



SSEN Distribution

DSO CAPABILITIES ROAD MAP

March 2024



Scottish & Southern
Electricity Networks

DSO Powering Change



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Who we are and our role as a DSO

The future energy system

If the UK is to deliver its net zero emissions target by 2050, the energy industry needs to embrace fundamental change in order to decarbonise transport and heat.

For this transition to be successful it requires:

- Greater utilisation of **flexible energy resources**, across electricity, heat and transport.
- A clear understanding of **the value flexible resources can provide** at any one time; and
- Greater **real-time coordination in energy system operation** to ensure that flexible resources can be 'optimised' across the energy system as a whole.

These services are being provided through functions within the Distribution Network Operators called Distribution System Operators (DSOs), which have three core areas:



Our DSO Toolkit



Strategic investment

- Provide the capacity on the network to deliver net zero by 2050.
- Ensure that we're making appropriate use of Flexibility Services to deliver efficient whole-system solutions at the optimum time.



Flexibility Services

- Solutions that enable us to use our existing network efficiently.
- Acts as an investment signal for strategic investment.
- Provides an interim solution if there are long lead times for strategic investment.



Access Products

- Connecting customers now, but with some level of compromise.
- Complemented by Flexibility Services or strategic investment to meet customers' full needs as soon as possible.

✓ Our role is to work in partnership to optimise our electricity networks through Flexibility Services, Access Products and strategic investment, data, and emerging technology to facilitate decarbonisation of transport and heat at maximum pace, and at a minimal cost to all communities and consumers.

✓ Our approach is tailored to local needs to drive a just and fair transition, advising and guiding our stakeholders in coordination with local communities to help them deliver net zero at maximum pace and minimum cost.

✓ Our Net Zero Strategic Plans will play a crucial role in delivering network capacity in the most efficient and effective way. This will enable us both to maximise the opportunities from and for flexibility providers to delay reinforcement through flexibility and also identify sites with whole system benefits for strategic investment where it can accelerate net zero outcomes in the long term.



Delivering our DSO strategy

Identify system needs

Release capacity

Optimise capacity



Distribution Network Options Assessment

How we make investment decisions in the context of net zero



Flexibility road map

How Flexibility is going to change over time



Operational decision-making framework

How we make dispatch decisions



Network visibility strategy

How we gather information about our network

How we are driving transparency and coordination



Data roadmap

Our plans for sharing data and what it can be used for



Data portal

Where to access our data

KPIs

How we measure our progress in an accessible way for others to measure

Capability roadmap

How we are building capability over time (including our Control room vision)

DSO Advisory Board

External advisory board to ensure fairness of decision making and delivery of our plans

About this document

This document sets out how we will enhance our capabilities over time in order to deliver on our ambitions for DSO.

We are choosing to publish this information to give our customers and stakeholders visibility of how we will deliver the commitments set out in our recent publications (e.g. DNOA, ODM, Flexibility Roadmap) and our focus areas and investments across people / process and technology in the coming years.

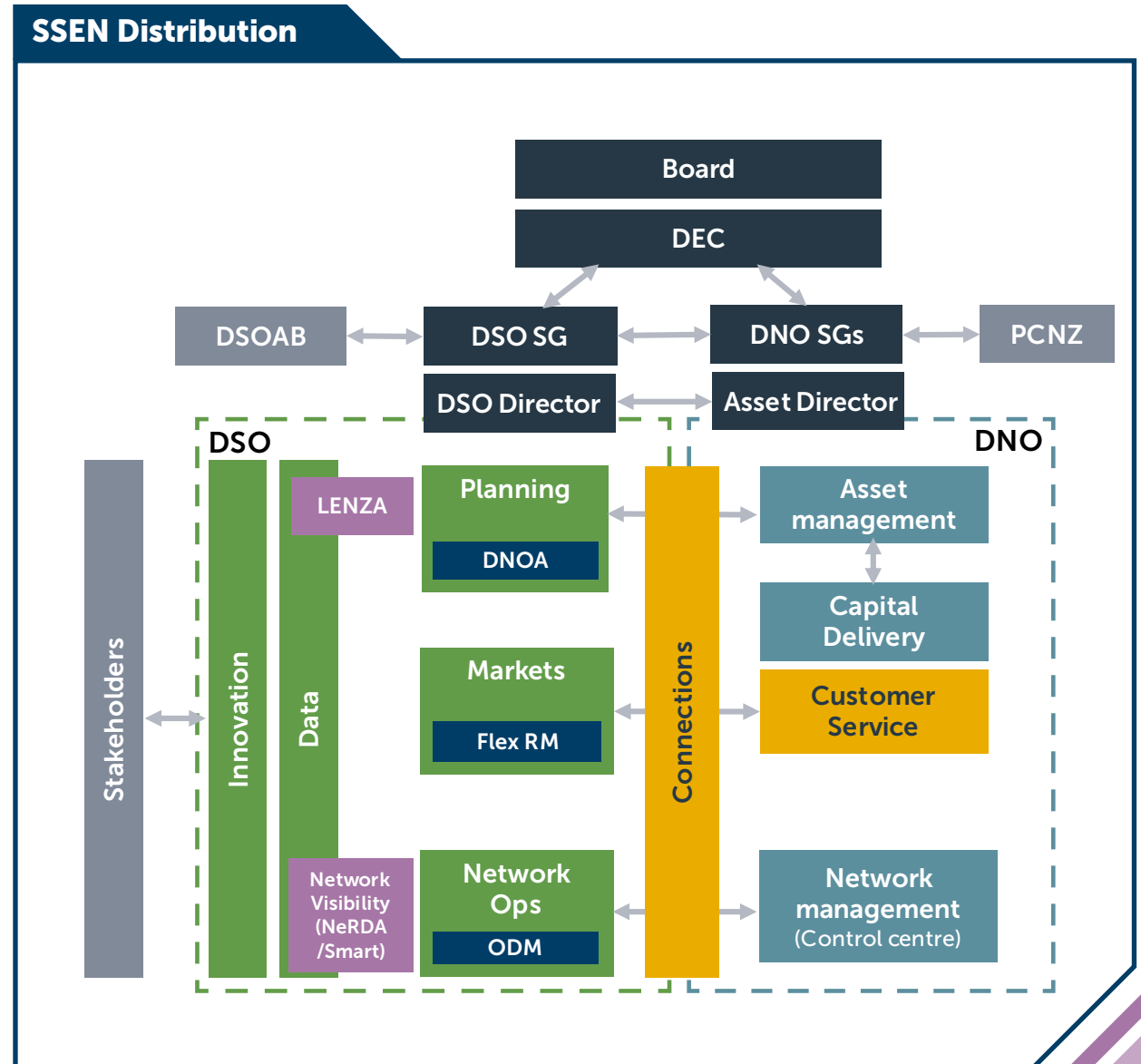
This document sets out the customer, stakeholder and wider system outcomes that will be delivered as a result of this capability build and also acts as a signal to our supply chain as to where we will be looking to partner and procure solutions in the near term.





Our DSO Governance:

- Our analysis with NERA shows the increased efficiencies and coordination we can deliver from an integrated business model, where our DSO function makes decisions on the optimal whole system solution. Our integrated operating model also allows us to enable greater capacity for connections, as our planning function reviews all types of investment drivers.
- We recognise this organisational structure means we need to be transparent in our decision making. We have published our decision-making methodologies (DNOA, ODM and Flexibility Roadmap), we will continue to regularly publish our decision outcomes and our external DSO Advisory Board will review our performance.
- As detailed in our ED2 business plan, we have a separate DSO directorate that reports into SSEN Distribution's Executive Committee. We are experienced in "Business Separation" education, as part of the broader SSE Group and we will extend similar training in support of DNO-DSO transparency.
- As part of our governance, we have a formally constituted, director-led DSO Steering Committee that's provide executive level accountability. It reports directly to the SSEN Distribution Executive Committee to give board level visibility of DSO Decisions.





Customer outcomes from growing our DSO capabilities

- We are growing our DSO capabilities so we can accelerate the benefits and outcomes we drive for our customers, stakeholders and wider society.
- We regularly report on our KPI progress and DSO benefits delivery through our quarterly newsletter and our Seasonal Operability Report (SOR). This includes the benefits to DNO customers, the ESO and TO, as well as wider societal benefits from the DSO transition.

Forecasting and Planning future needs



- Our DNOA outcomes will give clear line of sight to our plans and timelines for our investment decisions.
- Our data portal will improve our customer's experience when accessing the planning data they need.
- A robust needs case based on high quality data and input from our stakeholders will decrease risk and reduce delays and costs.
- Whole system solutions will increase deliverability and ensure the changes we make to our network are efficient and fit for purpose.

 Read more on about this in the DNOA Report



Forecasting and Planning future needs



- Increased participation in flexibility markets and market liquidity through the right product mix and greater awareness of our forward plans.
- Improved provider experience for flexibility procurement through process improvements and our move to a third-party market platform.
- Increased volumes of flexibility procured and dispatched, reducing reinforcement costs and enabling faster network access.
- Improved ESO access to flexibility resources on the distribution network, lowering wider system costs and providing increased revenue for participants.

 Read more on about this in the Flexibility Roadmap



Delivering Network and Flexibility at Scale



- Providing our customers, flexibility providers, and stakeholders with clarity and confidence in how we will schedule and dispatch flexibility, to stimulate participation.
- Provide clarity on the system services we will need in future to assist flexibility service providers in planning their operations and investments.
- Enabling the optimal use of flexibility on the network to create capacity for connections, enable DER to participate in ESO markets, and reduce network costs for all.
- Validate our roadmap for the development of our network operations capabilities to ensure we are focusing investment where our customers and stakeholders value it most
- Lead industry on the initiatives where our network can deliver benefits and learnings for a wide range of stakeholders.






 Read more on about this in the ODM Report





Capability roadmap






There is uncertainty regarding the point in time by when our DSO needs to be dealing with high volumes of flexibility, including at LV levels. We are assuming we need systems support in place for this by the end of Year 3 of RII0-ED2, and are committing our investments to deliver by this point.

 Key stages of our journey	Transparent DSO foundations and aligned intent	Evolving DSO operations	Enabled capacity for communities
STRATEGIC OBJECTIVES	Y1: TO APRIL 2024	Y2-Y3: TO MARCH 2026	Y4-5: APRIL 2026+
 Forecasting and planning future needs	<ul style="list-style-type: none"> ✓ Development and publication of long-term forecasts, network models, and real time smart metering data, for each geographical area of our network ✓ Development of our transparent Distribution Network Options Assessment process, and approach to accounting for broad societal benefits in making investment decisions ✓ Engagement with Local Authorities on using whole system planning tools such as LENZA 	<ul style="list-style-type: none"> ✓ Enhancing network modelling and forecasting capabilities, including exploring customer behaviour forecasting and making more data available to customers and stakeholders ✓ Scaling up engagement and coordination with local and whole system stakeholders – including potential Regional Energy System Planners 	<ul style="list-style-type: none"> ✓ 100% network visibility for all stakeholders, at all voltage levels, available on our Open Data Portal ✓ Mature processes and tools in place to engage whole system and local stakeholders and make decisions on system wide needs and solutions
 Developing an inclusive flexibility marketplace	<ul style="list-style-type: none"> ✓ Publication of our flexibility roadmap and a wider range of market data to signal our intent and help participants plan their investments and future operations ✓ Continued evolution of flexibility services and access products to stimulate participation in our tenders and with our flexible connections products 	<ul style="list-style-type: none"> ✓ Establish and evolve a third-party flexibility market platform to drive closer to real time procurement, standardisation with wider system operators, and a simpler customer journey ✓ Evolution of flexibility products, access products, and market data to support shorter-term procurement, reduce barriers to entry, and meet a broader set of customer needs 	<ul style="list-style-type: none"> ✓ Flexibility markets that are easy to participate in, which include a range of inclusive products over different time horizons, including support for secondary trading, co-created with stakeholders and wider system operators
 Delivering network flexibility at scale	<ul style="list-style-type: none"> ✓ Development and publication of our Operational Decision Making Framework (ODM) ✓ Development of our control room vision to define operational DNO/DSO hand-offs now and in the future ✓ Deployment of our ICCP link for coordination with the ESO 	<ul style="list-style-type: none"> ✓ Implementing system support for the end-to-end flexibility journey, including short-term forecasting, scheduling, whole system coordination, dispatch, and settlement ✓ Enhanced transparency through publication of our DNO/DSO code and regular dispatch reporting for compliance with our Operational Decision Making Framework (ODM) 	<ul style="list-style-type: none"> ✓ DSO flexibility operations that make it easy for customers to participate and offer their flexibility for use where it is most valued across the whole system ✓ Fully mature and scalable systems that enable us to efficiently coordinate flexibility at all levels of the system at scale
 Driving transparency & coordination	<ul style="list-style-type: none"> ✓ Cocreate our DSO processes with stakeholders ✓ Mobilise our external DSO Advisory Board ✓ Launch our data portal with prioritised customer features 	<ul style="list-style-type: none"> ✓ Continuous improvement of our services, processes, tools, and data based on stakeholder feedback and regular reporting on progress from our external DSO Advisory Board ✓ Regular reporting of societal benefits delivery through our KPIs, with evolution based on stakeholder feedback 	<ul style="list-style-type: none"> ✓ Full transparency in our decision making and assurance of these decisions ✓ Mature stakeholder engagement and collaboration embedded into everything we do, with all the data our customers and stakeholders need published on our data portal ✓ Transparent tracking and reacting to system-wide benefits








Capability gap assessment - people, process, tech

We are choosing to publish this information to give our customers and stakeholders visibility of how we will deliver the commitments set out in our recent publications (e.g. DNOA, ODM, Flexibility Roadmap) and our focus areas and investments across people / process and technology in the coming years.

DSO Role	Gaps to deliver the Y3 DSO strategy		
	 People / Organisation	 Process	 System / Data
 <p>Forecasting and Planning future needs</p>	<ul style="list-style-type: none"> ■ Organisation design – Continuing to assess detailed resourcing and skills to deliver on our strategy, including: <ul style="list-style-type: none"> ■ Potential efficiencies through automation of system planning processes, in parallel to increasing connections volumes ■ New capabilities for whole system engagement / coordination, enhanced forecasting ■ Effort to deliver new / enhanced DSO processes such as DNOA, enhanced CBAs, long term forecasting 	<ul style="list-style-type: none"> ■ Forecasting – Incorporate enhancements e.g. LENZA, Nerda, network visibility, smart meter data, customer behaviour ■ Planning – Embed enhanced processes and governance for DNOA, Net Zero Strategies per GSP, Strategic Investment ■ Coordination – Processes for enhanced NESO coordination and whole system planning, incl. potential RESP impacts 	<ul style="list-style-type: none"> ■ Scale up of LENZA ■ Enhanced long-term forecasting – e.g. progressing to include customer behaviour ■ Network visibility evolution ■ CEM / whole system CBA tools ■ Enhanced network model data ■ Enhanced network modelling capabilities
 <p>Developing an inclusive flexibility marketplace</p>	<ul style="list-style-type: none"> ■ Organisation design – Continuing to assess detailed resourcing and skills to deliver on our strategy, including: <ul style="list-style-type: none"> ■ Growing areas such as inclusive and co-created flexibility product development (flex services, access products, price signals) ■ Flexibility procurement and contract management, and assessment of automation through the new market platform 	<ul style="list-style-type: none"> ■ Flexibility services and Access product design – Continue to embed process for ongoing stakeholder engagement / partnerships to inform product development, and link with innovation ■ Flexibility procurement – Embed processes for DNOA interaction and procurement/ settlement of flexibility services ■ Wider market operations – Evolution of potential DSO roles and processes for customer/asset registration, settlement, secondary trading, market surveillance and reporting ■ NESO coordination – Evolve / formalise processes for ESO interaction across timeframes 	<ul style="list-style-type: none"> ■ Market platform for procurement ■ Market interface for DSO/DNO Operations ■ Market platform support for potential wider market operations roles – e.g. Settlement, Secondary trading support ■ Data exchange for ESO coordination ■ Market analysis tools ■ Access to enhanced market data and insight ■ Market reporting ■ Market surveillance ■ Market insight on open data platform



Capability gap assessment - people, process, tech (continued)

DSO Role	Gaps to deliver the Y3 DSO strategy		
	 People / Organisation	 Process	 System / Data
 Delivering network flexibility at scale	<ul style="list-style-type: none">■ Organisation design – Continuing to assess detailed resourcing and skills to deliver on our strategy, including:<ul style="list-style-type: none">■ Outage planning team roles and skills to incorporate the use of flexibility services■ Short-term forecasting of constraints■ Scheduling and dispatch and ESO coordination■ Commercial capabilities	<ul style="list-style-type: none">■ Outage planning – Evolving processes to make greater use of flexibility services■ Short-term forecasting – New processes to enable short-term forecasting of generation, demand and network constraints to support flexibility service scheduling■ Scheduling, optimisation, and dispatch – Evolution of ODM principles to embed new process across DSO and DNO operations to enable scheduling, commercial optimisation of options (flexibility service/ curtailment / operational solutions), and dispatch at scale and closer to real-time■ NESO coordination – Evolve and formalise processes for ESO interaction across timeframes■ Seasonal Operability Reporting – new process to enable publication of dispatch actions summary report	<ul style="list-style-type: none">■ Enhanced access to DER register and contracts database in operations■ Flexibility options interface for DSO and DNO operations■ Short-term forecasting■ Enhanced power systems analysis / powerflow analysis / constraint forecasting tool to support real-time operations■ Online contingency analysis■ Outage plan publication portal■ Scheduling / optimisation / decision support■ Schedule publication portal■ Enhanced ICCP link / conflicts report exchange■ Flexibility dispatch and decision logging platform■ Comprehensive DER monitoring■ Enhanced data and reporting/analytics
 Driving transparency and coordination	<ul style="list-style-type: none">■ Organisation design – Continuing to assess detailed resourcing and skills to deliver on our strategy, including:<ul style="list-style-type: none">■ Open data management and data analytics■ Business change capabilities to embed significant new processes■ Technology procurement and agile solution development■ Stakeholder engagement	<ul style="list-style-type: none">■ Open data portal – Data governance, ongoing updating of the data portal, use case development, evolution of the data roadmap■ Innovation into BaU – Continuing to focus innovation to deliver on this future strategy, whilst evolving processes to continually embed innovation into BaU■ Data driven stakeholder engagement – Embedding continuous improvement processes based on stakeholder feedback	<ul style="list-style-type: none">■ Open data portal■ Stakeholder insights analytics



How the control room of the future may operate

Everyday we operate our network to keep the lights on, often this is done without any intervention to manage the flow of electricity, we won't intervene unless we must when an operational event occurs.

At present we are managing a relatively stable network, where we understand the predicted flows of electricity on our network. Our control engineers have the skills, capabilities and systems to manage network security and network faults by use of limited flexibility and operational switching. Our outage planning engineers have the skills, capabilities and systems to effectively plan network outages with limited use of flexibility. We coordinate with the NESO as described in our ODM.

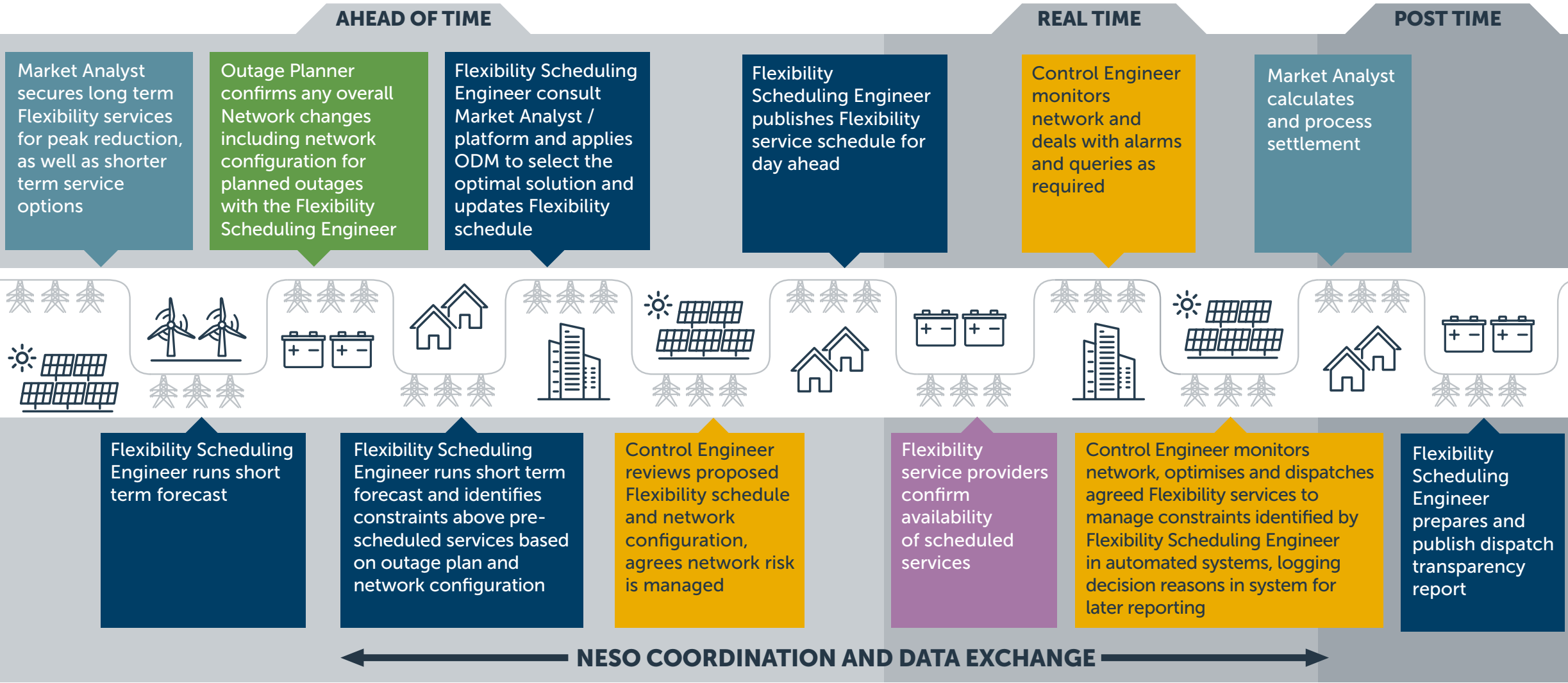
We are moving to a more complex and actively managed network and by 2027 our control room teams will need to evolve their skills, systems and capabilities to enable this as detailed in our capabilities gap analysis. The network will be more constrained, and the flows of electricity will be less predictable. Our control and outage planning engineers will have access to high volumes of flexibility for a range of operational scenarios they can schedule and dispatch to manage this more complex network. To make this as efficient as possible we will require more automated system, clear commercial optimisation of our dispatch decisions and enhanced coordination with the NESO . We will need to carefully balance market costs with reliability of flexibility services to ensure we continue to keep the lights on an operate a safe, secure and smart electricity network





How the control room of the future may operate

SCENARIO 1 (2027) FLEXIBILITY TO MITIGATE FORECAST OVERLOADS



Key

Outage Planner

Control Engineer

Flexibility Scheduling Engineer

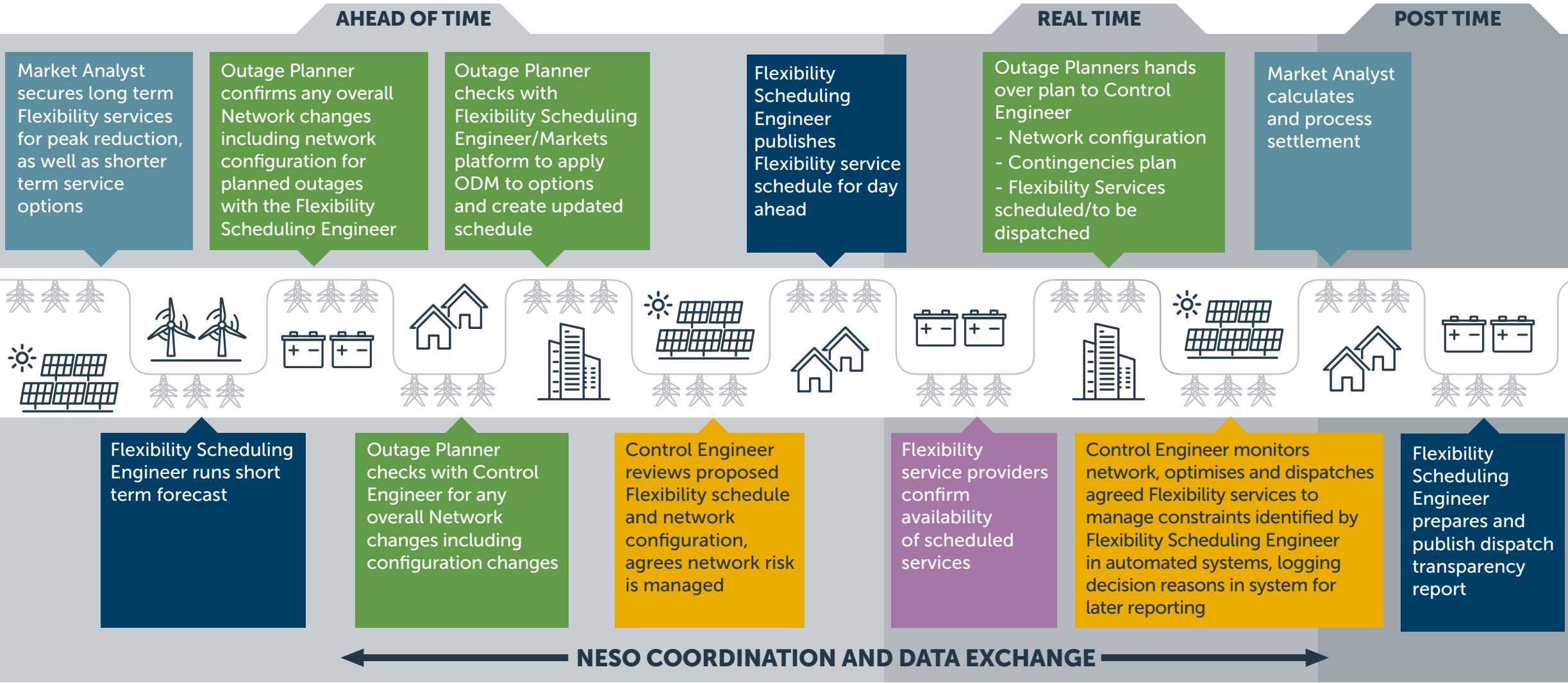
Market Analyst

External participants



How the control room of the future may operate

SCENARIO 2 (2027) USE OF FLEXIBILITY IN A PLANNED OUTAGE



Key

Outage Planner

Control Engineer

Flexibility Scheduling Engineer

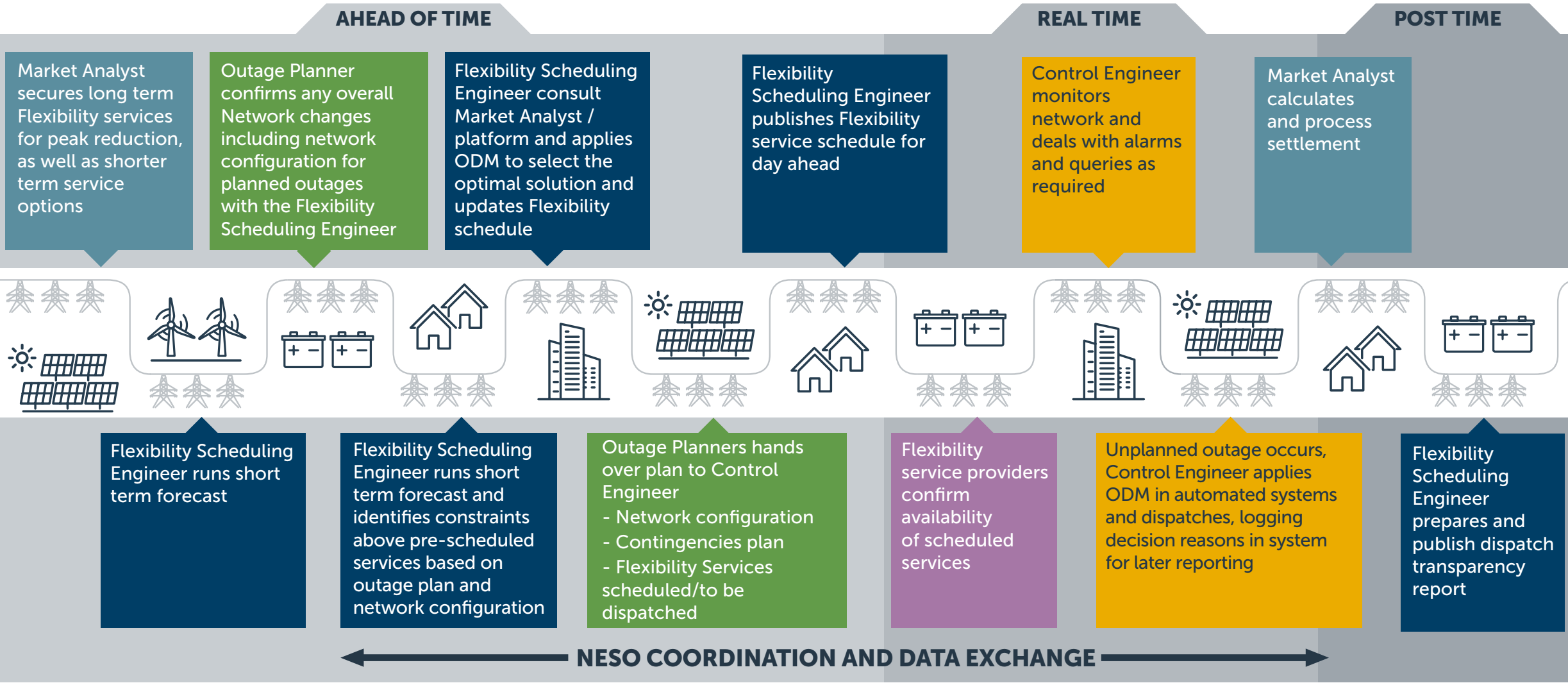
Market Analyst

External participants



How the control room of the future may operate

SCENARIO 3 (2027) USE OF FLEXIBILITY IN AN UNPLANNED OUTAGE



Key

Outage Planner

Control Engineer

Flexibility Scheduling Engineer

Market Analyst

External participants



Glossary

Term	Description
Aggregators	A new type of energy service provider which can increase or moderate the electricity consumption of a group of consumers according to total electricity demand on the grid.
BAU	Business As Usual
BSP	Bulk Supply Point
CMZ	Constraint Managed Zones . These zones make use of technologies providing flexibility to alleviate network constraints, deploying them as an alternative to traditional network reinforcement in the management of peak demand.
Data triage	Systematically find issues which should inhibit open data, identify the 'least impact' mitigation technique(s) and make the process transparent.
Decarbonisation	Reducing the carbon intensity in terms of emissions per unit of electricity generated.
DER	Distributed Energy Resources. Any resource on the distribution system that produces or stores electricity. This can include distributed generation, storage, heat pumps and electric vehicles as well as other technologies.
DNO	Distribution Network Operator
DNOA	Distribution Network Options Assessment
DSO	Distribution Systems Operator. The directorate within SSEN that supports a more flexible network operation. Uniquely placed to ensure simple and consistent access to new markets for our active customers through maximising the utilisation of our existing electrical and communication networks.
DSOAB	DSO Advisory Board
DSAP	Digital Strategy and Action Plan
ESO	Electricity System Operator. The electricity system operator for Great Britain, making sure that Great Britain has the essential energy it needs by ensuring supply meets demand.
EV	Electric Vehicle
FSO	Future System Operator. Ofgem intend to set up an expert, independent FSO with responsibilities across both the electricity and gas systems and the ability to expand its remit to additional energy vectors when needed. The FSO will be in the public sector, with operational independence from government.
GDN	Gas Distribution Network
GIS	Geographic Information System
GSP	Grid Supply Point
GW	Gigawatt
HV	High Voltage
IDNO	Independent Distribution Network Operator
kWh	Kilowatt hour

Term	Description
LAEP	Local Area Energy Plan. A data-driven and whole energy system, evidence-based approach that sets out to identify the most effective route for the local area to contribute towards meeting the national net zero target, as well as meeting its local net zero target.
LCT	Low Carbon Technologies
LENZA	Local Energy net zero Accelerator. SSEN's tool for supporting local authority LAEPs.
LEO(N)	Local Energy Oxfordshire (Neighbourhood)
LTDS	Long Term Development Statements. Designed to help to identify and evaluate opportunities for entering into arrangements with us relating to use of system or connection.
LV	Low Voltage
MW	Megawatt
NDP	Network Development Plan
NeRDA	Near Real-Time Data Access
NIA	Network Innovation Allowance
NMF	Neutral Market Facilitator will provide a market for trading use of Distributed Energy Resources (DERs).
NESO	National Energy System Operator
Open Data	Data in a machine-readable format that can be freely used, shared and built on by anyone, anywhere, for any purpose.
PSR	Priority Services Register. Our register of vulnerable customers.
RIIO-ED2	Price control for Electricity Distribution (2023-2028)
RSP	Regional System Planner. Ofgem proposal for regional energy system planning bodies.
SDG	Sustainability Development Goals
SEPD	Southern Electric Power Distribution
SHEPD	Scottish Hydro Electric Power Distribution
SIF	Strategic Innovation Fund
SME	Small Medium Size Enterprise
SSE	Scottish and Southern Electricity
TO	Transmission Owner
TOM	Target Operating Model
VFES	Vulnerability Future Energy Scenarios
VIVID	Vulnerability Identification Via Informative Data

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