Resilience as a Service

WP 5 Internal Deliverable Report: "Investor Business Case Modelling Methodology Report" (E5.1)

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RaaS

Resilience as a Service

Scottish & Southern Electricity Networks

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1. Contents

2. Executive Summary

RaaS Work Package 5 'Business Model' aims to develop the Investor Business Case and Heads of Terms for the Business as Usual RaaS concept.

Deliverable E5.1 has been created to gain agreement between the project partners (SSEN, Costain and E.ON) on the Investor Business Case modelling methodology, the inputs required and outputs to be produced, and the proposed structure of the Investor Business Case report to be provided as deliverable E5.3 'Investor Business Case'.

The purpose of this preparatory work is to ensure that the output of the Investor Business Case will feed all relevant information into the project stage gate decision on whether to proceed to Phase 2 of the project with installation and trial of a RaaS system.

Agreement has been reached between the partners, and this report presents the outline of the proposed IBC report, together with the accompanying template spreadsheet model.

3. Introduction & Purpose of Report

The RaaS project is an Ofgem Network Innovation Competition (NIC) funded project that 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, E.ON are an energy solutions provider who are leading the technical and commercial development and delivery of the project, and Costain are a management consultancy acting as programme managers while also providing input to the market design assessment. The project is publicly funded through NIC and has a budget of £10.2m.

The aim of the project is to investigate the technical application and commercial opportunities associated with the provision of a new flexibility service that could be offered to 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.

This project will determine how network resilience can be improved in a cost-effective manner for customers who experience an untypically high frequency of outages. This can be achieved by a DNO procuring RaaS from a third-party service provider who can stack revenues gained through participation in other flexibility markets. This project seeks to evaluate the financial case from a DNO perspective while giving insight to RaaS service providers on the investment case necessary and optimal flexibility markets to operate in.

In the first phase, the project focuses on site selection, system design for the chosen demonstration site, and refinement of the business case for RaaS. This stage will validate whether the concept is technically feasible and financially viable to inform a decision to be made in 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.

Phase two of the project comprises the delivery, commissioning and operation of the system in a test phase and is due to start in 2022. It will involve monitoring and evaluation of the systems performance plus examining different combinations of flexibility services.

This report has been produced to ensure that the outputs of E5.3 Investor Business Case identify the market opportunity for investors, highlight the factors that shape the opportunity and support the decision on whether to proceed with Phase 2.

A high-level template for the proposed Investor Business Case spreadsheet model has also been created to accompany this report, as referenced in Appendix 1. The model will be developed through E5.3 and will allow an investor to assess an individual RaaS site or a portfolio of potential sites.

Completion of Deliverable E5.1 ensures that the format and content of E5.3 can be planned/sourced well in advance of completion to allow sufficient time to refine the business case to its best version. It manages the expectations of the partners on the output of E5.3 and gains their agreement that E5.3 will achieve its objectives.

4. Proposed Investor Business Case document structure

The following pages of this E5.1 report outline the proposed content of the Investor Business Case (IBC) report to be provided as deliverable E5.3. That report will present the findings from the Investor Business Case assessment undertaken using the template model developed for this deliverable E5.1.

Appendix 2 sets out wider project activities that will feed in to completion of deliverable E5.3 'Investor Business Case'.

4.1. Purpose of the Investor Business Case document

This section will set out the purpose of the E5.3 Investor Business Case document, which will be to:

- Give an overview of the RaaS project
- Explain the proposed solution and commercial strategy
- Describe the factors that have been considered within the Investor Business Case assessment
- Explore investor types
- Describe the sources of information used (including why they are relevant, how certain the info is, etc.) and set out the business case assumptions
- Present the financial business case
- Identify factors that will act to influence the business case in future (e.g. technical capability to prioritise individual loads to be restored, DSR to smooth/reduce demand during RaaS operation, economies of scale, etc.)
- Explain the risks and opportunities
- Summarise and conclude on the market opportunity for investors
- Identify any recommendations for Ofgem and BEIS to facilitate investor participation

4.2. Introduction to RaaS project

This section will provide a brief overview of the project, its evolution and objectives.

4.3. Investor Types

This section will explore the types of companies that might want to invest in RaaS including:

- Forecasts on the volume and size of participants
- Barriers to entry
- Competitive advantage by investor type

4.4. Proposed Solution and Commercial Strategy

The following sections map out the decisions that will be required by an investor when developing a RaaS solution and assessing the associated business case.

4.4.1. Suitable Locations

This section will be a high-level summary drawing on the detailed reports, including:

- Summary of the criteria for identifying sites suitable for RaaS deployment
- Estimated volumes by regions of UK (informed through findings from the DNO Business Case)
- Specific details for the trial site selected for the RaaS project as described in E2a.1 'Site Selection Report'

4.4.2. Technical Specification

This section will provide a high-level summary of technical aspects of the system, drawing on other detailed project reports, including:

- Summary of proposed technical solutions
- Explanation of reasons for proposed solutions
- Specific details for the trial site

4.4.3. Procurement Strategy

This section will explore how investors might procure battery installation and maintenance services from suppliers to encourage a competitive supply chain, participation by all investor types and to drive best value for DNOs, including:

- Work packages – consideration of the potential benefits of investor procurement through separate, distinct work packages vs procurement from a single supplier, with regard to cost effectiveness and participation of different organisations to build the supply chain for flexibility services
- Tender process (e.g. Frameworks) – will it be more cost effective to work with a network of suppliers through a framework or tender each project. Will a tender process enable certain suppliers to monopolise the market deterring entry by other participants?
- Size of supplier market – how large are the equipment, installation and maintenance supplier markets. Will a small supplier market enable larger investors to sweep up availability restricting access for certain investor types?
- How to drive savings – as the RaaS market matures, what factors will act to reduce/influence costs? Will smaller investors benefit from these savings or will suppliers take advantage of their weak negotiating position?
- Specific details for the trial site – this will be a high-level summary of the planned procurement process for the demonstration site.

4.4.4. Revenue Optimisation Strategy

This section will explore what markets and revenue streams are available to the RaaS provider, including:

- How to maximise revenues
- How these evolve over time and the impact on the RaaS fee to DNO's
- Conflicts and conflict resolution between different services
- Which markets
- Size of markets
- Certainty / maturity of markets
- Market drivers
- Competition

The influence of these factors on the trial site selected for the RaaS project will also be considered.

4.4.5. Contract Strategy

This section will explore the key contractual terms expected to relate to procurement of a RaaS service from an investor's perspective, including:

- Length of contract – how might the DNO contract period relate to the life of the battery asset
- Determination of RaaS fee – how does the revenue from flexibility services affect the fee payable by DNO's for the RaaS service

- Precedence of services – set out how the investor will prioritise the provision of RaaS with flexibility market services
- Expected payback and returns – links to 'Determination of acceptable RaaS fee'
- Provider and DNO obligations – the service levels and key performance indicators required by the DNO from the investor, and any obligations the DNO must fulfil to enable the RaaS service to be provided in line with expectations
- Inflation mechanisms – will the RaaS fee inflate annually or will inflation be managed through the flexibility services performance forecast
- Termination – in what scenarios can the contract be terminated early and by whom, with an indication of cost to DNO of early termination
- Liabilities – investor expectations on liability caps for themselves and for the DNO
- Ownership – will batteries have to be removed at the end of contracts, if so, how will the cost be accounted for

Note - as a point of clarification for the reader, the contract strategy presented here is designed for BAU deployment of RaaS, however for the trial site the contract terms will be incorporated into and form part of the project partnership Collaboration Agreement.

4.5. Business Case Modelling Methodology

This section will provide a description of the spreadsheet model used to assess the Investor Business Case, including the inputs, assumptions, calculations and outputs. The model will allow an investor to assess an individual RaaS site or a portfolio of potential sites.

A description will also be given of the scenario analysis undertaken, using the model. This analysis will consider the RaaS product design scenarios defined in E4.1 'Flexibility Scenarios Report', with further sensitivity analysis possible on key input factors.

4.5.1. Investor Business Case - Inputs

The inputs into the Investor Business Case will include the following:

- Asset sizes
- Asset life
- Quantity
- Programme phasing (multiple sites)
- Potential RaaS fees (income for availability and/or utilisation)
- Potential revenues from other Flexibility Services
- Capex cost, further detailed in the Capex Cost Breakdown subsection below
- Opex costs, further detailed in the Opex Cost Breakdown subsection below
- Inflation
- Period of ownership
- Tax aspects (e.g. Corporation Tax rates, Written Down Allowance)
- Return expectations
- 10 year RaaS market projection
- Required service levels for resilience for different scenarios as described in E4.1 'Flexibility Scenario Report'

4.5.2. Investor Business Case - Assumptions

This section will highlight the key assumptions made in developing the Investor Business Case, and the levels of confidence in these.

The assumptions will be discussed and agreed by all partners.

Table 1 below illustrates the information to be presented for each assumption.

Table 1: Information to be presented for each assumption

Input Name	Assumption	Source	Received	Certainty	Value at Risk

4.5.3. CAPEX & OPEX Cost Breakdown and Descriptions

This section will provide a breakdown and explanation of all RaaS service provider costs associated with the provision of RaaS to a DNO (e.g. battery, installation, maintenance etc.), including:

- Forecast cost projections over time
- Specific details for the trial site

4.5.4. Calculations

This section will detail the calculations incorporated into the Investor Business Case model to create the outputs, as summarised in Table 2. A high level template for the proposed spreadsheet model has been created to accompany this report, as referenced in Appendix 1.

Table 2: Calculations

Output	**Description**	**Inputs**
Market Size - Volume	The yearly/cumulative number of batteries installed	Suitable Locations Battery Install Phasing
Market Size - Capacity	The yearly/cumulative capacity of batteries installed	Suitable Locations Battery Size
Market Size - Investment Required	The yearly/cumulative cost of batteries installed	Suitable Locations Battery Install Phasing Battery Size Market Duration Year 0 RaaS Provider Battery Install Cost RPI or CPI Battery Install Cost Projections
RaaS Capacity	The yearly/cumulative capacity reserved for resilience	Suitable Locations Battery Size Resilience Required
RaaS Revenue	The yearly/cumulative revenue from RaaS fees	Suitable Locations Battery Install Phasing Battery Size Market Duration RPI or CPI Contract Length RaaS DNO Fee

Flexibility Services Revenue	The yearly/cumulative revenue from flexibility services	Suitable Locations Battery Install Phasing Battery Size Market Duration RPI or CPI Contract Length Flexibility Revenue per MW per year
Battery Operational Costs	The yearly/cumulative operational cost of maintaining batteries	Suitable Locations Battery Install Phasing Battery Size Operational Cost Operational Cost Projections RPI or CPI
Charging Costs	The yearly/cumulative cost of charging batteries to provide RaaS/flexibility services	Suitable Locations Battery Install Phasing Battery Size Year 0 Battery Charging Cost per MW Power Cost Projections
Depreciation	Release of battery cost to P&L over the life of battery	Individual Battery Install Cost Battery Life
Earnings before interest, tax and depreciation (EBITDA)	Revenue less costs. Interest, Tax and Depreciation excluded	RaaS Revenue Flexibility Revenue Battery Operational Costs Charging Costs
Earnings before interest and tax (EBIT)	Revenue less costs less depreciation. Interest and Tax excluded	RaaS Revenue Flexibility Revenue Battery Operational Costs Charging Costs Depreciation
Tax	Tax owed on EBITDA less capital allowances	Capital Allowances Rate Corporate Tax Rate EBITDA
Cashflow	EBITDA less Tax less Capex	EBITDA Tax Capex
Payback	The time it takes for the battery installation to breakeven	Cashflow
Internal Rate of Return	The discount rate that makes the net present value of all cashflows equal to zero.	Cashflow
Net Present Value	The present value of the future cashflows over the project period.	Cashflow Cost of capital

4.5.5. Investor Business Case - Financial Outputs

This section will record the key performance indicators and cashflow projections for RaaS providers, informed by analysis undertaken using the Investor Business Case model.

The outputs of the Investor Business Case will include the following:

- Investment costs
- Potential investor returns
- RaaS income projections
- Potential investor returns from a suite of Flexibility Services
- Acceptable levels of RaaS fees
- Evaluation of RaaS market size (forecast of eligible sites for investment)
- Evaluation of RaaS market growth
- Evaluation of Flexibility Services growth

There will be a specific section assessing the Investor Business Case for the RaaS trial site.

4.6. Scenario Matrix

This section will summarise the different market outturns and opportunities modelled in the Investor Business Case. There will be a specific section applying the scenarios to the RaaS trial site.

4.7. Risk and Opportunities

This section will include a list of the key risks and opportunities identified in deliverable E5.2 'Investor Risk Matrix', including:

- Probability
- Financial impact
- Mitigations

There will be specific details for the trial site.

4.8. Summary and Conclusions

This section will summarise the Investor Business Case and market opportunities, and provide conclusions and recommendations, including:

- Key risks
- Implications for development of the RaaS solution
- Next steps for subsequent project deliverables
- Commitments as a result of next steps
- Any recommendations for Ofgem, BEIS and others to facilitate investor participation

4.9. Impact of DNO Business Case on Investor Market Opportunity

As a counterpart to E.ON's evaluation of the Investor Business Case, SSEN will undertake an assessment of the DNO business case for RaaS to appraise the cost effectiveness of applying this as a solution for improving network resilience.

To consider the financial viability of RaaS from both the DNO and investor perspectives, the outputs of the corresponding business cases will be assessed to ascertain the potential RaaS market size, discarding those opportunities that would not be attractive to DNO's based on price proposals.

This section will analyse and summarise the implications of the DNO business case assessment on the Investor Business Case, including volume / value consequences.

It will also evaluate what, if any, options there are to improve the market opportunity.

5. Impact of Results on Subsequent Project Work

This Investor Business Case Modelling Methodology report was created to provide the foundation for E5.3 'Investor Business Case' and ensure that the planned format, content and modelling approach are accepted by the project team in advance of commencing the analysis required for E5.3. By providing a high level template and setting out the planned inputs, calculations, scenarios and outputs relevant to assessing the Investor Business Case for RaaS, this report will influence significantly the further work on the Investor Business Case and ultimately the evaluation of the BAU market potential.

Furthermore, the proposed Modelling Methodology will be used to engage with a range of stakeholders, including but not limited to potential investors. The information provided in this report will therefore also guide these discussions and help ensure that appropriate information is collected to build the Investor Business Case.

6. Impact of Results on Risks and Mitigation Measures

By outlining the Investor Business Case Modelling Methodology in this report, the project team provides a basis for all stakeholders to offer feedback and identify relevant changes to inputs and outputs. All comments and challenges received will be used to inform development of the Investor Business Case for RaaS, reducing risks associated with BAU implementation by ensuring that the approach developed reflects a good understanding of broader perspectives on investment.

7. Conclusions & Recommendations for Further Work

The development of this report has demonstrated the value of engagement between the RaaS project partners to draw on their different perspectives and experience. In addition to maintaining collaborative discussion throughout development of all aspects of the RaaS concept, a defined process for capturing ideas and interactions between different elements of the project has been established, and will be used to integrate this collective thinking into future project activities.

The work has also emphasized the importance of reconciliation between the Investor and DNO business cases to understand the relationship between the resilience services that could be provided in a given location, whilst ensuring commercial viability for all RaaS market participants. Within Work Package 5 the project team will ensure that the Investor Business Case and DNO business case for RaaS are understood to assess the financial viability of RaaS, and inform the project's Stage Gate Decision Point regarding the progression to Phase 2 of the project and the installation and trial of a RaaS solution on SSEN's network.

Further, the valuable insights from Costain's stakeholder engagement activities will be considered and incorporated where applicable within the Investor Business Case assessment and other related project activities.

Appendix 1 - Proposed Investor Business Case Model template

A high level template for the proposed Investor Business Case spreadsheet model accompanies this report and is available on request from the project team.

Appendix 2 - Contributions required to complete deliverable E5.3 - Investor Business Case

The table below lists which project partner and who within E.ON will lead on each section of the Investor Business Case. It also indicates which deliverables and work packages will contribute to the completion of each section.

IBC Section	**E.ON Lead**	**Partner Lead**	**Contribution from Deliverables or Work Packages (WP)**
RaaS Introduction	C Bucher	E.ON	n/a
Investor Types	C Bucher	E.ON & Costain	C5.1
Suitable Locations	I Berazaluce	E.ON	E2a.1 & E2a.2
Technical Specification	I Berazaluce	E.ON	E2a.1 & E2a.2
Procurement Strategy	C Bucher & I Berazaluce	E.ON & Costain	E3a.1, E3a.4, C6.1, C6.2
Revenue Optimisation	S Rahman	E.ON & Costain	E4.1, E4.2, E4.3 & C4.1
Contract Strategy	D Radburn	E.ON	WP 2 to 6
Business Case Assumptions	D Radburn	E.ON	WP 2 to 6
Cost Breakdown	I Berazaluce	E.ON & Costain	WP 2, 3 & 6
Financial Business Case	D Radburn	E.ON	WP 2 to 6
Scenario Matrix	D Radburn	E.ON	WP 2 to 6
Risks & Opportunities	D Radburn	E.ON	WP 2 to 6
Summary & Conclusions	C Bucher	E.ON	WP 2 to 6