

# RIIO-ED2 Investment Decision Pack

## DSO - Active Network Management (ANM)

Investment Reference No: 31/SSEPD/IT-DSO/DSO\_ANM



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## Definitions and Abbreviations

ADMS	Advanced Distribution Management System
ANM	Active Network Management
BPDT	Business Plan Data Table
CAPEX	Capital Expenditure
CMZ	Constraint Managed Zone
DER	Distributed Energy Resources
DSO	Distribution System Operator
EHV	Extra High Voltage
EJP	Engineering Justification Paper
ESO	Energy System Operator
HV	High Voltage
IDP	Investment Decision Pack
IT	Information Technology
LCT	Low Carbon Technology
NPV	Net Present Value
OPEX	Operational Expenditure
OT	Operational Technology
OTN	Operational Technology Network
SCR	Significant Code Review
SWAN	South West Active Network

## 1. Executive Summary

Active Network Management (ANM) is already a major function across our networks, helping to maintain a safe and resilient network. There's a growing need to enable multiple Distributed Energy Resources (DERs) at a rapid pace, far faster than would be possible by manual means. Some of the drivers for this are listed below:

- Growth in Flexibility Markets and need for Flexibility Services.
- Need to ever improve customer service and value.
- Increase in Constrained networks, both in terms of maximising generation export and demand growth.
- Aspiration and need to decarbonise the distribution system and our related operations.
- Reliance on real-time data and communication for Whole System operation.
- Need to maximise use and related benefits of DER and LCT.
- Potential impacts of the Access SCR minded to position.

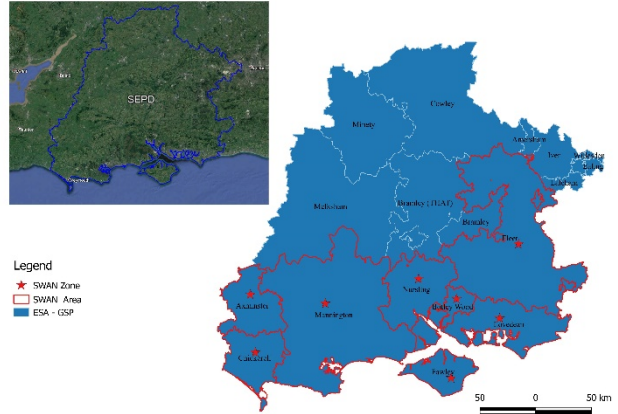
This project will enable our growth in terms of use and ability of ANM systems to help meet the growing demands and expectations of our customers, whilst efficiently maximising benefit from the existing distribution system and reducing the need for a traditional asset augmentation/ investment type approach.

## 2. Investment Summary Table

Summary Table			
<b>Name of Scheme / Programme</b>	DSO Active Network Management (ANM)		
<b>Primary Investment Driver</b>	Progress to Net Zero		
<b>Scheme Reference / Mechanism or Category</b>	31/SSEPD/IT-DSO/DSO_ANM		
<b>Output References / Type</b>			
<b>Cost (CAPEX)</b>	■		
<b>Delivery Year</b>	RIIO ED2		
<b>Reporting Table</b>	CV11		
<b>Outputs Included in RIIO ED1 Business Plan</b>			
<b>Spend Apportionment</b>	<b>ED1</b>	<b>ED2</b> ■	<b>ED3</b>

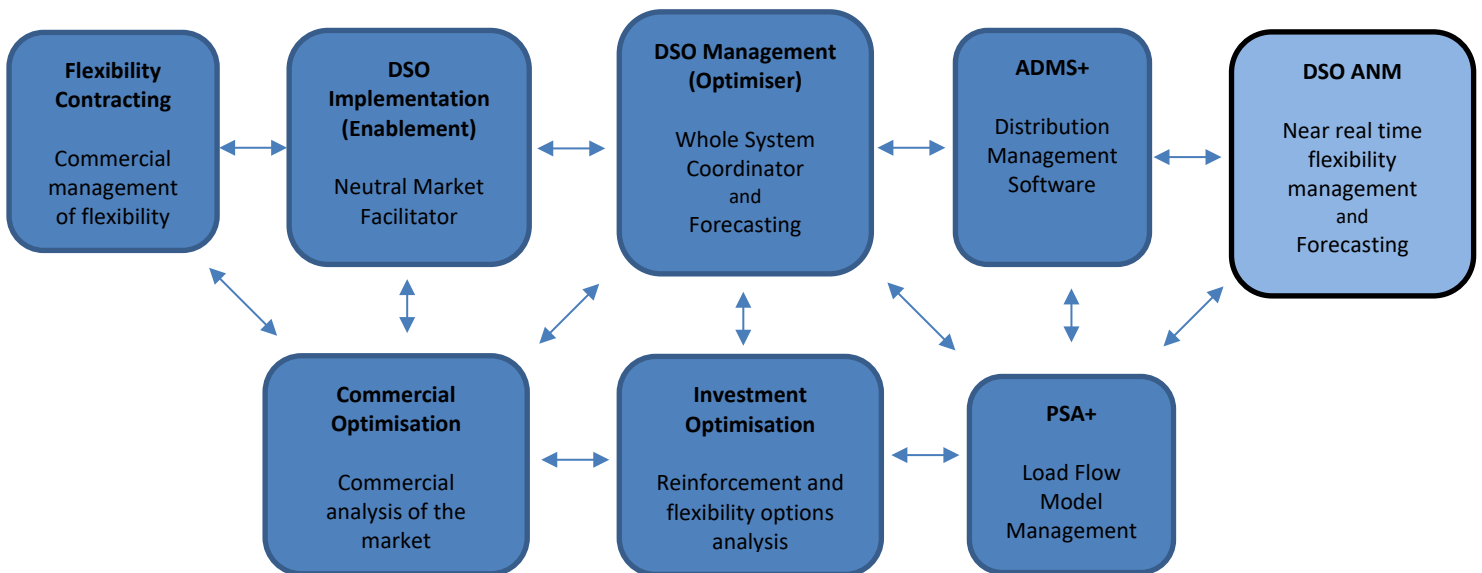
### 3. Introduction and Background Information

Throughout RIIO-ED1 we have increased our use of Active Network Management (ANM) facilities and have core systems working in conjunction with our Advanced Distribution Management System (ADMS). We have also started to use facilities to manage larger Flexibility services as we move closer towards maximising existing system capacity and DER export. Additionally, our South West Active Network (SWAN) ANM based system will defer traditional reinforcement at the Transmission level, to keep customer costs as low as possible whilst building system resilience.



In RIIO-ED2 we will increase the use of ANM systems to support growth in flexibility, dynamically manage our networks, and provide cost effective customer connections. We expect these to be based around the HV and EHV connected Flexibility resources, although the same core software facilities would be capable of managing large numbers of LV resources, albeit requiring additional scaling of IT and OT equipment. This RIIO-ED2 project will cover the development of new and improved functionality within ANM systems, integration works and the development of LV system solutions. The OT facilities (i.e. communications, sensors, controls, etc.) are set out in our OT projects; in particular, the roll-out of the OTN (EJP-ED2-OTN Rollout) is designed to ensure our system is ready for ANM.

The diagram below shows the interactions between the key systems outlined in our IDPs related to DSO. It should be noted that these systems will be integrated with our main business systems, e.g. our Asset Management Database and Geographic Information System.



#### 4. Business Plan Fit

This project can be mapped to following strategic themes:

Progress to Net Zero	Safe, resilient and responsive networks	A trusted and valued service to customers and communities	Positive Impact on Society
✓	✓	✓	✓

#### 5. Optioneering

Our plan in RIIO-ED2 is to build on our RIIO-ED1 research and investment to provide an industry leading platform from which enhance the delivery of Flexibility services, increasing resilience whilst minimising costs. For example, our ANM Centralisation Platform will provide a base for much of the functionality required. Our IT investment in this project is therefore targeted at further integrating our existing systems (ANM and ADMS) and the new DSO based facilities (largely DSO Management, although this will also link to the DSO Enablement). The exact make-up of these tools and systems will be determined through current Innovation trials (e.g. TRANSITION project); and we will continue to work with partners and our supply chain to ensure we are offering the best value solution.



The work in this project will include:

- Integration between ADMS, ANM and the new DSO facilities (primarily the ‘Whole System Coordinator’ function in our DSO Management project).
- Through the ‘Whole System Coordinator’ function appropriate market interactions through the Enablement tools (primarily the Market Facilitator function).
- Ensure that the tool(s) align and adapt to market operational requirements, such as the interaction of ANM systems, DSO markets and Constraint Managed Zones (CMZ) service management.
- Enabling the rollout of infrastructure which can facilitate lower voltage ANM connections at a lower cost.

The system must have the ability to take direct control to ensure network integrity during extraordinary events (i.e. storms), keeping the markets operating effectively, and maintain a safe and resilient network.

This project will rely on facilities being delivered in other projects, such as the DSO Enablement (Optimiser), DSO Management (Orchestrator) and Flexibility Contracting projects, which includes:

- System Co-ordination with other DSOs.
- ANM technology refresh (in OT projects).
- Pricing, market and ‘rules of the game’
- Connectivity model updates.
- Commercial information.

##### 5.1.1 Alternative Options

At present there is no alternative to an Active Network Management system. By nature, switching is undertaken at a speed that cannot be matched by manual means, so if the Flexibility benefits set out in this proposal are to be achieved, an ANM solution is required.

The proposed solution has been based on the best value solutions that are currently available. However, given the pace of development in this area, the market will be re-examined throughout the project lifecycle to ensure the best value solutions at that time are chosen for delivery.

## 6. Stakeholder Evidence

Our larger LCT suppliers stated, unsurprisingly, that they were keen on any technology or system that would maximise the return on their investment in Flexibility resources. Moreover, they stated that they would be more likely to deploy new Flexibility where there were systems that would maximise their return. Smaller LCT suppliers were less likely to be interested in such systems, as the cost of installation of control technology would likely be in excess of any benefit. If the technology were linked to the 'smart metering' infrastructure in some way, that might alter stakeholder willingness to invest in such intelligent systems.

More details of overall stakeholder engagement are set out in the *Digital Investment Plan (Annex 5.2)*.

## 7. Analysis and Cost

Costs have been developed using a bottom up approach and have been based on the best currently available solutions. IT systems in this sector are rapidly changing, so the market will be re-examined prior to delivery, and the best value option to meet the requirements set out above will be chosen. The project has been assessed over a 5-year lifecycle, with both Opex and Benefits equated for that operational period, as IT projects often need updating after 5 years. NPVs of both 5 and 45 years have therefore been quoted below.

### 7.1 Cost Profile

This project has the following cost profile and will be delivered as a rolling programme of updates. As no alternative option is possible, in line with guidance, no CBA has been completed. However, although no NPV is provided (as no CBA has been completed), over 5 years the NPV would be circa [REDACTED] and over 45 years the NPV would be circa [REDACTED]. The full build-up of costs is contained in the ED2 IT Investment Plan (Non-Op Capex) Cost Estimate spreadsheet.

	Total £'M	2023/24 £'M	2024/25 £'M	2025/26 £'M	2026/27 £'M	2027/28 £'M
CAPEX	[REDACTED]			[REDACTED]	[REDACTED]	[REDACTED]
ED2 OPEX	[REDACTED]					[REDACTED]
ED2 Benefits	[REDACTED]					[REDACTED]
5 Year OPEX	[REDACTED]					
5 Year Benefits	[REDACTED]					
NPV (5 Year)	n/a					
NPV (45 Year)	n/a					

## 7.2 Benefits

### 7.2.1 Financial Benefits

Benefits are shown for the first 5 years after the project is implemented.

	Total	Year 1	Year 2	Year 3	Year 4	Year 5
Deferral/removal of reinforcement due to more effective use of available Flexibility resource. Overall benefit is estimated at ■ across all our operating regions	■	■	■	■	■	■

The system will also bring other financial benefits, which will become evident throughout the project lifecycle.

- The current rollout of ANM (Shetland, Orkney, Isle of Wight) has resulted in the offset of 326,000 tonnes of CO2 to date. Further reductions will be possible as rollout increases. The current estimate is that 2,106,465t CO2 will be saved overall
- Enables faster connection to the network where it would not have been possible, increasing the penetration of renewables.
- Removes the reliance/need on Diesel Generation.
- Supersedes the need for manual operations thus saving time, related resources, carbon footprint, etc.

### 7.2.2 Non-Financial Benefits

The system will help to maximise the return on investment for Flexibility providers by reducing the cost of flexible connections by fully utilising the existing available capacity of our networks. The project will also increase network resilience and data visibility, providing SSEN with optimum systems in which to monitor and manage flexibility connected to our networks. Should the development of the system extend to support LV flexibility, the range of benefits both financial and non-financial are extended significantly and will include the support of local energy markets, enabling greater levels of LCT connections at LV and the societal benefits attached to that increase. As ANM systems evolve the scope to accommodate larger schemes under the auspices of 'Whole System' thinking will also materialise delivering greater benefits and customer value.

#### 7.2.2.1 Foundation to other Projects/Initiatives

Although not a direct foundation to other projects, there are links to support the Whole System Co-ordinator initiative along with the delivery of LV Strategy.

## 7.3 Key Assumptions

The costs in this project have been based on the level of Flexibility resource deployment we have anticipated in our overall RIIO-ED2 submission. Should the level of resource deployment change in the period, the project scope will also need to be revised accordingly.

The current programme and costings assume that all planned RIIO-ED1 system changes will be complete before the start of RIIO-ED2. If some of the current planned application changes are not completed, this will increase the complexity, and hence cost and timescale, of this project.



## 7.4 High Level Dependencies

This project is dependent several other developments including but not limited to ADMS+, DSO Enablement (Orchestrator) and DSO Management (Optimiser). It will also require agreement on several standards, in particular data and communication protocols (e.g. CIM, IEC61850) across the industry. The system must also be able to support any Open Networks requirement, and this will need agreement on standards across the industry.

Our suite of DSO projects all rely on each other to create an optimised and holistic approach to DSO. If any one of these are unable to be delivered it would significantly impede our ability to efficiently deliver the changes needed to accommodate decarbonisation of our distribution systems and provide the desired level of customer performance and value.

## 7.5 Deliverability & Risk

Our ***Ensuring Deliverability and a Resilient Workforce (Chapter 16)*** describes our approach to evidencing the deliverability of our overall plan as a package, and its individual components. Testing of our EJPs has prioritised assessment of efficiency and capacity, and this has ensured that we can demonstrate a credible plan to move from SSEN's ED1 performance to our target ED2 efficiency. We have also demonstrated that SSEN's in house and contractor options can, or will through investment or managed change, provide the capacity and skills at the right time, in the right locations. This assessment has been part of the regular assessment of our EJPs, IDPs and BPDs. Our ***Deliverability Strategy (Annex 16.1)*** and ***Supply Chain Strategy (Annex 16.2)*** are included in the Business plan Submission.

Our deliverability testing has identified a major strategic opportunity which is relevant to all EJPs.

- In ED2 SSEN will change the way Capital Expenditure is delivered, maximising synergies within the network to minimise disruptions for our customers. This is particularly relevant for a Price Control period where volumes of work are increasing across all work types.
- The principle is to develop and deliver Programmes of work, manage risk and complexity at Programme level and to develop strategic relationships with our Suppliers and Partners to enable efficiency realisation.

## 8. Conclusion

This project will expand our capability to utilise ANM technology for greater customer value and system resilience. Fully utilising existing system capability in-line with customer agreements is a fantastic way of ensuring value from the distribution system and a solid return on previous asset investment. The system will allow much better visibility and control of both SSEN and Third-Party LCT resources than would be possible using manual control, increasing the resilience of our networks and the available connections of LCT thanks to the increased network capacity released through Active Management. These benefits, traditionally focussed on the EHV and HV networks should also be further enabled at lower voltages through this project which will have direct financial and societal benefits, including investment deferral and avoidance, reduced connection costs, CO2 reduction and wider environmental benefits in addition to supporting local energy markets and energy cost reduction for our customers.