services in parallel to RaaS, etc.
- Payment arrangement – clear definition of the utilisation and/or availability payments associated with participation.
- Asset failure – should the DER fail this will determine what steps the DER must take to remediate the problem. Depending on who was responsible for the fault this clause will detail what compensation is due for lost revenue.
- Termination – both parties must have the opportunity to terminate the contract if either default on or breach their obligations, with details of any compensation due as a result of a breach also set out.

Data Sharing

- The RaaS Service Provider will signal the start and end of a RaaS response to the Local DER (e.g. via the platform).
- The Local DER should allow the platform used to confirm a response to a RaaS event signal from the RaaS Service Provider.
- The Local DER should allow the platform used to provide an indication of available energy to the RaaS Service Provider.
- The Local DER should notify the RaaS Service Provider of any periods during which they expect to be unavailable (e.g. outages for maintenance).
- The platform used will inform the Local DER of the energy contributed to a RaaS response.

4.2.10 NG ESO or DSO - other Flexibility Services

Roles and Responsibilities

RaaS Service Provider

- Ensure availability of the BESS to participate in the other Flexibility Services.
- Deliver Flexibility Service requirement as specified by NG ESO or DSO.
- Install the necessary metering and controls requested by NG ESO or DSO to be able to demonstrate performance of service for qualification and payment.
- Manage qualification of the BESS to enable participation in the relevant Flexibility Services.

NG ESO/DSO

- Procure Providers to deliver Flexibility Services via auctions, or as otherwise appropriate.
- Issue instructions to Provider to deliver Flexibility Services when required.
- Undertake prequalification of providers depending on requirements of service.
- Validate performance of Providers and pay Providers as part of settlement.

Key Contractual Terms

Note that NG ESO/DSO are likely to have standard terms governing their products which will not be altered for specific participant - the RaaS Service Provider / Aggregator will have to ensure that they do not breach these arrangements.

- Termination – should the RaaS Service Provider fail to deliver the Flexibility Service in line with the specification, the RaaS Service Provider will have a window of time to remediate the issues, following which the NG ESO/DSO will have the right to terminate the contract.
- Reporting and metering – the NG ESO / DSO will specify what metering and other systems the RaaS Service Provider must have in place (e.g. including frequency, battery power, response time, duration and energy output monitoring) so that the RaaS Service Provider can provide the required performance reporting as required.
- Provision of other Services – this is a critical clause in the Dynamic Containment contract specifically, which will have a key influence on a RaaS Service Provider’s business case - should the delivery of Dynamic Containment be impaired by the RaaS Service Provider’s performance of another service at the same time then the RaaS Service Provider will have to reimburse the NG ESO for any costs and expenses incurred as a result.

Data Sharing

- To qualify for participation in a Flexibility Service the RaaS Service Provider will have to provide asset and metering data to the NG ESO/DSO (e.g. meter readings, response times, power delivered, and/or duration of service), and perform tests to demonstrate the functionality and capability to deliver the service.
- The NG ESO/DSO will provide the RaaS Service Provider with a monthly statement of the services delivered and the revenue generated and will pay for the provision of those other Flexibility Services.

5 Summary of Findings and Conclusions

A review of the Open Networks' Flexibility Services Standard Agreement by the RaaS project team has established that it would be both possible and appropriate to incorporate the procurement of RaaS into the FSSA.

Section 3.3 lists the proposed changes identified. In summary these are:

- Introduction of a definition for 'RaaS Activation' in addition to 'Utilisation Instruction' - when contracted for RaaS the BESS will automatically respond to a network outage, rather than a DNO making a decision to issue a utilisation instruction.
- Inclusion of Company (DNO) Obligations associated with the provision of a RaaS service - the FSSA does not currently include a Company Obligations clause however for RaaS the DNO would be required to undertake activities associated with e.g. installation of DNO side elements of a RaaS scheme & joint commissioning, monitoring, and investigation & resolution of any issues with system operation.
- Amendments to schedules - the existing schedules would need to be amended to reflect the unique attributes of RaaS, for example with the inclusion of a 'RaaS Service Parameters' table in Schedule 7, and the definition of key performance indicators which reflect the complexity of variable durations of response and reserved capacity required for RaaS.
- Amendments to Service Windows and Power Requirement (equivalent to RaaS). The agreement currently allows the DNO to amend these. This would have to be optional to the RaaS Service Provider in case it affects the revenues they generate from participation in other Flexibility Services.
- At present, the FSSA refers to auctions and utilisation if successful, however as RaaS provides a geographically specific solution for resilience, likely needing investment in a new BESS asset, an Investor would require a commitment from the DNO as to the contract term - it is unlikely, at least during the early stages of RaaS deployment, that an Investor would be prepared to enter regular auctions for RaaS unless they are highly confident that they can recover their investment through other Flexibility Services.

Careful consideration may also need to be given to the role of contractual obligations verses performance incentives/penalties for RaaS, likewise to the balance of e.g. fixed, availability and utilisation payments. It is recognised that different approaches may be preferred by different types of Investor, and so the standard agreement would need to reflect and accommodate all suitable options - this area will be explored further through stakeholder engagement during Phase 2 of the RaaS project, subject to a positive Stage Gate decision.

These points will be raised with the ENA Open Networks project during Phase 2 of RaaS, and discussed with the appropriate work streams to reach an industry consensus which ensures that the standard agreement will be suitable for the future BAU roll out of RaaS.

Section 0 then sets out key factors associated with a RaaS Service Provider's potential engagement with other actors as part of the provision of a RaaS scheme. The additional parties considered are:

- Aggregators
- Battery Suppliers
- BESS Installers
- BESS O&M Providers
- Energy Management System (EMS) Supplier
- Energy Supplier

- Individual Domestic or Commercial Customers
- Landowners
- Local Distributed Energy Resources
- National Grid ESO or DSOs

The key contractual themes then identified across the different partners were:

- Availability – parties must be accountable for ensuring the availability of their technology to deliver RaaS, particularly where failure to do so would impact on the RaaS Service Provider revenues.
- Termination – if a party is failing to fulfil their obligations or is otherwise in breach of the agreement, the other party must have a right to terminate the agreement, and/or be recompensed for and costs or losses due to the fault of the other party.
- Warranties and Liabilities – it is appropriate for the RaaS Service Provider to hold partners accountable for the repair or replacement of items not performing as specified.
- Contract duration – in some instances, the RaaS Service Provider will need to enter long term contracts (such as with Landowners) to ensure the BESS can operate for the duration required to meet business case expectations, and in other instances the RaaS Service Provider may seek shorter term contracts to be able to monitor the operation of a system and/or performance of other parties (e.g. Aggregators).
- Payment – mechanisms for relevant parties to receive appropriate payment for participation in RaaS.

Subject to a positive Stage Gate decision, the proposals put forward in this report will continue to be reviewed and refined as the RaaS concept is implemented and continues to develop through the trial phase of the project.

Appendix 1 Marked up copy of the FSSA

A copy of v1.2 of the Flexibility Services Standard Agreement has been marked up with the proposed changes presented in this report, and accompanies this document.