SSEN Distribution

OPERATIONAL DECISION-MAKING (ODM)

November 2024 Update

Scottish & Southern Electricity Networks

DSO Powering Change

Contents

DSO OPERATIONAL DECISION-MAKING (ODM) NOVEMBER 2024

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 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.

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.

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

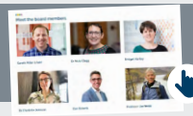
How we are driving transparency and coordination

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

This document

This document sets out our Operational Decision-Making (ODM) framework.

Our DNOA outlines our decisions on where to invest in network infrastructure or procure flexibility to meet future capacity needs in the longer term. Our Flexibility Road Map describes our flexibility approach and how this will evolve over time.

ODM sets out the way in which we dispatch Distributed Energy Resources (DER) to meet short term capacity needs.

This Document details how the way in which we make fair and efficient decisions that ensure a safe and secure network when dispatching Distributed Energy Resources (DER) by coordinating flexibility services and access products to protect the access rights of our customers and enable wider activities by the system operator (SO) and the wholesale market.

Informed by stakeholder feedback, we set out our clear and transparent process for making operational decisions and coordinating with others across the whole system.

Our framework enables all parties to make informed choices when operating in markets and accessing other SO services. This maximises the use of the network and increases whole system efficiency by improving market coordination and supporting market liquidity. This document explains these principles and how we apply them in different operational scenarios to manage and enable a more reliable, affordable and decarbonised energy system.

This document also details the annual review and update process including our new Seasonal Operability Report (SOR).

Document Audience - Network Users

We operate our network to safely manage the access rights, evolving needs and activities of our customers. This ensures all users of our network, including Flexibility Service Providers (FSPs) and customers using Access Products, have increased transparency of our actions.

Access Rights are the rights each customer has to use our network which will be either detailed in a site-specific connection agreement or the National Terms of Connection.

Access Products allow customers to avoid delays when connecting to congested parts of the network using a range of connection options which allow earlier connection by allowing the connected capacity to be temporarily varied to manage network constraints.

Large connection customers

The maximum import and export requirements for the customer are set out in the site-specific connection agreements. This means we may be required to limit a generator's export capacity, or a demand site's import capacity when the network is an abnormal state during network outages, to ensure that the network continues to operate safely and securely.

Customers using Access Products

Our access products allow customers to avoid delays when connecting to congested parts of the network using a range of connection options which enables earlier connection by allowing the connected capacity to be temporarily varied to manage network constraints. Access Products include curtailable, flexible, and phased connections. These are not available for domestic customers as a connection agreement is required.

Smaller customers

For households, micro-businesses and other customers who connect using the National Terms of Connection. We operate our network to meet the maximum capacity required, once diversity is applied across the network and up to the rating of the assets they are directly connected to.

Flexibility Service Providers

A Flexibility Service is a contract arranged between a DSO and a Flexibility Service Provider (FSP) allowing the DSO to request to vary their usage at a specific time (generation or demand) in response to network needs. This allows us to release additional capacity on the network and manage network constraints without needing immediate strategic investment, and can facilitate outage management, responding to urgent situations and accelerating connections. Providers must be connected to the network to provide flexibility services.

DNO & DSO dispatch roles and responsibilities

SSEN Distribution MD

DSO Directorate

DNO Directorates

Markets Team

The Markets Team are responsible for creating an inclusive marketplace and procuring flexibility services to meet the network's needs.

While the Markets Team does not directly make dispatch decisions, the procurement strategy they develop influences how and when services are dispatched.

Additionally, they will establish how markets/products are stacked and operated, which will affect operational decision-making.

The Markets Team procure all Flexibility Services.

Flexibility Solutions

The Flexible Solutions Team are responsible for forecasting, scheduling, dispatch, and settlement of Flexibility Services and Access Products.

The Flexible Solutions Team apply the operational decision-making framework when dispatching Flexibility Services and designing systems that enable the operation of Access Products.

The Flexible Solutions Team are responsible for recording and the regulatory reporting of our dispatch of Flexibility Services.

The Flexible Solutions team does short term procurement with Markets support.

The Flexibility Services Team typically dispatch variants of the following Flexibility Products:

- Scheduled Availability and Operational Utilisation
- Variable Availability and Operational Utilisation
- Scheduled Utilisation

Distribution Control Centre

The Distribution Control Centre Teams are responsible for the day-to-day operations of the live network.

The Distribution Control Centre Teams will apply the operational decision-making framework when dispatching Distributed Energy Resources, including Flexibility Services and Access Products during network outages.

The Distribution Control Centre Teams typically dispatch the following Flexibility Products;

- Operational Utilisation
- Variable Availability and Operational Utilisation

Our Principles - how we make dispatch decisions

Every day we operate our network to keep customers connected and energised.

When we request or enact a change on a Distributed Energy Resources (DERs) import or export, it is referred to as dispatch. We don't dispatch Distributed Energy Resources (DER) unless there is a need when a network event occurs.

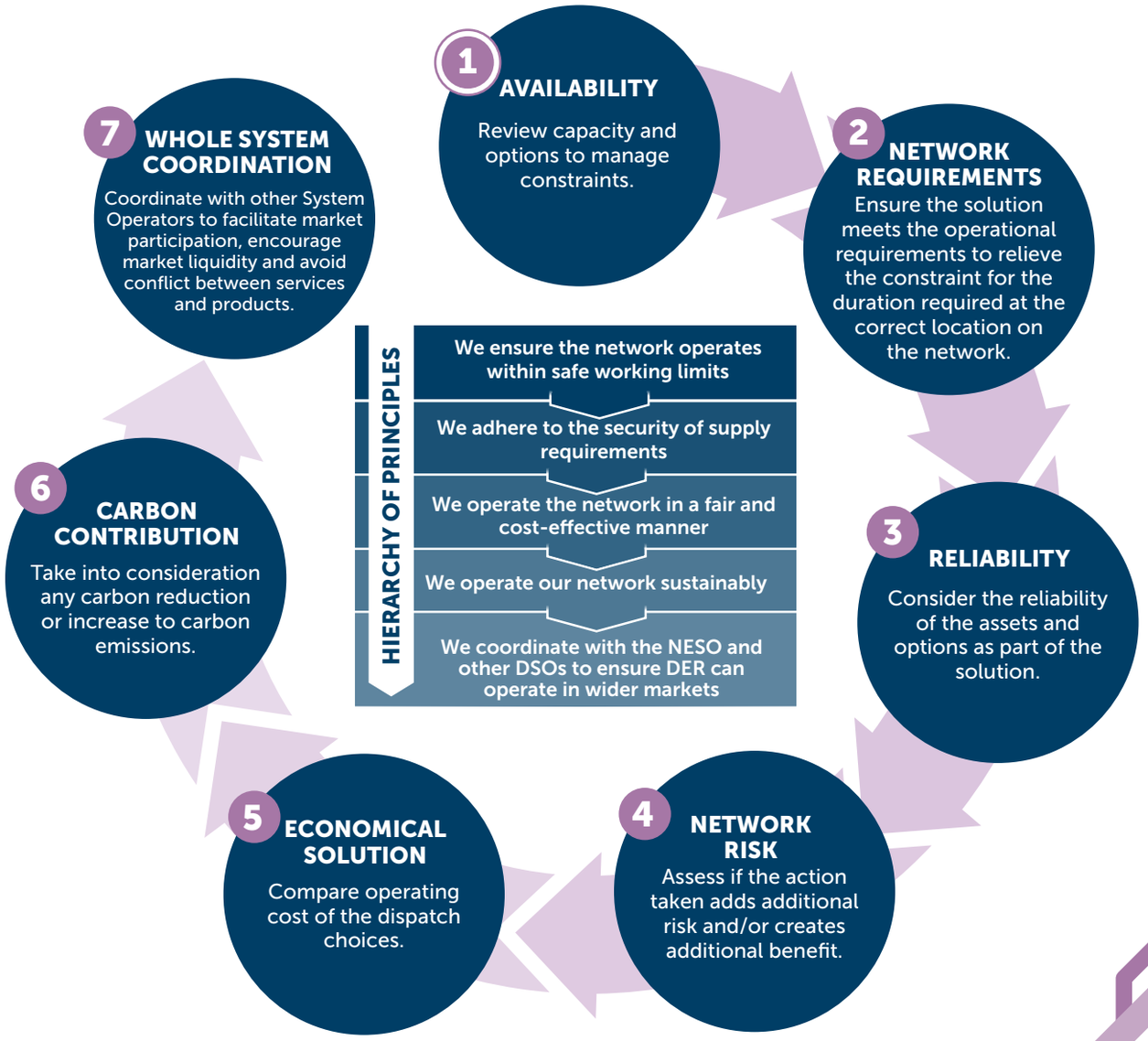
We have established a set of Operational Decision Making (ODM) principles that we apply when we are operating our network to manage network events, shown on the right.

These principles define how we manage Access Rights, Access Products and Flexibility Services and apply to all our networks across operational timelines.

At each stage, we review specific considerations in a structured way to drive the most effective decision using the full range of options available to us.

Individual solutions may become more or less favourable, or even unviable, as each stage is considered. It can take several iterations to identify the optimal coordinated solution. Once we have established our most efficient option, we coordinate this with the National Energy System Operator (NESO) and neighbouring operators (as relevant), for the best whole system solution.

When assessing several similar options, the framework sets out a hierarchy to ensure choices are made in a fair and transparent manner.



Timeline and options

Operational decisions are made as we approach or are faced with a network event.

Network events, such as a planned or unplanned outages or forecasted constraint may require us to dispatch Distributed Energy Resources (DER). Longer-term investment decisions are considered using Distribution Network Options Assessment (DNOA) process

There are a range of dispatch options which can be used to provide the necessary outcome. The Operational Decision-Making (ODM) principles enable us to consistently evaluate the wide range of options to resolve network events, irrespective of technology type or commercial arrangement. Our Flexibility Roadmap sets out the range of flexibility products and access products we are using and developing to release more capacity and options to manage operational events.

The engineering function responsible for managing the network event apply the ODM principles in their planning, scheduling and real time activities based on the options they have available to them. Operational decisions are planned and considered in a coordinated manner leading up to each event. The ODM principles are used to select the most appropriate operational action in a fair and transparent way across all timelines. Once we have established our most efficient option, we then coordinate with the NESO and neighbouring DSOs, where relevant, for the best whole system solution.

Every quarter we will, in our Seasonal Operability Report (SOR), publish when we have applied our decision-making framework to actual network events.

Time frame

Within Day

Function

Real time System Requirements and Unplanned Outages – Control Engineer

Products and options

Managing Connections within their connection agreement and access rights.

Access Products

Flexibility Services

- Operational Utilisation

Mobile Temporary Generation

Time frame

Year ahead and up to day ahead

Function

Managing Capacity – Flexibility Scheduling Engineer

Products and options

Flexibility services:

- Scheduled Utilisation
- Scheduled Availability and Operational Utilisation
- Variable Availability and Operational Utilisation

Time frame

3 months up to and including day ahead

Function

Planned Outages– Outage Planning Engineer

Products and options

Managing Connections within their connection agreement and access rights.

Access Products

Flexibility Services

- Scheduled Availability and Operational Utilisation

Mobile Temporary Generation

Market dispatch decisions

We operate in both long-term and short-term markets; these timeframes influence our decision-making process. Therefore, we need to make dispatch decisions for Flexibility Services across multiple timeframes. These Flexibility Services are described in the timeline and options section.

Scheduled Utilisation (SU)
Planned one year in advance and utilisation is confirmed and instructed one month ahead.

Variable Availability Operational Utilisation (VAOU)
Planned five weeks ahead and utilisation is confirmed and instructed one week ahead.

Scheduled Availability Operational Utilisation (SAOU)
Planned five weeks ahead and utilisation is confirmed and instructed one week ahead.

Operational Utilisation (OU)
Not planned, utilisation instructed within day.

SSEN standard flexibility services descriptions can be found here

Confirm Flexibility Need
We use updated forecasts to recalculate need.

Availability instructions sent to contracted Flexible Service Providers (FSPs)
We use updated forecasts to recalculate need.

Response to Availability Instructions
FSPs accept or reject availability instructions.

Calculate Remaining Need
Flexibility Need – Accepted Availability Instructions

SAOU Requirement Published & Market Initiated

Planned availability
1 year ahead SU
5 weeks ahead VAOU
3 weeks ahead SAOU

Utilisation Instructed
1 month ahead SU
1 week ahead VAOU
1 day ahead SAOU
Within day OU

Data and communication for Distributed Energy Resources (DER)

Data allows us to make informed operational decisions.

Through our site-specific connection agreements, we obtain the characteristics and parameters of Distributed Energy Resources (DER) connected to our network. This data is used by our outage planning engineers when analysing outage conditions and running arrangements. Where appropriate, our outage planning teams share network outage and system study results with DER customers as required, when communicating dispatch actions necessary to manage outages via email and phone call.

Our SCADA (supervisory control and data acquisition) system is used to manage the daily operation of the network and collects real time Distributed Energy Resources (DER) data through analogues and signals. This is used to understand the real time power flows on the network and informs our decision making when we need to dispatch Distributed Energy Resources (DER) . Where Distributed Energy Resources (DER) is not part of an Active Network Management system (ANM), our control engineers dispatch Distributed Energy Resources (DER) in real time via phone call. Our control engineers will share with DER details of network events and faults when a dispatch action is required.

Our flexibility scheduling engineers efficiently manage our short-term flexibility needs to ensure a safe and secure network through our scheduling platform, Flexible Power. The platform operates as a two-way data exchange, our engineers can request Flexible Service Providers (FSPs) to provide a service to meet our specific network need and FSPs can then accept dispatch instructions from us through the platform. Flexible Power calculates payments due for the services provided and provides access to performance reports. These reports offer an additional level of transparency and enable Flexibility Service Providers (FSPs) to assess the success of the services they provide, and informs a view of their potential reliability in future.

The Operational Decision Making (ODM) principles and hierarchy are built into the operational processes and procedures followed by our outage planning, flexibility scheduling- and control engineers. This ensures the logic is adhered to consistency across all our operational engineering disciplines responsible for dispatching Distributed Energy Resources (DER). As the first DSO to implement Active Network Management (ANM) and the concept of flexibility through Constraint Managed Zones, we are leading the way with industry best practice in these areas. We are continually working with other DSO and National Energy System Operator (NESO) to share our ways of working and the learnings we have gained through our experience. We are continually improving our systems and capabilities to ensure they are scalable and to ensure we can keep pace and lead on data and communication with the rapidly changing landscape. Our Data Roadmap serves as the strategic plan outlining the key milestones related to data provision and management. Our DSO Capabilities Roadmap sets out how we will enhance our capabilities over time to deliver on the DSO Acceleration Strategy.

Timeframe	Within Day
Function	Real-time System – Control Engineer
DER to DSO data	■ *Contracted Capacity* ■ *Network location & connectivity* ■ *Type of DER* ■ *Real time real power (MW)* ■ *Real time apparent power (MVAr)* ■ *Real time point of connection voltage* ■ *Real time AMPs*
DSO to DER data	■ *Dispatch instructions* ■ *Fault information*

Timeframe	3 months up to and including within day
Function	Managing Capacity – Flexibility Scheduling Engineer
DER to DSO data	■ *Availability (capacity & duration)* ■ *Performance/metering data*
DSO to DER data	■ *Dispatch Instructions* ■ *Statement report*

Timeframe	3 months up to and including within day
Function	Planned Outages– Outage Planning Engineer
DER to DSO data	■ *Contracted Capacity (MW)* ■ *Network location & connectivity* ■ *Type of DER* ■ *Power Factor (per unit)* ■ *Network location & connectivity* ■ *Site specific Access Rights*
DSO to DER data	■ *Dispatch requirements* ■ *Outage details and information*

Applying ODM principles when we use Distributed Energy Resource (DER) to manage network capacity

The growth of Consumer Energy Resources (CER) and Distributed Energy Resources (DER), such as generation and low carbon technologies is creating new constraints on our network.

To manage new capacity constraints we carry out network analysis on a regular basis using half-hourly demand data to forecast network requirements. The outcome of this network analysis identifies if there is a network need during normal network conditions, or during proposed outages, that require a increase/reduction in demand, or an increase/reduction in generation, in a specific part of the network, for a specific time period. Network analysis also confirms what Flexibility Services are needed to manage that constraint; the required capacity to be made available (availability), how much of this we will use (utilisation) and in what time period (service window).

Flexibility Services need to be dispatched before we exceed the capacity constraint to ensure system security and keep the network operating safely. Exceeding the capacity constraints can result in network faults, damage to assets and compromise the safety of our staff working on the network. Flexibility Services are scheduled in advance - the maximum period is one year ahead, and the minimum period is one month ahead. Utilisation is confirmed and instructed one week ahead.

When we need Flexibility Services, we individually contact each Flexibility Service Provider (FSP) with the availability and service window requirements within the maximum and minimum scheduling period to confirm their availability based on the latest forecast data. Once we have gathered that information back from the Flexibility Service Providers (FSPs), we apply our ODM principles.

The ODM principles are applied giving a weighting to each Flexibility Service Provider (FSP), a prioritised list of options are then created (assuming there is more than one FSP to instruct) to allow us to identify the optimal solution. The preferred option is entered into our scheduling and dispatch platform, which notifies the providers of our utilisation request or we send a utilisation request to the provider via email.

Flexibility Scheduling Engineer

Jiabin works in the DSO Network Operations department and is responsible for short term forecasting load on the network and determines potential network constraints. To mitigate constraints, he schedules flexibility services to manage the network within safe limits and supports keeping the lights on. He helps wider industry by facilitating and shaping Flexibility Services that increase liquidity and ensure coordination with other DSOs and the National Energy System Operator (NESO).

Some History

We have successfully dispatched over 14 GWh of Flexibility Services since 2018.

Types of constraints

- **Fault level:** when the maximum fault current exceeds what the network can safely manage during a short circuit event.
- **Thermal Constraint:** when the load on the network is greater than the ratings of our assets.
- **Voltage constraint:** when the network voltages are either above, or below maximum or minimum acceptable voltage levels set out in the statutory limits.

Weighting

The weighting factor, ranging from 0-1, is determined by a weighted scores assigned to cost (50%), reliability (25%) and carbon impact (25%). Where there is more than one FSP available to dispatch, the weighted score is used to determine the proportion of dispatch across all FSPs. The cost score is based on a ratio between the FSPs price, and the highest price contracted for the specific location. The reliability score is reviewed annually for each FSP and is a ratio of the requested utilisation vs delivered utilisation (any over delivery is capped at 1). If the dispatch of the FSP results in a reduction of carbon it is scored 1, if it increases carbon, it scores 0.

Managing capacity

FLEXIBILITY SCHEDULING

Month Ahead

The Flexibility Scheduling Engineer has run their monthly network analysis based on half-hourly demand data and from these studies they have identified a network need for generation turn up or demand turn down on the network, for a 3-hour period in a specific location, to ensure that the network remains within limits. The specific network needs are required for us to select the most suitable option to address this need.

1. The team check for Flexibility Service Providers (FSPs) that are available in the required location can provide the service. Where a FSP has declared unavailable they are no longer considered as part of the decision making.
   - Forecast data. Real time monitoring.
2. The team assess if there are any specific technical requirements that need to be met for the service duration. If FSPs cannot provide support for the required duration they are removed from the list of options.
   - FSPs keep their Asset technical parameters up to date
3. The team check the reliability of the FSPs based on historical performance data. Reliability will form part of the weighting score of the FSP.
   - FSPs performance data
4. The team assess if the FSPs add any unacceptable additional risk to the operation of the network. If this is the case that FSP is removed from the list of options.
5. The team check that the FSPs have submitted bid data and use this to calculate the total cost for the service.
   - FSPs contract price
6. The team assess the carbon impact of each of the FSPs in terms of CO^2/MWh for the required duration. Carbon impact will form part of the weighting score of the FSP.
7. The team inform NESO of services we are dispatching.

Outcome

The Flexibility Scheduling Engineers applies the ODM principles by requesting availability across all Flexibility Service Providers (FSPs) in the required location. The requested availability is weighted based on reliability, cost and carbon impact. The Flexibility Service Providers (FSPs) are then scheduled. A similar process is then followed for issuing dispatch instructions, based on forecasted demand data at week ahead. Lastly, the Flexibility Scheduling Engineer will inform the NESO and neighbouring DSOs, if relevant, of the services we are dispatching.

Flexibility shortfall - risk management

When we do not have enough Flexibility Services available to meet out network needs, we refer to this as a flexibility shortfall. Managing the risk of flexibility shortfall is critical to the safe and secure operation of the network.

Flexibility shortfalls occur when there is not enough flexibility services available to meet our network requirements. This can be due to:

- Flexibility Services Provider (FSP) declaring themselves unavailable.
- Network reinforcements not being completed by the time the network need occurs.
- We cannot procure enough capacity from Flexibility Services to meet the network need.
- The total volume of services we have procured does not meet our forecasted need.
- FSP are unavailable due to network outages.

Our Flexibility Scheduling Engineers review the availability of procured services, demand forecasts, our planned outages and network capacity constraints and calculate any flexibility shortfall. This takes place after the conclusion of the short-term market tender and is updated one week prior to service dispatch. When flexibility shortfall is identified the Flexibility Scheduling Engineer will carry out a flexibility shortfall risk assessment. The risk assessment will determine the likelihood of a network overload and the potential impact on the network. There are a range of risk mitigation options that we can use to manage the flexibility shortfall risk. The Flexibility Scheduling Engineer will select the most appropriate mitigation action, or combination of mitigation actions based on the results of the risk assessment.

If a shortfall occurs during a service dispatch period in real time, e.g., FSPs fail to deliver the requested services, we may take a short-term mitigation method by reconfiguring the impacted network. Our control room engineers will transfer load from the constrained network area to the adjacent network area. Post event the FSP's reliability score will be updated to reflect their failure to deliver dispatched service in real time.

Potential Risk

Failure to effectively manage shortfall may result in:

- Overloading of our network assets, such as transformers, overhead line, and cables.
- Reducing the service life of or damaging our equipment.
- Partial, or full, power interruption to our customers
- Damage to SSENs reputation
- Non-Compliance with relevant industry code

Risk Mitigation Actions

- We accept the network risk and dispatch all the available FSPs we have in the zone.
- Add additional thermal protection
- Accelerate the network construction.
- Procure additional services.
- Transfer of load by our control room.
- Alter the outage plan during the shortfall period.
- Utilise Mobile Diesel Generation.

Shortfall Risk Score Methodology

The shortfall risk = potential impact vs likelihood

- Potential impact is scored based on the severity of the network impact based on overload potential and cost.
- Likelihood is scored based on historical outage information and shortfall potential period.

Flexibility shortfall - risk management

Day Ahead

Flexibility Scheduling Engineer (FSE) has run their monthly network analysis based on half-hourly demand data and sourced the required capacity from VAOU and secure service providers from the short-term market (SAOU & OU). However, the confirmed availability is less than what we need to secure the network, so there is a flexibility shortfall. We need to manage this risk.

1. The FSE will schedule the total confirmed availability from the flexibility service products available and check the protentional risk on our network.
2. The FSE will assess the network requirements and determine the overload conditions for consideration when assessing risk.
3. The FSE assesses the reliability and feasibility of the different mitigation options.
4. The FSE assess the shortfall impact and likelihood. If the risk is high, we will select multiple mitigation options to enhance the operational reliability and prevent a single point of failure.
5. The FSE assess the cost of the shortfall and then examines each mitigation options from a cost benefit analysis perspective and select the optimal option whilst still maintaining a secure and safe network.
6. The shortfall risk management considers carbon contribution as part of the assessment.
7. The FSE inform NESO of services we are dispatching to manage the network capacity via our risk of conflict report.

Outcome

The Flexibility Scheduling Engineers identifies the flexibility shortfall and carries out the shortfall risk assessment to assess the potential impact on our network. A mitigation action or a combination of mitigation actions based on the risk assessment results will be selected. The FSE will refine the proposed option one week ahead of the services dispatch based on the updated network information.

Applying Operational Decision Making (ODM) principles when we manage outages

We need to plan, optimise and manage outages on our network for a variety of reasons including network reinforcement, commissioning new assets, maintenance and emergency repairs to our network assets.

Unplanned outages can occur due to a variety of reasons (e.g., storms, asset failure) and these also need careful management to ensure our end customers have access to a reliable energy supply. Outage duration can range from minutes to hours, and in rare occasions longer.

During both planned and unplanned outages, we use the ODM to ensure that we dispatch the available options fairly, these options include:

- Distributed Energy Resources
- Access Products
- Flexibility Service Providers
- Mobile Temporary Generation

When we experience an unplanned outage, our priority is to get our customers restored as fast and as safely as we can using the information available to us at that time to apply ODM principles. Once customer supplies are restored, we review our approach and may make changes to this to ensure the most economical and secure solution is being utilised until the fault can be repaired.

As we operate a complex, active network, there can be scenarios that fall outside our normal planning and operational decision-making. An example of this is when we need to operate a portion of the network as a power island under certain conditions. The use of a Flexibility Service, Access Products and customer Access Rights will be determined by the technical parameters of the power island and will follow all security of supply requirements.

When the NESO receives an outage request from the Transmission Owner (TO) that will create a power island on the DSO network and along with the NESO and the TO we consider any requirements for utilising a Flexibility Service to ensure the best whole system solution.

Some History

- We were the first DSO to use Flexibility Services.
- In 2018, Flexibility Services were first used in a parallel with a Standby Diesel Power Stations during outages reduce carbon emissions.
- We have utilised over 5GWh of this Flexibility Service, which we still use to date.
- This has reduced our carbon emissions by 3,647 tonnes of CO^2

Control Engineer

Tom works in the Distribution Control Centre (DCC). He works as part of the Control Room team that monitors and controls the distribution network.

He must also respond to emergency unplanned events whilst taking account of wider network implications and risks. To do this he needs to have visibility and control of what is happening on the network. He is also dispatching flexibility for local system needs and is aware that he could even be talking to the same service providers as NESO.

Outage Planning Engineer

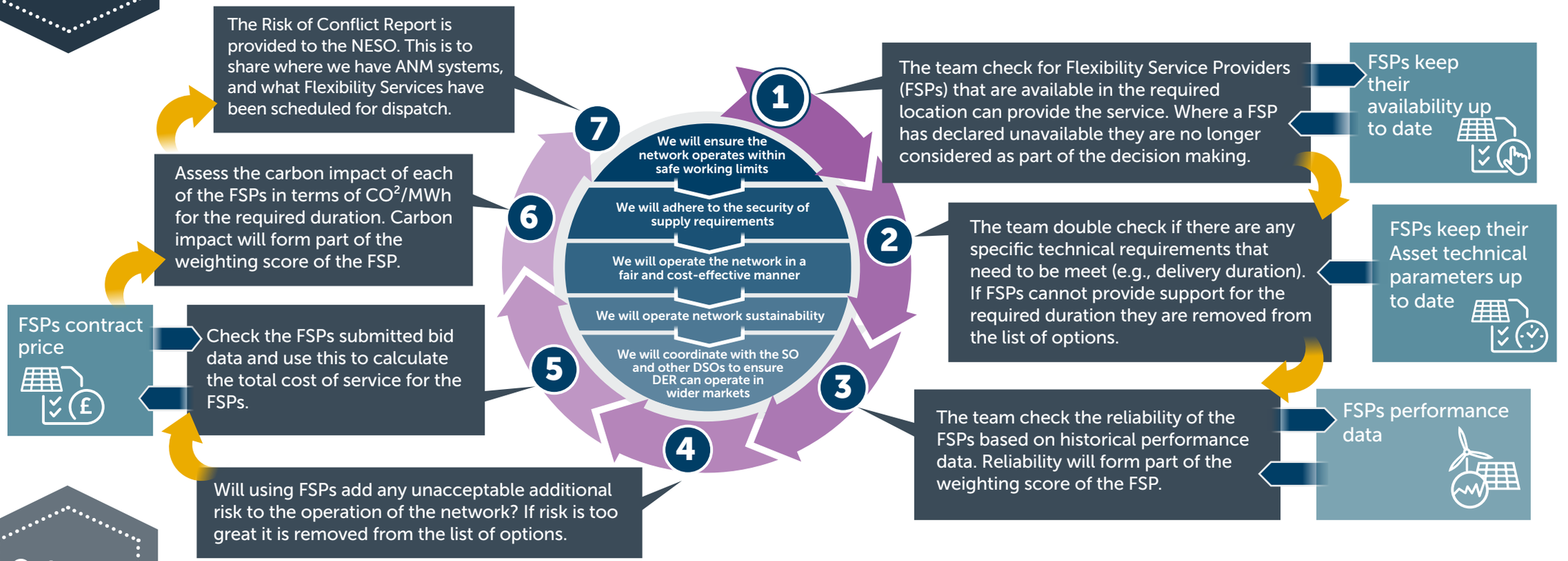
Laura works in the Distribution Control Centre (DCC). She works as part of the Outage Planning team.

She is responsible for system analysis and modelling to ensure safe access for our customers to our network. To do this she carries out detailed technical assessment and modelling of the outages on the affected networks, consider merits of all the potential options (e.g., DER generation, FSPs) and identifies an optimum plan. This ensures compliance with all industry standards. She works very closely with the Control Engineers and Flexibility Scheduling Engineers.

Managing outages

Day Ahead

The Outage Planning Engineer has a request for an outage to maintain a transformer. The team ensure that they optimise their outage plans minimising risks to the end consumers. They complete all their checks, network studies and apply curtailment to manage customers Access Rights and Access Products limits. The studies indicate there is still a need for flexibility to support demand, to ensure that the substation remains within security limits for the outage.



Outcome

The Outage Planning Engineer applies the ODM principles by requesting availability across all Flexibility Service Providers (FSPs) in the required location. The requested availability is weighted based on reliability, cost and carbon impact. After ensuring whole system coordination, the successful FSP is notified of the outcome and availability is scheduled. If there are not enough Flexibility Service Providers (FSPs) suitable, diesel generation will be considered.

Active Network Management dispatch of curtailable access products

Distributed Energy Resources (DERs) on an Access Product, managed by an Active Network Management (ANM) system, are dispatched based on their Principle of Access (PoA) position.

This is pre-defined when the Access Product is offered, this is then configured within the Active Network Management (ANM) system at the time of connection. The ANM system configuration is also updated when new customers connect with the same Access Product behind the same constraint.

- For sites connected under Flexible Connection, the ANM system is configured to dispatch Distributed Energy Resources (DER) in a Last In First Off (LIFO) stack. LIFO dispatches the DER at the bottom of the stack to reduce their import or export until the power flow at the network constraint location has reduced to a safe value. This approach is based on the contracted capacity of the site and not their actual output, this means if a customer has a lower output and cannot utilise all the capacity it has been given, this headroom is lost and not available to others behind them in the stack. This is in place for our older ANM systems.
- For sites connected under a Curtailable Connection, in line with Distribution Connection and Use of System Agreement (DCUSA) Schedule 2D, the ANM system is configured to dispatch Distributed Energy Resources (DER) in a Dynamic stack. This works in the same manner as Last In Fist Off (LIFO) and dispatches the DER at the bottom of the stack to reduce their import or export until the power flow at the network constraint location has reduced to a safe value. This approach offers the headroom capacity to the first in the stack, however if a customer has a lower output and cannot utilise all the capacity it will be given to the next connection in the stack until all the available headroom has been utilised.
- Curtailable Connection and Flexible Connection have different contractual arrangements. Curtailable Connections have defined curtailment limits and receive payment for curtailment exceedance and follow a standard form set out in Distribution Connection and Use of System Agreement (DCUSA) Schedule 2D. Flexible Connections follow a locally agreed form and do not include curtailment limits or exceedance payments.

To support Distributed Energy Resources (DER) being able to enter into specific markets that require rapid ramping (dynamic containment for example), we assess options to enable additional headroom to be made available for services required for whole system management and coordination with National Energy System Operator (NESO) to ensure they have access to the right service within the market when required.

Some History

- We have been operating ANM for over a decade.
- ANM was first establish as part of our own innovation project in 2009.
- During this time, we have enabled over 613GWh of renewable generation to connect in constrained part of the network.
- This is enough renewable energy to power 218,000 homes*.

* number of homes based on an annual consumption of 2,800MWh

What is an Active Network Management system?

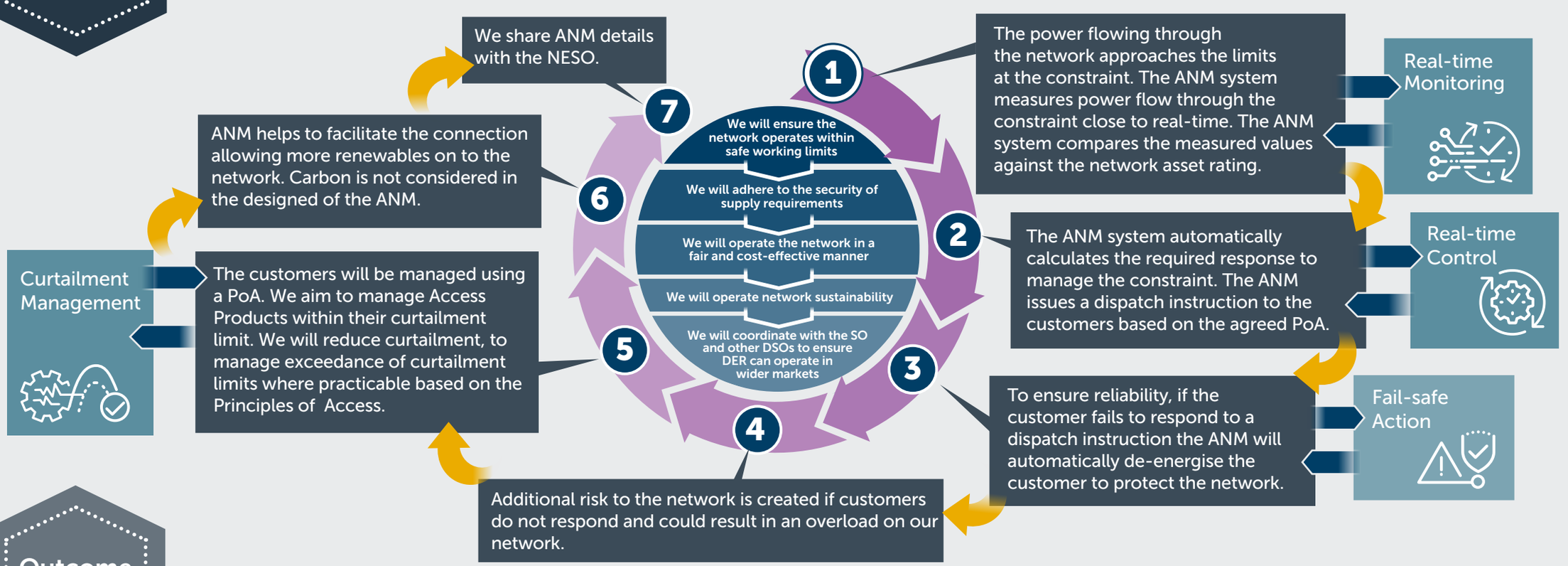
Active Network Management (ANM) systems are used to manage some Access Products such as Curtailable and Flexible Connections. The ANM dispatches DER based on the pre-defined PoA.

The ANM monitors the constraints points on the network and dispatches the DER sitting behind the constraint in real-time. The ANM enhances DER output without breaching network constraints. This minimises curtailment by allocating the maximum capacity at the constraint point in real time and accelerates new DER connections. This also reduces the necessity for strategic investment in some instances.

Active Network Management ANM and Access Product: Curtailable Connection

Within Day

A new customer has connected a new generation asset to our network. Planning studies had identified a network export constraint during the summer months upstream of the new customer asset. The customer is connected under an Access Product, on a curtailable connection with a curtailment limit. An Active Network Management (ANM) system has already been implemented to manage the multiple customers behind constraint. The new customer is added to the Active Network Management (ANM) system and Principles of Access (PoA) is applied.



Outcome

The Principles of Access (PoA) informed by the Operational Decision Making (ODM) principles, are embedded within the Active Network Management (ANM) systems. Where an Access Product has an associated curtailment limit and exceedance payment, this will be factored in to the PoA through the ODM principles. The ANM system allows the customer to connect quicker, ahead of network reinforcement.

Applying ODM principles to Battery Energy Storage Systems

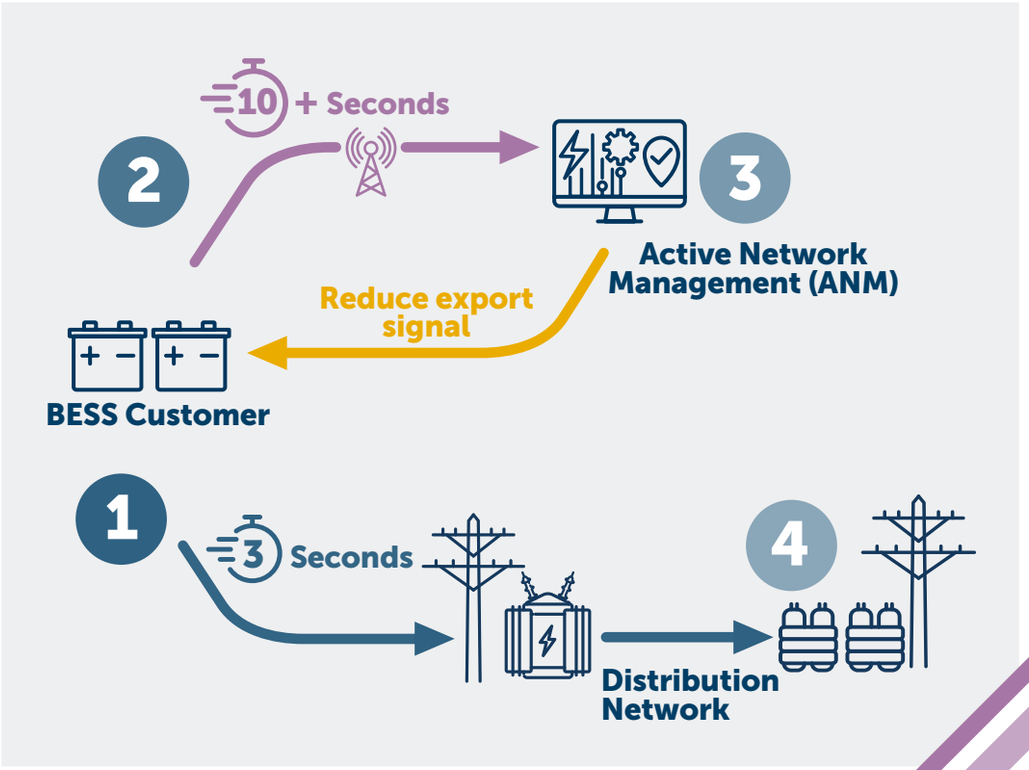
We want to enable Battery Energy Storage System (BESS) to participate in wider markets whilst also being connected to our ANM system.

Unlike traditional types of generation like Wind and Solar, BESS connections can transition from standby to full power in just a few seconds. This raises the risk that a BESS could export faster than the ANM system has time to respond, increasing the chance of an overload on the network. BESS can participate in the ESO markets for their fast-acting service, rapid ramping. Our ANM isn't designed to recognise this rapid change instantly.

Ramp Rates

The rate of increase (up rate) , or decrease (down rate), of kW's from the customer every second (kW/s).

1. A storage customer receives a signal from National Energy System Operator (NESO) and exports 5MW onto the network in 3 seconds. There is headroom available for this.
2. Our ANM module runs every 5 seconds so it could take 10 seconds or more for it to recognise the storage customer's export.
3. The ANM may interpret this as the customer not following their setpoint and issue a failsafe action by reducing their setpoint or disconnecting them from the network.
4. The result is that the storage customer is curtailed by the ANM even though headroom was available, limiting their ability to participate in ESO frequency and balancing markets.



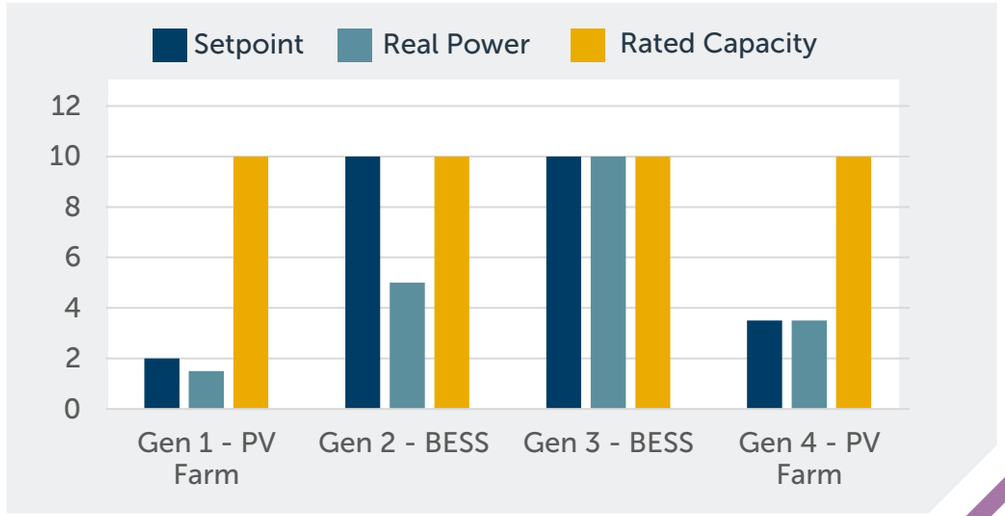
Applying ODM principles to Battery Energy Storage Systems

Our ANM systems dispatch Distributed Energy Resources (DER) in a Dynamic Last In First Off Stack. This method offers available headroom capacity to the first in the stack, similar to a Last In First Off (LIFO) queue. However, If a customer is not using that capacity, it will be allocated to the next in the queue until all available headroom is utilised.

How we manage BESS in coordination with ESO rapid ramping services. If headroom is available and in recognition of storage customers' requirements to ramp up quickly, the ANM system allocates them a higher set-point than their real power output so that if they did want to increase their export, they would be able to. This enables BESS connected to ANM systems to participate in wider markets.

1. Gen 1 is highest in the stack but is not exporting much. It's setpoint is slightly more than its output to allow it to ramp up if the sun comes out.
2. Gen 2 is a BESS customer. It's setpoint is set higher than its output so that it can ramp up if required.
3. Gen 3 can produce its full export and given the capacity to do so
4. Gen 4 is restricted to 3.5 MW as there is no more headroom available

Dynamic LIFO w/Battery Connection



Active Network Management dispatch of energy storage connections

Day Ahead

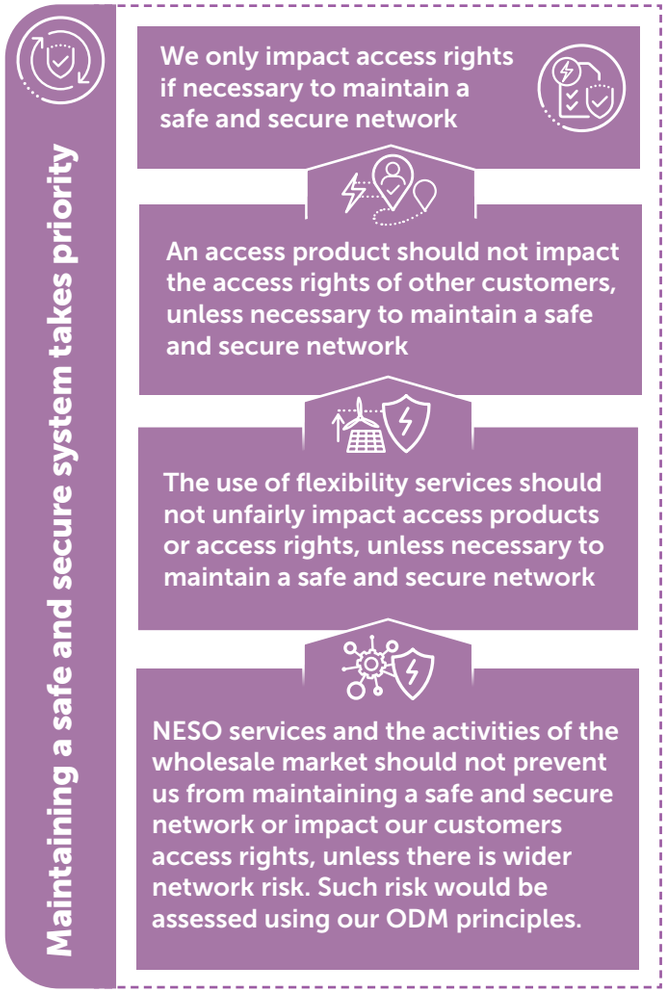
A BESS Curtailable Connection customer is connected to an ANM scheme that has multiple customers; the BESS customer is second in the dynamic LIFO stack. There is capacity available at the constraint, the customer at the top of the stack is not outputting and utilising the capacity. In recognition of the BESS customers' requirements to ramp up quickly, the ANM system allocates them greater access, so they could increase their export.

1. The ANM system measures the power flow through the constraint near to real time. When there is capacity available, the BESS customer is given access to the network.
2. We will assess the network requirements and set the ramp up rates appropriately. The BESS customer ramp rates are set high to enable access to wider markets, but without adding risk to the distribution network.
3. If the customer tries to export faster than their ramp up rates allow, the ANM system will automatically de-energise the customer to protect the network.
4. The added benefit of enabling BESS customers to participate in other markets outweighs the risk to the network and is fair.
5. The customers will be managed using a PoA. We aim to manage Access Products within their curtailment limit. We will reduce curtailment, to manage exceedance of curtailment limits where practicable based on the Principles of Access.
6. ANM helps to facilitate the connection allowing more renewables on to the network. Carbon is not considered in the designed of the ANM.
7. We share ANM details with the NESO. The BESS is able to participate in wider markets by our review of the ramp rates.

Outcome

When there is headroom available at the constraint, the ANM system gives BESS customers a much higher set point than their real power output. This allows them to participate in other markets ensuring their project remains viable even though they are being managed by an ANM system. In recent years there has been a huge increase in the number of energy storage connection applications, and we are committed to providing BESS customers with early access, so they can connect ahead of reinforcement.

Coordination and optimisation



[1] Published following open data triage to ensure we have the appropriate safeguards in place to protect privacy, commercial confidentiality and nationally critical infrastructure

We operate our network to keep customers connected and energised, whilst maintaining their Access Rights.

This allows NESO, the activities of the wholesale market, other system and network operators and energy service providers to operate without hindrance within these Access Rights.

However, there are instances where we need to intervene to ensure safe and secure operation. At these times we may even need to make more than one intervention in the same area, either in sequence or at the same time. When these situations occur, we coordinate our decision making, with the NESO, using our ODM principles to make sure we take the most appropriate dispatch action for the best whole system outcome. Where there is more than one option available to us to manage a network event, we use the ODM to select the most appropriate action or combination of actions. Where there is a wider interaction, we then review the best whole system solution with the NESO.

Sharing network visibility data to support coordination

We publish near-real time data about our network publicly and openly to support all users of the electricity system to coordinate their actions [1]. EHV, HV and LV data is published through our NeRDA portal in near real-time with graphical and API access. Smart metering data is published, via our data portal with tabular and API access, aggregated at local LV feeder level (i.e. local street level). Our control rooms exchange operational data through their routine activities. We are the first DNO to publish network data to this extent in near real-time across the whole of our distribution network and, whilst some of these services are new and developing, we will continue to refine their design to drive better coordination.

We have an established Inter-Control Center Protocol (ICCP) interface that we use to share real time network data with NESO. ICCP interfaces are the industry standard for sharing real time data. This enable the ESO to see the same information we see about power flows and DER output on our network seconds after it happens. We continue to enhance our ICCP capabilities to provide NESO further visibility of our distribution networks and connected DER and enable more efficient coordination. We are working closely with NESO on their DER visibility project, and we participate on the ENA Open Networks DER Harmonisation and Visibility technical working group.

Our published Embedded Capacity Register information follows the Distribution Connection and Use of System Agreement (DCUSA) standards for interoperability to give detailed information about each DER above 50kW connected and connecting to our network.

Access Products

EXAMPLE

Access Products allow customers to connect to constrained areas of network quicker and ahead of reinforcement. We also use Flexibility Service to manage some of our network constraints.

When we have the option to dispatch both, our priority will always be to keep customers connected, energised and maintain customer's Access Rights in the most economical way. Some Access Products have no cost associated with dispatching them and this is often the most economical solution.

Some Access Products have agreed curtailment limits which we make reasonable endeavours not to breach and, if we do, we agree to make exceeded curtailment payments. In some circumstances we may also have the option to dispatch Flexibility Service and, using our ODM principles we will assess the use of flexibility to minimise excess curtailment. For example, where dispatching a flexibility service can meet the network requirement with sufficient reliability and is an economic solution.

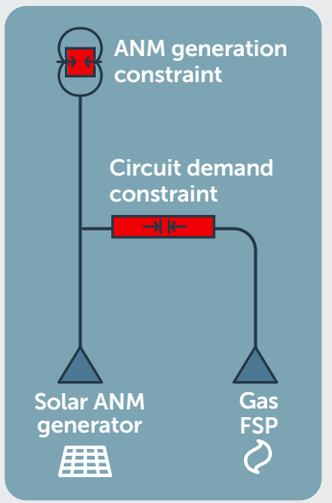
Coordination and optimisation continued

COORDINATION AND OPTIMISATION

Within day

A customer, with a solar farm, has connected under a curtailable connection and has a curtailment limit. The customer is managed by an Active Network Management (ANM) system and connected upstream of a gas turbine managed by a Flexibility Service Provider (FSP). The FSP is scheduled to provide generation turn up. When the Flexibility Service Providers (FSPs) turns up generation as instructed, the curtailable connection will be curtailed and the ANM will counteract the action; this is a coordination challenge.

1. The Flexibility Scheduling Engineer forecasts a demand constraint on one of our circuits and identified an FSP as being available to provide the service.
   The ANM system is monitoring a generation constraint at a transformer further up on the network.
   - Forecast data. Real time monitoring.
2. The Flexibility Scheduling Engineer identifies the network need and schedules the FSP to provide the service.
   The ANM is continuously monitoring the transformer constraint and calculating any actions required.
3. The FSP is a reliable provider and provides the service as requested.
   The ANM customer is responding to all ANM dispatch signals.
4. A conflict risk is identified. If the FSP turns up generation the ANM customer will be curtailed over their curtailment limit, as the power flow will be exceeded at the transformer constraint the ANM is managing.
5. The cost of exceeding curtailment increases the total cost of the action, it is no longer economically efficient.
   If this FSP is not dispatched, the demand constraint can't be managed.
   No other alternative options are available to manage our circuit constraint.
   The Flexibility Scheduling Engineer takes the decision to dispatch the FSP.
   - Cost of exceeding curtailment limit
6. The overall carbon emissions are increased. This is because the solar farm has been curtailed and the gas turbine has increased export.
7. The Risk of Conflict Report is provided to the NESO. This is to share where we have ANM systems, and what Flexibility Services have been scheduled for dispatch.



Outcome

The Flexibility Scheduling Engineer applied the Operational Decision Making principles and requested availability across all service providers. The requested availability could only be met by one non-renewable Flexibility Service Provider (FSP). The cost analysis showed the actions were not economically efficient, however there were no alternatives to manage the circuit constraint. Therefore, the Flexibility Scheduling Engineer prioritised safe and secure operation of the network over the cost to the DSO and the curtailment of an Access Product customer.

Coordination and optimisation continued

Our ODM principles and hierarchy enable us to be coordinated in our decision-making, the agreed industry wide ENA Open Network Primacy technical working group - Primacy Rules enables us to be coordinated with the NESO.

ANM coordination; there is one ANM managing two different constraints, one constraint is at the transmission and distribution boundary and one constraint is on the distribution network. The customer sits behind both constraints and is part of both ANM systems. The customer is requested to respond to the lowest output request from either constraint. This is to ensure we maintain safe limits across all our network where constraints are being monitored.

ANM systems may counteract dispatch actions taken by the NESO; the NESO have scheduled generation, turn down, to be dispatched from a service provider also located behind our distribution ANM constraint. If the NESO take this action, our ANM system will see an increase in headroom when the service provider turns down. The ANM will release this headroom to the next customers based on the PoA; filling up the headroom again. If not coordinated, this would result in the NESO not receiving the turn down in generation they had expected. To optimise this scenario, we share information about the constraints our ANM are managing and their location through the Risk of Conflict Report. Sharing this information allows the NESO to consider this in their decision making.

The NESO are scheduling the same service provider as us, at the same time, but in an opposite direction; the NESO want to schedule a service provider for generation turn up to manage and balance a wider GB system constraint. We have scheduled the same provider for generation turn down to manage a distribution network constraint. The NESO would identify the provider is already scheduled in the different direction in the Risk of Conflict Report. Whilst we have alternative providers dispatch at the same cost behind this constraint all these dispatch actions would still counteract the NESO dispatch action. The NESO has options to procure the service from other providers or markets within the wider location. The use of NESO is deemed the most optimal whole system solution.

Primacy rules

Primacy rules determine who has priority between DSO and the NESO. These rules are very similar to our own principles, they aim to;

- Deliver the least cost to consumers.
- Facilitate fair, accessible, liquid and efficient markets.
- Ensure operability at a nation level and transmission and distribution system security.

Risk of conflict report

We share the risk of conflict report weekly with the NESO this details;

- When NESO customer are in the same location as our ANM systems.
- Where we have schedule flexibility to be dispatched.
- The direction of our scheduled flexibility, generation turn up or down, demand turn up or down.

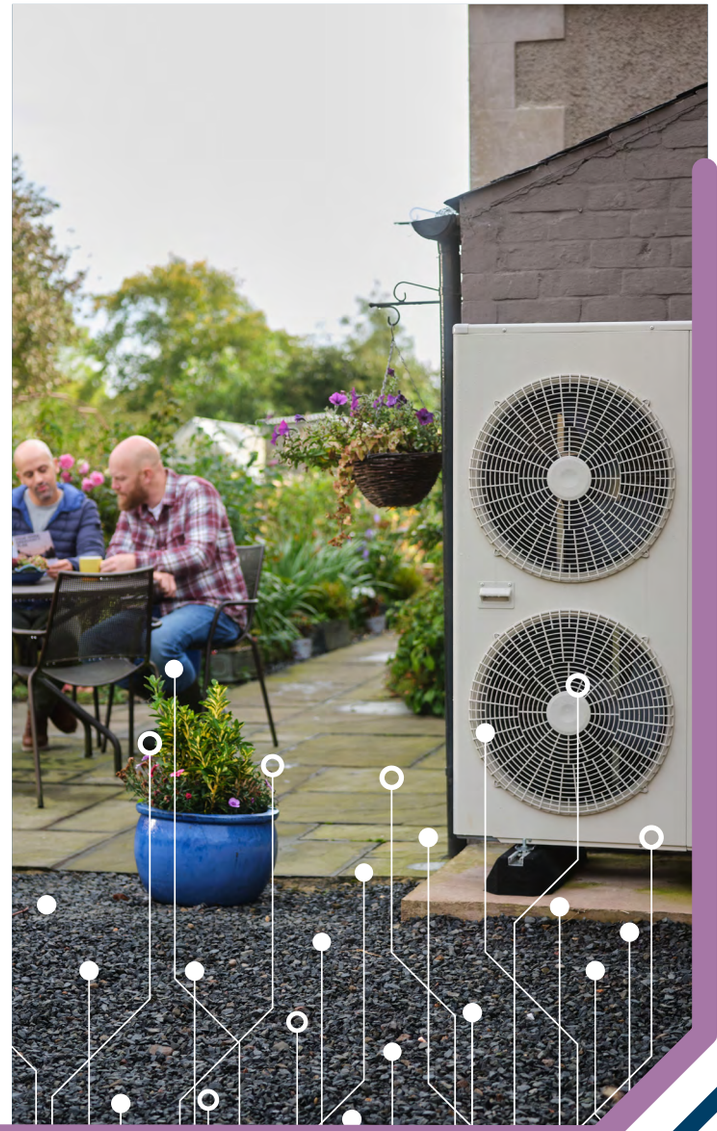
GSP Technical Limits

The Technical Limits will be applied at each Grid Supply Point (GSP) and will be managed by our ANM system. Our ANM will monitor the Technical Limit at the GSP and dispatch DER in real time to ensure the export or import remains within the Technical Limit.

We will receive a fixed power flow limit from NESO for a specified Grid Supply Point (GSP). This will enable Customers to connect on a curtailable basis behind Transmission constraints and ahead of transmission reinforcement. This limit defines the maximum power flow between Distribution and Transmission. The limit is not always in relation to a specific asset constraint and could be due to constraints on the wider GB system .

The rulebook applied to calculate the technical is published by the ENA here.

We have published the methodology used to prepare technical limits curtailment assessments here.



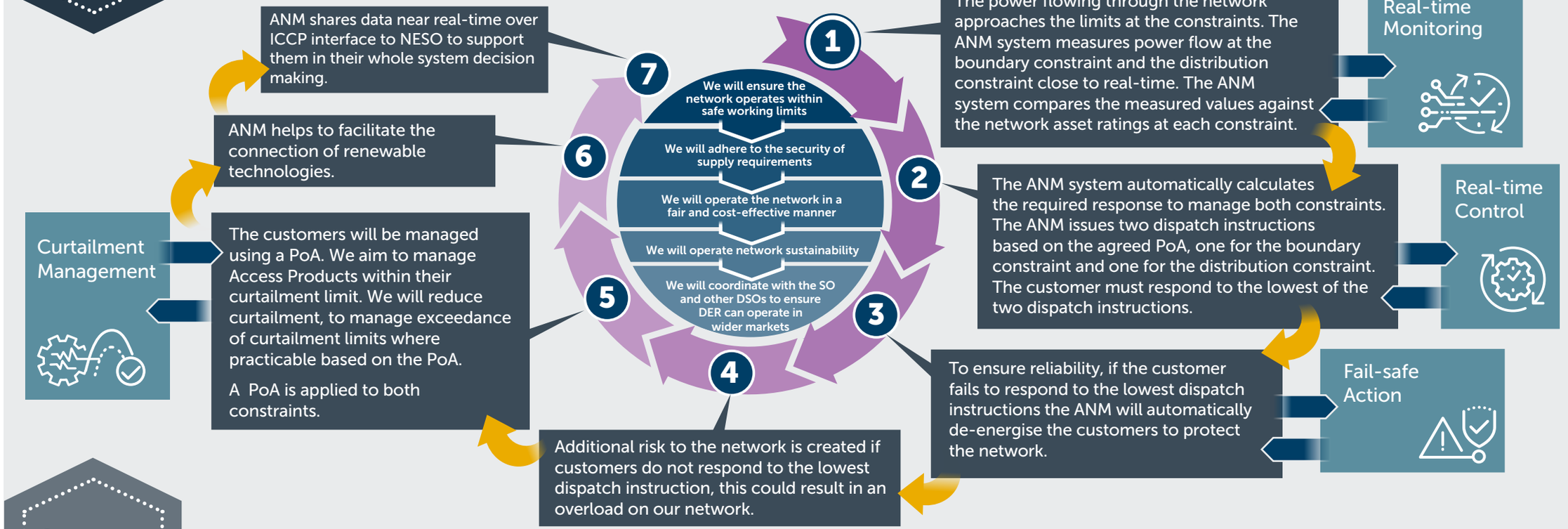
GSP technical limits and GSP boundary

ANM coordination; there is one ANM managing two different constraints, one constraint is on a transmission asset, either upstream or at the Transmission boundary. The other constraint is the GSP Technical Limit. The customer sits behind both constraints and is part of both ANM systems. In this case the customer is requested to respond to the lowest output request from either constraint. This is to ensure we maintain safe limits across all our network where constraints are being monitored.

NESO ANM coordination

Within Day

An Active Network Management (ANM) system has been created to manage a constraint at the transmission and distribution boundary, and to managing a constraint on the distribution network. New connecting customers, downstream of both constraints, will be connected to the ANM system. We have decided to use the dynamic stack Principles of Access to optimise how our customers are dispatched.



Outcome

The Principles of Access (PoA) , informed by the ODM principles, are embedded within the ANM systems. Where an Access Product has an associated curtailment limit and exceedance payment, this will be factored in to the PoA through the ODM principles. We agree the management of the boundary constraint in conjunction with the NESO to ensure system security needs are met for both our own constraints and constraints at the transmission boundary. The Active Network Management (ANM) system allows the customer to connect quicker, ahead of distribution and transmission network reinforcement.

Seasonal Operability Report (SOR)

In addition to our Operational Decision Making (ODM) review and update process, we will be publishing a quarterly Seasonal Operability Report (SOR).

The report will be split between our two license areas; Scottish Hydro Electric Power Distribution (SHEPD) in the north of Scotland and Southern Electric Power Distribution (SEPD) in the south of England. Our network needs are specific to the location and do differ seasonally due to changes in weather and consumer behaviour.

The SOR will increase the visibility and transparency of flexibility actions taken by our outage planning, control and flexibility scheduling engineers to manage network events. This will cover the previous quarter and forecast the actions that we expect to take in the next quarter.

Each quarter we will detail any changes within the year to our decision-making process and provide an opportunity for our stakeholders to give their feedback following the SOR publication.

We will publish KPI's within the SOR showing the impact our decision-making has had to flexibility providers, distributed energy resources and Access Product customers for the quarter.

We will also include information on new industry incentive and new products and services.

ODM governance

Our ODM framework provides clear rules for our DNO and DSO teams within SSEN distribution for the dispatch of distributed energy resource.

We understand the importance of adhering to the ODM principles consistently. Therefore, we have established measures to ensure full compliance with the principles and hierarchy. To monitor compliance, we have implemented the following steps:

- Formed a working group with representatives from DSO Flexible Solutions Team and DNO Distribution Control Centres to review and align work processes, people, and systems with our ODM principles and hierarchy.
- Working group members; DNO control engineers, Outage planning Engineers, Flexibility Scheduling Engineer and Operational technology specialists.
- Formed a steering group of senior leaders from the DNO and DSO directorates to guide and challenge the working group.
- Developed training materials and are actively rolling out training programs to ensure our teams understand and follow the ODM procedures.
- Introduced regular internal audits to ensure decisions are properly documented and that we maintain an auditable process.
- Continuous improvement measures to review the risks associated with decision-making and ensuring appropriate mitigation strategies are in place.

Review, Update and Compliance Process

Stakeholder Engagement Cycle:

After we release the initial version of the ODM in February we will continue a period of stakeholder engagement. During this time, stakeholders can contribute to shaping our decision-making framework. Moving forward we will conduct webinars and dedicated challenge group sessions led by industry subject matter experts. This process will allow us to create a 'you said, we did' list of commitments.

ODM Drafting:

Following stakeholder engagement, we will use the feedback received to draft an updated version of the ODM. This draft will include any changes to our decision-making that we have adopted based on stakeholder input.

ODM Consultation:

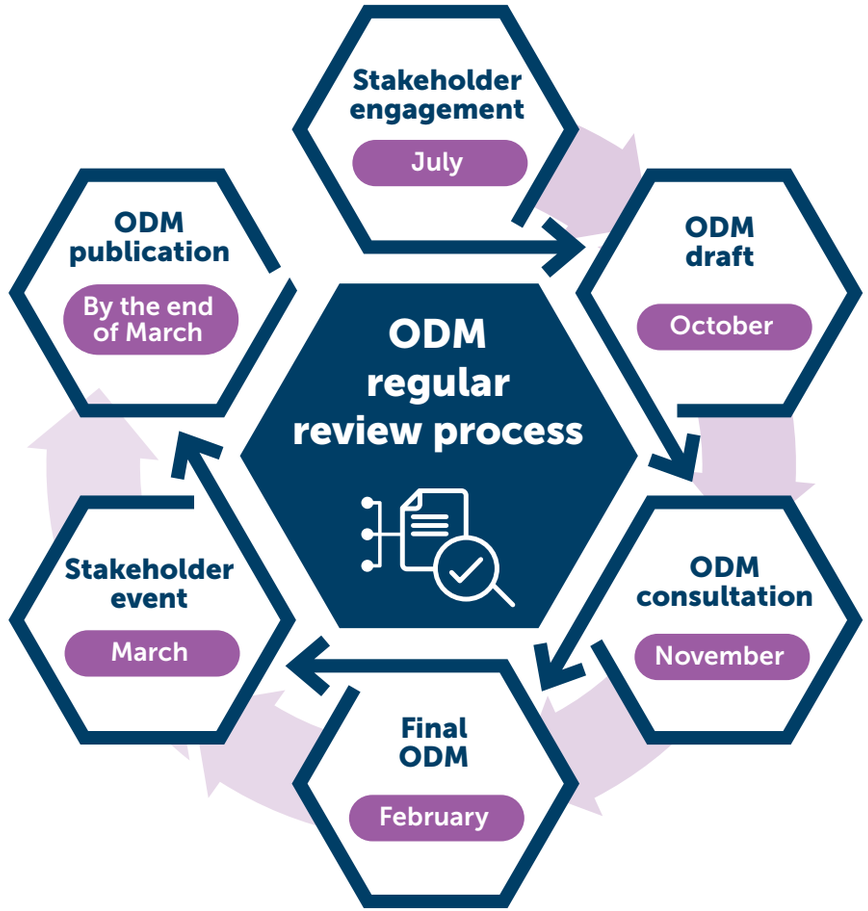
Once the draft is ready, we will release the new revision of the ODM for consultation. This provides stakeholders with additional opportunities to share insights on our decisions.

Final ODM:

Considering the feedback received during the consultation, we will create the final version of the ODM.

Stakeholder Event:

In March, we will host a stakeholder event to highlight the changes made in the new version of the ODM before its official publication.



ODM Publication:

The finalised ODM will be published in an electronic format on our website, making it publicly available for all interested parties.

Consultation Questions

1. On a scale of 1 to 10, how clearly do you think we have laid out our operational decision-making (ODM)? (1 being not clear and 10 being very clearly)
2. Do you agree with the ODM principles and hierarchy that we use to make these decisions? Yes/No If No. What aspect do you not agree with and why?
3. Do you agree with the steps in which we take to apply the ODM principles and hierarchy? Yes/No If not, what order would you put them in?
4. Is there anything missing from our ODM principles and hierarchy? Yes/No If so, what do you think this is?
5. Do you agree with the our decision to consider carbon contribution as part of our decision making? Yes/No If not, why do you disagree?
6. Do you agree with our approach to managing the risk associated with Flexibility Shortfall? Yes/No if not, what should we consider changing
7. Do you agree with our decision making for dispatching of energy storage customers? Yes/No If not, why do you disagree?
8. Are our roles and responsibilities clearly defined as to who is making decisions? Yes/No If not how can we define them better?
9. Do you agree the ODM principles and hierarchy supports the best outcome for the whole system? Yes/No If not, what would you change or include?
10. On a scale of 1 to 10, how clear and transparent do you think we are currently with our decision making? (1 being not at all and 10 being very transparent)
11. On a scale of 1 to 10, is our approach to coordination across Access Products and Flexibility Services within the industry clear and transparent? (1 being not clear and 10 being very clearly)
12. Does the ODM document provide enough detail to allow you, as a stakeholder, to make informed operational and commercial decisions? Yes/No If not, what additional detail do you require?
13. Do you have any further thoughts or proposed additions to our operational decision making?

Your feedback

We'd greatly appreciate if you would take the time to tell us what you think of this document. It will help inform our decision making and future initiatives.

Tell us your thoughts by visiting: ODM Consultation link

Please could you provide your responses by 2nd December 2024.

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.
ANM	Active Network Management. A system that continually monitors all the constraints on an area of the network, in real-time, and allocates the maximum amount of capacity available to customers in that area based on the date their connection was accepted
BAU	Business As Usual
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
FSP	Flexibility Service Provider. The owners, operators or aggregators of Distributed Energy Resources (DERs), which can be generators, storage or demand assets
GSP	Grid Supply Point. The boundary between the electricity transmission and distribution networks
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.
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.
MW	Megawatt
MVA	MVA - Mega Volt-Amp (measurement of apparent power)
NDP	Network Development Plan
NeRDA	Near Real-Time Data Access
NESO	NESO National Energy System Operator is the energy system operator for Great Britain, making sure that Great Britain has the essential energy it needs by ensuring supply meets demand
NIA	Network Innovation Allowance
NMF	Neutral Market Facilitator will provide a market for trading use of Distributed Energy Resources (DERs)
ODM	Operational Decision Making
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
SOR	Seasonal Operability Report
SME	Small Medium Size Enterprise
SSEN	Scottish and Southern Electricity Networks
TO	Transmission Owner

ENGAGE WITH US

For any queries or to request further information, please contact us on:

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