RaaS - Resilience as a Service
local energy resources to improve security of supply

Maciej Fila - SSEN Distribution
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OUR NETWORK AT A GLANCE

Our electricity distribution network delivers power to over 3.9 million homes and businesses across the diverse and unique geographies of the north of Scotland and central southern England.

OUR DISTRIBUTION NETWORK AT A GLANCE

- Over **3.9 million** homes and businesses
- More than **888,000** customers on our Priority Services Register
- Over **128,000km** of overhead lines and underground cables
- Over **460km** of subsea cables powering our island communities
- Over **4,100** employees across the country

Figures as at October 2023
RaaS Concept
Improved resilience of the electricity system using local energy storage and generation to restore supply in the event of a power outage

Benefits
• Security of Supply - customers experience fewer and/or shorter interruptions
• Increased uptime - renewables continue to generate and export to grid at times when that energy would otherwise have been lost
• Reduced use of temporary diesel generation
• Additional income stream for storage / flexibility market assets

Why now?
To harness the growing number of third party owned assets and emerging markets for flexibility in addressing network challenges

Project Objective
Develop and demonstrate a new market-based solution to improve network resilience using local energy resources
£10.9m Network Innovation Competition funded project
RaaS Technical Solution

- 33 or 132kV Transmission Substation
- 132, 275 or 400kV
- Primary Substation
- 33/11kV
- Secondary Substation to LV network
- 33 kV Feeders
- 11kV Busbar
- 11kV Feeders
- 11/0.4 kV BESS Tx
- Additional 11kV Board
- BESS

Additional components:
- 33 or 132kV BSP / GSP
- 11kV Busbar
- Secondary Substation
- Existing
- New
**Detailed Design**

**topics addressed in the detailed design**

- **SSEN**
  - Modelling & Feasibility Studies - RaaS at primary substation level - WSP
  - Modelling of Inrush Currents During a RaaS Black Start Scenario - WSP
  - Protection & Control Settings Study - WSP
  - PoW Switching Studies - Enspec
  - Detailed DNO Control Scheme Design - SGS

- **E.ON**
  - Request for Information & Request for Proposals stages
    - identification and qualification of potential suppliers for BESS components & functionalities
  - RaaS BESS Detailed Engineering Design

https://ssen-innovation.co.uk/raas
Trial Site - Drynoch, Isle of Skye
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RaaS Commercial Solution

RaaS Supply Chain:
- RaaS Provider as single contractor to DNO
- Technology agnostic and cost-optimized procurement structure

Challenges to solve to mitigate risk of RaaS provider:
- Standardisation of requirements
- Operational optimisation
- Inclusion of local renewables
- Equipment Supply Chain
Business Case

RSP valuation - *Willingness to Accept*

DNO valuation - *Willingness to Pay*

- CIs / CMLs
- VoLL

- figures drawn from Electricity North West’s detailed Value of Lost Load to Customers studies
Next steps...

• Drynoch trial - proving the technical solution for fault response and local resilience

• approach to DNO requirements specification for procurement/tendering
  • level of granularity in requirements definition
  • duration of service - relative costs & benefits
  • specified reserved capacity vs ‘use available capacity’ approach

• the role of forecasting
  • demand - to inform the DNO requirements specification and reserved capacity at different points in time
  • interruptions - to inform DNO decisions re ‘standing down’ a RaaS service at certain points in time

• implications of different RaaS fee structures
  • e.g. fixed / availability / utilisation payments
  • contract vs incentives - rewards / penalties
  • impact of ‘opt out’ option
Wider industry activities

Flexibility Markets

• ENA’s Open Networks activities to bring standardisation which supports participation in local flexibility market - in line with actions from BEIS’ and Ofgem’s Smart Systems and Flexibility plan (2021)

• Ofgem’s work looking at creation of a System-Wide Flexibility Exchange / Common Digital Energy Infrastructure (CDEI) for flexibility markets - ‘Consultation: Future of local energy institutions and governance’ and ‘Call for Input: The Future of Distributed Flexibility’ (March 2023)

Network constraints & new connections - recognised as a key issue for network development and the net zero transition

• National Grid ESO’s Connections Reform project - ESO 5 Point Plan
• ENA’s Strategic Connections Group - Three-Step Action Plan
• Accelerated Strategic Transmission Investment (ASTI)
• Large Onshore Transmission Investments (LOTI) reopener
• Access SCR (Significant Code Review) - implemented for RIIO-ED2
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Questions & comments welcome - RaaS@costain.com
https://ssen-innovation.co.uk/raas
Stand M7