DNO:DSO CODE OF PRACTICE

Network Operation

March 2026

SP Energy Networks | DSO

1. SCOPE

Network Operation activities and outputs benefit our customers and society, and are essential for maintaining a safe, reliable and efficient electricity supply.

Delivering them requires DSO and DNO parts of our business to work together. It's therefore important that we're clear about where the responsibilities fall and the obligations on each part. This clarity helps ensure these activities and outputs are delivered efficiently and on time, and the transparency helps stakeholders understand our processes and how decisions are made.

That is the purpose of this DNO:DSO Code of Practice for network operation activities in SP Distribution plc and SP Manweb plc. It covers three main areas: how operational flexibility opportunities are identified, requirements assessed, procured and how visibility of these contracted services is provided to control room teams, through to how dispatch decisions are enabled and implemented, and post-event review, settlement and learning are carried out; how planned flexibility associated with investment deferral is dispatched, through to settlement and review; and how curtailment is deployed, managed, measured and reported. It provides the next level of detail down from our DNO:DSO Operating Framework - Operations.

DNO:DSO Code of Practice for Network Planning is the equivalent document that sets out the detail for how we identify, assess and plan flexibility associated with network investment.

2. ISSUE RECORD

Issue Date	Issue No.	Author	Amendment Details
16th March 2026	Issue 1	Scott Taylor Ralph Eyre-Walker	Original Issue

3. ISSUE AUTHORITY

Author	Owner	Issue Authority
Scott Taylor Flexibility Performance Manager Ralph Eyre-Walker Environmental & Innovation Manager	Gerry Boyd Head of Flexibility	Nia Lowe Head of DSO Date:16/3/2026

4. REVIEW

This document shall be reviewed as dictated by business / legislative change; this includes stakeholder input. It shall be reviewed at a period of no greater than two years from the last issue date. A review shall be required for the transition to RIIO-ED3.

5. DISTRIBUTION

This document is published on our DSO Website.

6. CONTENTS

7. DEFINITIONS AND ABBREVIATIONS

DSO	Distribution System Operator. It refers to the DSO responsibilities defined by Ofgem (in the September 2021 RIIO-ED2 Business Plan Guidance), and the SP Energy Networks personnel and teams responsible for delivering them.
FSP	Flexibility Service Provider. A customer or third party who provides flexibility services to support the distribution network.
NESO	National Energy System Operator.
Operational flexibility	A procured flexibility service used to support planned outages, abnormal network conditions, post-fault restoration, storm response, and other operational requirements on the distribution network. It may be scheduled in advance or dispatched in real time depending on the operational requirement.
SP Distribution plc	The Distribution Licence Holder for the Distribution Service area formerly known as Scottish Power.
SP Manweb plc	The Distribution Licence Holder for the Distribution Service area formerly known as Manweb.
SP Energy Networks	A term used throughout this document to refer to both SP Distribution plc and SP Manweb plc including all associated design and planning practices.

8. RELATED DOCUMENTS

This document is one of a suite of documents relating to this subject area and should be read in conjunction with:

(a) SP Energy Networks Documents

- DNO:DSO Operating Framework, February 2026
- Decision Making Framework - Planning, February 2026
- Decision Making Framework – Operations February 2026
- Conflict of Interest Management Plan, February 2026
- DSO Strategy
- DSO Flexibility documents published on our website: Flexibility Services - SP Energy Networks

(b) Ofgem Documents

- RIIO-ED2 Business Plan Guidance, September 2021

All processes must comply with both the requirements described within this document and those detailed above.

9. GENERAL

SP Energy Networks reserves the right to change the data contained within this document without prior notification. The data and guidance contained within this document remains the property of SP Energy Networks and may not be used for purposes other than that for which it has been supplied and may not be reproduced either wholly or in part, in any way whatsoever, nor may it be used by, or its contents divulged to, any other person whosoever, without the prior written permission of SP Energy Networks.

Stated timescales are usually the maximum time period in which processes can be completed, and do not prevent processes being completed more quickly.

10. FLEXIBILITY

This code of practice focuses on process steps and where responsibilities sit, rather than on the methodological detail on each process step (that methodological detail is in our Decision Making Framework). The justification for the responsibilities in this Code of Practice is contained in our DNO:DSO Operating Framework.

10.1 Objective

The objective is to manage the network safely, reliably and efficiently through a clear division of responsibilities between DNO and DSO for the deployment of flexibility. Network operation includes activities before real time, in real time, and post event. This Code of Practice sets out how flexibility for network investment is dispatched and reviewed and flexibility for outage support is identified, procured, made visible to control room teams, dispatched where required, and reviewed afterwards. There are two ways flexibility is dispatched, depending on if the decision to utilise the flexibility is made in advance, as is the case for planned outages and investment support (scheduled flexibility), or if the decision is made in real time, as is the case for unplanned outage support.

10.2 Process overview

Figure 1

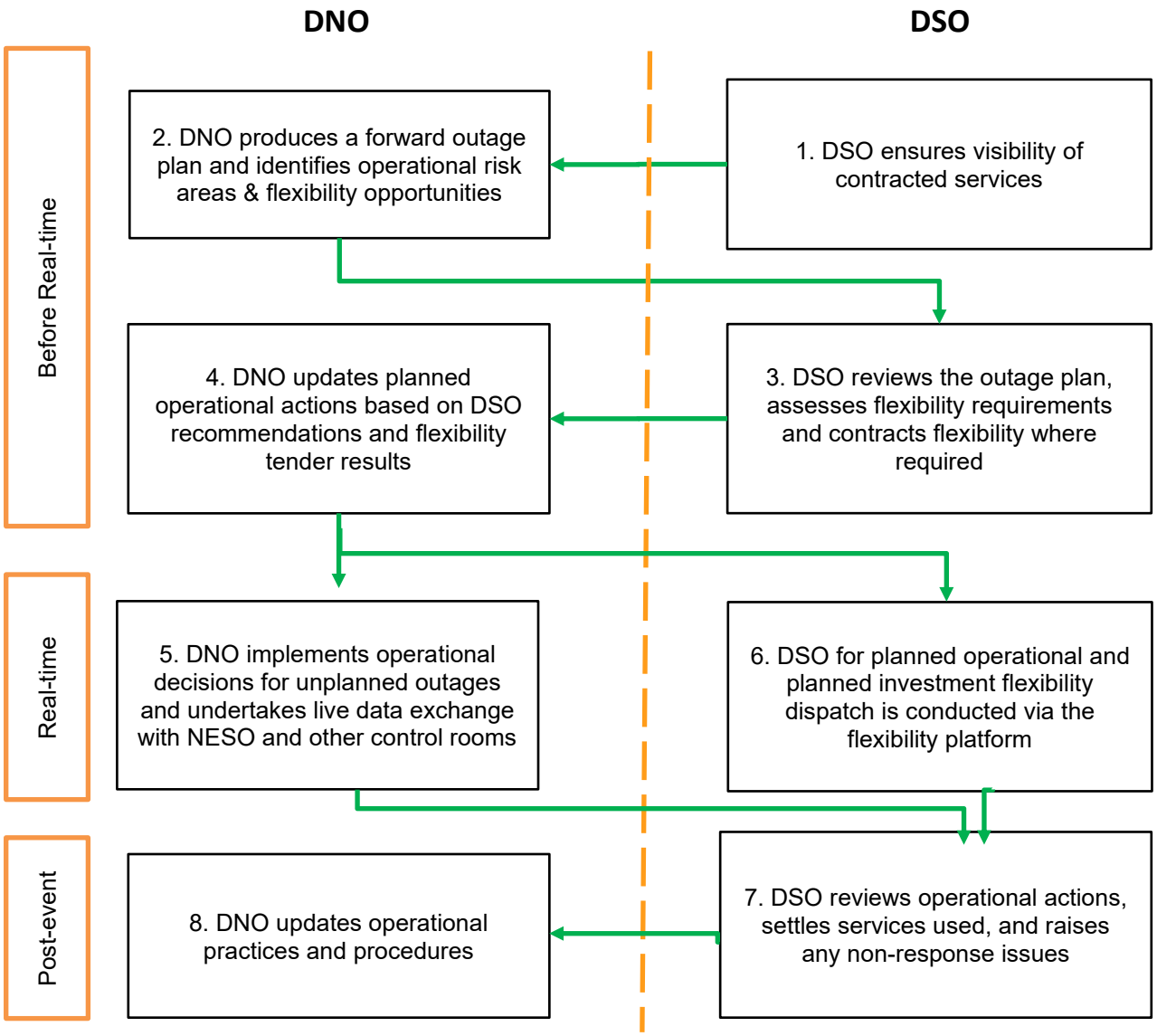

Figure 1: Flexibility process flow chart

10.3 Step 1: DSO ensures visibility of contracted services

Scope: This step is about ensuring that the DNO Control Room has a clear and up-to-date view of contracted flexibility services, that may be relevant to planned or live operational decisions.

To achieve this, the DSO maintains the relevant records for contracted flexibility services and ensures that the availability, dispatch method and cost are clear for each. The DSO updates the operational visibility tools and directories used by the Control Room, and issues dispatch schedules where dispatch requirements have been agreed in advance.

The DSO also provides the supporting operational and commercial information needed to use those services correctly, including relevant provider contact details, dispatch arrangements, and supporting records.

Output: The DNO Control Room has a clear and up-to-date view of contracted flexibility services, including the relevant availability, dispatch method, cost, dispatch schedules, contact details and supporting records needed to support operational decision-making.

Responsibility: DSO Flexibility Performance team

Timescale: Continuous, with records, schedules and visibility tools updated as contracts are awarded, dispatch schedules are issued, curtailable connection records change, and provider availability or dispatch arrangements change.

10.4 Step 2: DNO produces a forward outage plan and identifies operational flexibility opportunities

Scope: This step is about ensuring there is a clear picture of upcoming planned outages and a structured assessment of where operational flexibility could be used to support them.

To achieve this, the DNO produces a forward outage plan covering the forthcoming operational period, setting out planned outages and identifying where flexibility could be used to support them.

For each outage, the Outage Planning conduct risk analysis of the outage plan to identify where the risk of a constraint or fault during an outage is material and where flexibility could provide a means of managing that risk. Where a flexibility opportunity is identified, the relevant technical requirements - including site and outage details, details of the flexibility service technical details relating to the flexibility asset and asset location communicated to the DSO in Step 3.

The DNO also coordinates with NESO to understand any transmission-level constraints or outages that may affect the distribution network's operational context during the planned period.

Output: A forward outage plan, with associated proformas for each identified flexibility opportunity, setting out the technical requirements for that opportunity. NESO coordination completed where relevant.

Responsibility: DNO Outage Planning

Timescale: The DNO issues the annual forward outage plan. The Outage Planning team conducts risk analysis and identifies flexibility opportunities, with proformas issued to DSO at least 1 month in advance of the first requirement.

10.5 Step 3: DSO reviews the outage plan, assesses flexibility requirements and contracts flexibility where required

Scope: This step is about the DSO reviewing the forward outage plan and associated proformas produced in Step 2, assessing whether existing contracted flexibility services can meet the identified requirements, procuring additional flexibility where gaps exist and making recommendations to the DNO where planned operational actions could be improved.

To achieve this, the DSO reviews the forward outage plan and proformas against existing contracted flexibility services to determine whether available providers can meet the requirements identified by the DNO. These requirements inform the month ahead tender process. For unplanned outage support, this may take the form of an expression of interest followed by a tender, or a bilateral agreement and ensures the Control Room visibility tools (PowerOn) are updated in accordance with Step 1.

Where the DSO considers that planned operational actions could be modified to make better use of contracted flexibility, it makes recommendations to the DNO. These recommendations may cover areas such as the sequencing of planned outages to align with periods of contracted flexibility

availability, the use of a contracted flexibility service as an alternative to a more complex switching arrangement, or the timing of an outage window to maximise the likelihood of flexibility provider response. The DNO considers these recommendations and takes action where appropriate, as set out in Step 4.

Output: Confirmation of flexibility services available to meet identified outage requirements; outcome of any additional procurement; dispatch schedules arranged; PowerOn updated with newly procured services; and recommendations provided to the DNO on planned operational actions where relevant.

Responsibility: DSO Flexibility Performance team and DSO Flexibility Procurement team.

Timescale: DSO formal review of forward outage plan and proformas is undertaken annually with changes and additional requests processed over the year.

10.6 Step 4: DNO updates planned operational actions based on DSO recommendations and flexibility tender results

Scope: This step is about the DNO considering the DSO's recommendations and the outcomes of any additional flexibility procurement completed in Step 3,and updating its planned operational actions accordingly ahead of real-time operation.

To achieve this, the DNO reviews the DSO's recommendations alongside the results of any procurement exercise completed in Step 3. Where the DNO agrees with a recommendation, it updates the relevant planned operational actions and informs the DSO. Where recommendations are not accepted, this is managed through the escalation process set out in Section 11. The Control Room is updated with the final confirmed position - including which flexibility services are available to support each planned outage - before the relevant outage window opens.

Output: Updated planned operational actions reflecting accepted DSO recommendations and confirmed flexibility arrangements.

Responsibility: DNO Outage Planning

Timescale: Once DSO recommendations and procurement award notifications are received, planned operational actions are updated and the Control Room is notified.

10.7 Step 5: DNO implements real-time operational decisions for unplanned outages and undertakes live data exchange with NESO

Scope: This step is about the DNO implementing the operational flexibility plan for unplanned outages in real time where required, to support the safe and efficient operation of the network.

During real-time operation, the DNO Control Room is responsible for all operational decisions on the distribution network.

Dispatch instructions for Operational Flexibility are issued via SPEN Control Room to FSP Control room via a pre-agreed communication channel, typically via email or telephone. The time in which notification occurs is dependent on the procured flexibility product. Dispatch notifications for operational flexibility are created and issued via the control room and issued directly to the FSP control room.

Where an additional real-time need arises that was not anticipated in the forward outage plan - for example, a fault, abnormal network condition, restoration event or inclement weather - the Control Room may call on existing contracted operational flexibility services. Should any of these issues arise, the Flexibility team will contact the FSPs to identify what flexibility is available and advise the Control Room of this. Dispatch instructions in these scenarios are issued from the SPEN Control Room to

Flexibility Provider Control room via a pre-agreed channel of communication. The DNO maintains live data exchange with NESO throughout, including notification of distribution-level operational actions and any events that may have a material effect on the transmission system.

Output: Operational decisions implemented. Flexibility services dispatched where required, via real-time instructions. Live data exchange with NESO maintained throughout.

Responsibility: DSO Flexibility Team and DNO Control Room

Timescale: Continuous during the operational period.

10.8 Step 6: DSO implements scheduled flexibility dispatch

Scope: This step is about the DSO implementing the contracted flexibility plan to support the safe and efficient operation of the network.

Following contract award for scheduled flexibility, dispatch instructions are automatically generated and issued via email within the flexibility platform. Each dispatch instruction will contain a unique reference obligation ID, facilitating the identification of associated assets.

Output: Planned Flexibility services dispatched.

Responsibility: DSO Flexibility Team

Timescale: Continuous during the operational period.

10.9 Step 7: DSO reviews operational actions, settles services used, and raises any non-response issues

Scope: This step is about the DSO reviewing what happened during the operational period, confirming that flexibility services and any customer curtailment were used correctly, settling services that were dispatched, and raising any cases where a provider failed to respond as required. This takes place post-event.

To achieve this, the DSO reviews each dispatch event against the contracted terms, including the volume dispatched, the duration, and the provider's response. Delivered flexibility is validated against the provider's baseline using metering data submitted by the FSP via the dedicated flexibility platform.

Where a service was dispatched and the provider responded as required, the DSO initiates settlement in accordance with the contract terms. Settlement reports are generated via the dedicated flexibility platform and made available to the provider, covering availability and utilisation payments as applicable. Providers have a 5 working day window to dispute settlement results. Payment is processed within 30 working days of invoice acceptance. Where a provider did not respond as required, in part or in full, the DSO raises a non-response issue and applies the relevant adjustment under the terms of the flexibility service agreement.

In the scenario where Flexibility was not pre-planned (e.g. Storm scenario), and the Control Room dispatched direct to FSP Control Room a template is completed and issued to the Flexibility Team post event to verify what was utilised and for payment to be made.

Output: Post-event review completed. Settlement initiated for all dispatched flexibility services, with settlement reports issued via the dedicated flexibility platform. Non-response adjustments applied where applicable. Concerns or observations captured for Step 7 recommendations.

Responsibility: DSO Flexibility Performance team

Timescale: Post-event review and non-response issues are raised on a monthly basis following each dispatch event throughout the operational period. review]. Settlement is initiated and concluded by the DSO on a monthly billing cycle.

10.10 Step 8: DNO updates operational practices and procedures

Scope: This step is about closing the learning loop - ensuring that insights from the post-event review completed in Step 7 are fed back into the DNO's and DSO's operational practices and procedures, so that the process improves over time.

To achieve this, the DSO provides the DNO with recommendations arising from its Step 7 review. These may include observations on how flexibility was dispatched, whether dispatch arrangements worked as intended, whether the Control Room had adequate visibility of available services, or whether operational actions could have been sequenced differently to make better use of flexibility. The DNO considers the recommendations and decides whether any updates are needed to its operational practices, procedures, or control room guidance. Where a recommendation is accepted, the relevant update is made.

This step ensures that learning from the event is translated into practical change where appropriate.

Output: Operational practices and procedures are updated to reflect relevant recommendations and lessons learned from the post-event review.

Responsibility: DNO Control Room and Outage Planning

Timescale: Completed following the post-event review and within a reasonable period to support future operational activities.

Task	DNO	DSO	SLA	Output
Step 1: DSO ensures visibility of contracted services		R	Continuous	DNO Control Room has up-to-date view of contracted flexibility services, dispatch schedules, and contact arrangements
Step 2: DNO produces a forward outage plan and identifies operational flexibility requirements	R		Annually and as requirements change	Forward outage plan and associated proformas setting out technical requirements for each identified flexibility opportunity
Step 3: DSO reviews the outage plan, assesses flexibility requirements and contracts flexibility where required		R	Review within 1 month. Flexibility tendering takes place monthly	Confirmed flexibility services; procurement outcome; dispatch schedules; PowerON updated; recommendations to DNO
Step 4: DNO updates planned operational actions based on DSO recommendations and flexibility tender results	R	I	On receiving DSO recommendations; before outage window opens	Updated planned operational actions;
Step 5: DNO implements operational decisions and undertakes live data exchange with NESO	R	I	Continuous during operational period	Operational decisions implemented; flexibility dispatched where required; live data exchange with NESO maintained
Step 6: DSO dispatches schedule flexibility		R	As scheduled	Dispatch instructions generated and issued automatically following contract award
Step 7: DSO reviews operational actions, settles services used, and raises any non-response issues		R	Rolling basis post-event; Monthly settlement	Post-event review completed; settlement reports issued; non-response adjustments applied; curtailment records confirmed
Step 7: DNO updates operational practices and procedures	R	I	Completed following post-event review	Operational practices and procedures updated; DSO internal performance reporting completed

Table 1: Responsibility and SLA matrix

11. OPERATION OF CONSTRAINT MANAGEMENT ZONES

This code of practice focuses on process steps and where responsibilities sit, rather than on the methodological detail on each process step (that methodological detail is in our Decision Making Framework). The justification for the responsibilities in this Code of Practice is contained in our DNO:DSO Operating Framework.

11.1 Objective

The objective is to manage the network safely, reliably and efficiently through a clear division of responsibilities between DNO and DSO teams for the use of constraint management zones to facilitate accelerating customer connections and minimising the likelihood of thermal and voltage network limits being exceeded.

This Code of Practice sets out how Constrain Management Zones (CMZs) and Active Network Management (ANM)-connected customers are made visible to control room teams, how CMZ and ANM readiness is maintained, how real-time curtailment decisions are enabled and overseen, and how curtailment actions are recorded, reviewed and reported.

11.2 Process overview

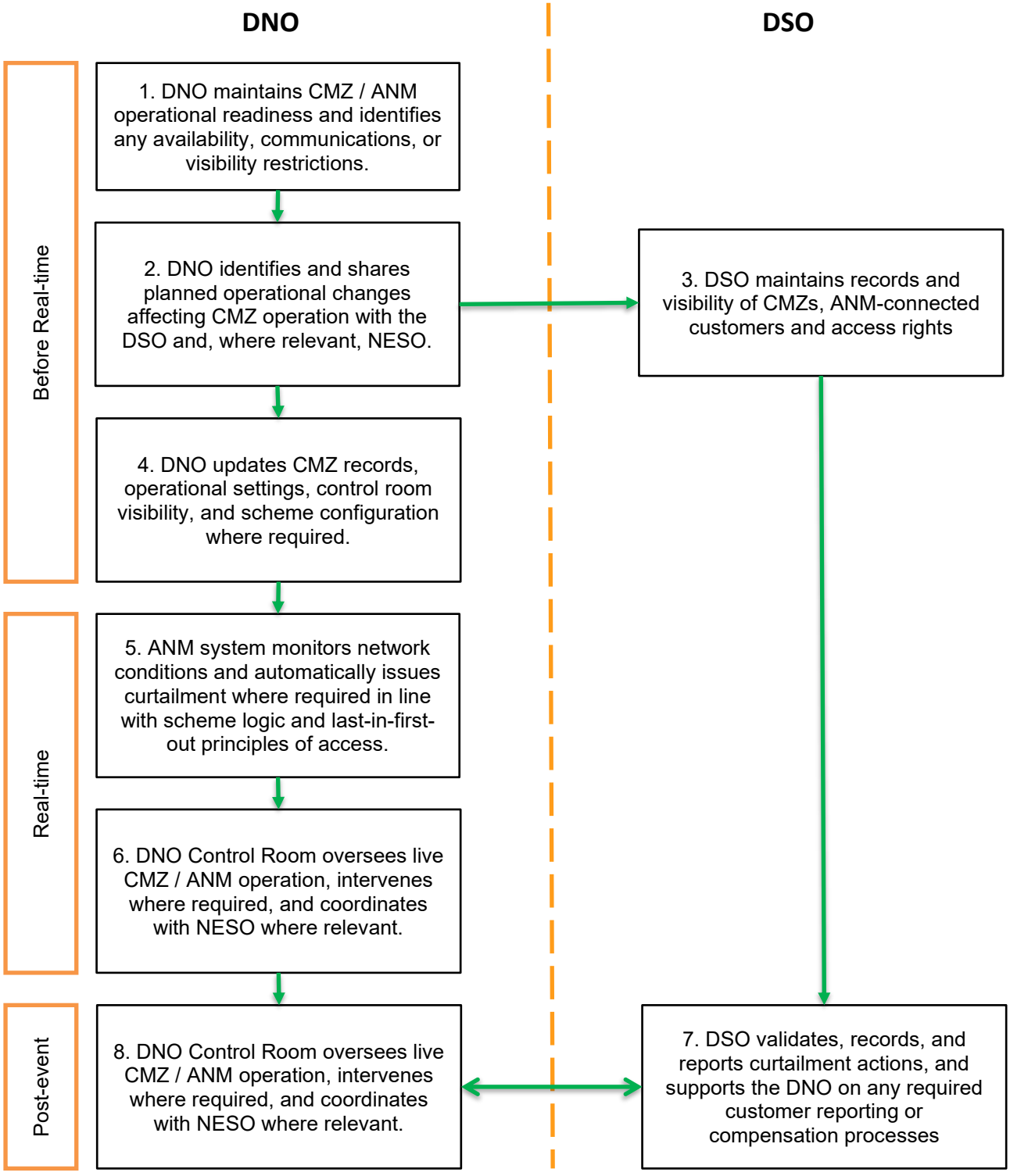

Figure 2: Curtailment Process flow chart

11.3 Step 1: DNO maintains CMZ/ANM operational readiness

Scope: The DNO confirms the CMZ and ANM arrangements are available and ready for live operation, and that any issue affecting their availability, performance, or visibility are identified and managed. This covers the ongoing monitoring of operational readiness for the relevant CMZ and ANM infrastructure, so that any restrictions on live use are understood and can be acted on appropriately.

To achieve this, DNO Network Planning team confirms that the relevant CMZ and ANM infrastructure is available for live operation, identifies any system outages, communications issues, or other operational restrictions, and ensures that the relevant operational status is visible and communicated where needed. This includes maintaining awareness of any condition that could affect the use of the scheme, including loss of availability, degraded communications, or reduced visibility through operational systems.

This step covers the core operational components that support CMZ and ANM operation, including CANMOP, CMZ Controllers, communications links, measurement points, outstations, and Supervisory Control and Data Acquisition (SCADA) interfaces, as applicable. These components together support the transfer of measurements, control signals, and operational visibility needed for live CMZ and ANM operation. Full details of the operational components are set out in 11.11.

Output: CMZ / ANM availability is confirmed, with any outages, communications issues, degraded functionality, or other operational restrictions identified, so that the DNO has a clear view of whether the scheme is fully available for live operation and what limitations, if any, need to be taken into account and what maintenance needs to be carried out.

Responsibility: DNO Network Operations and Network Digitisation

Timescale: Continuous, with readiness monitored as part of normal operational activity and reviewed whenever there is a system outage, communications issue, change in operational status, maintenance activity, or any other event that could affect CMZ / ANM availability or visibility.

11.4 Step 2: DNO shares planned operational changes affecting CMZ operation

Scope: This ensures that planned operational changes which affect CMZ operation are identified in advance and communicated to the relevant DSO teams in time for any necessary record, dataset, or visibility updates to be made. It covers planned changes to network operation that affect how a CMZ or ANM scheme is expected to operate, or how its status and arrangements need to be reflected in supporting records and data.

To achieve this, DNO Network Operations identifies switching arrangements and other planned operational changes that affect CMZ operation. This includes any planned network condition, outage state, or operational arrangement that could change the expected topology in a way that affects the applicability of an existing scheme arrangement, or require follow-on updates to operational records or scheme information.

The DNO shares the relevant information with the DSO Data Team in sufficient time for records, datasets, and any related visibility arrangements to be updated before or alongside the operational change taking effect. Where relevant, the DNO also coordinates with NESO on planned operational changes that affect CMZ operation, particularly where those changes may affect agreed operational arrangements or boundary conditions beyond the immediate CMZ.

Output: Planned operational changes affecting CMZ operation are identified and communicated to the relevant DSO teams and, where relevant, NESO, so that the impact on CMZ operation is understood in advance and the necessary records, datasets, and supporting visibility arrangements can be updated in line with the planned change.

Responsibility: DNO Network Operations

Timescale: Continuous, with changes identified and communicated as part of ongoing operational planning and whenever a planned outage, switching arrangement, topology change, or other operational change affects CMZ operation.

11.5 Step 3: DSO maintains records and visibility of CMZs, ANM-connected customers and access rights

Scope: The DSO maintains an accurate and current view of CMZs, ANM-connected customers, access rights, curtailable connection arrangements, and relevant CMZ operational status by reviewing information provided by the DNO and updating the relevant records, datasets, and visibility tools. This supports curtailment governance, operational visibility, and subsequent reporting.

To achieve this, the DSO Data team maintains the records and supporting data needed to show which CMZs are in operation, which customers are connected within those arrangements, which access rights and curtailment terms apply, and what operational changes need to be reflected in DSO records or visibility tools. This includes maintaining records of customer participation in CMZ and ANM arrangements, curtailable connection data, and any related visibility arrangements used to support DSO awareness of CMZ operation.

The DSO updates these records, datasets, and visibility tools as CMZ arrangements change, as customers are added, removed, or amended within those arrangements, as access rights or curtailable connection details are revised, and as planned operational changes are provided by the DNO. In the current arrangement, this step is limited to maintaining DSO awareness, records, and visibility, rather than operating or configuring the scheme itself.

Output: The DSO has an up-to-date view of CMZs, ANM-connected customers, access rights, curtailable connection arrangements, and CMZ operational status through current records, datasets, and visibility tools.

Responsibility: DSO Data Team

Timescale: Continuous, with records, datasets, and visibility tools updated as CMZs are introduced, amended, or retired, as customers are connected to or removed from CMZ or ANM arrangements, as access rights or curtailable connection details change, and as planned operational changes are provided by the DNO.

11.6 Step 4: DNO updates scheme configuration where required

Scope: This step ensures that CMZ records, operational settings, and control room visibility are updated where required to reflect live arrangements and any change in customer status, scheme status, or operating conditions.

To achieve this, DNO Network Operations team updates CMZ records, operational settings, control room visibility tools, and supporting records as required. Where an operational change requires a change to scheme configuration or live operating settings, this is implemented through the relevant DNO operational or technical process. The DNO also ensures that curtailment continues to align with customer access rights and operational arrangements, and that the Control Room has visibility of the relevant customer and scheme status

Output: CMZ records, operational settings, control room visibility tools, and supporting records are kept up to date, and any required scheme configuration changes are implemented through the appropriate DNO process.

Responsibility: DNO Network Operations

Timescale: Continuous, with updates made whenever customer status, scheme status, operational arrangements, or live settings change.

11.7 Step 5: ANM system monitors network conditions and issues curtailment where required

Scope: During live operation, the ANM system monitors network conditions in real time and determines whether curtailment is required to protect network limits. It uses the available measurements and approved scheme logic to identify when thermal or voltage limits are being approached or exceeded, calculate the required response, and issue curtailment automatically through the ANM scheme.

Where curtailment is required, the ANM system applies trim or trip actions as appropriate. Curtailment is issued in accordance with the relevant principles of access. Where multiple ANM-connected customers contribute to the same constraint, the scheme applies curtailment automatically on a last-in-first-out basis, rather than through real-time manual judgement, curtailing the last customer to join the scheme first, and working then through customers in reverse order of connection until the network is below thermal or voltage limits. Ongoing operation of the ANM system sits with DNO Network Digitisation.

Output: Network conditions are monitored continuously and curtailment instructions are issued automatically where required, in line with approved scheme logic and the applicable principles of access.

Responsibility: DNO Network Digitisation

Timescale: Continuous during the operational period

11.8 Step 6: DNO Control Room oversees live operation and intervenes where required

Scope: During live operation, the DNO Control Room maintains oversight of CMZ and ANM operation through its control-room systems and the Centralised ANM Operating Platform (CANMOP) system and retains responsibility for wider operational decisions across the distribution network. This includes monitoring scheme status and live control actions, maintaining awareness of how CMZ and ANM operation interacts with wider network conditions, and ensuring that automatic scheme operation remains consistent with the safe operation of the network as a whole.

Where abnormal conditions arise, the DNO Control Room intervenes as required. This includes circumstances such as communications failures, telemetry loss, scheme unavailability, unexpected network behaviour, or wider system risks. In these situations, the Control Room retains the authority to take operational action, including overriding ANM operation where necessary, in order to maintain safe network operation.

The DNO Control Room also coordinates with NESO and, where relevant, other control rooms where live CMZ or ANM operation has implications beyond the immediate scheme or requires wider system coordination.

Output: Live CMZ and ANM operation is overseen through the Control Room, and operational interventions are made where required. Coordination with NESO and other control rooms is maintained where relevant.

Responsibility: DNO control room

Timescale: Continuous during the operational period

11.9 Step 7: DSO validates, records and reports curtailment actions

Scope: Following the operational period, the DSO reviews the curtailment actions taken and records the relevant event information for reporting purposes. In the current arrangement, this principally relates to validating the curtailment data received, maintaining the relevant records, and producing the

required periodic reporting outputs. This includes the information needed for publication through DSO data channels and for wider regulatory reporting.

To achieve this, the relevant DSO team receives information from the DNO Network Planning team, and reviews curtailment actions taken during the period, records the key event details, and completes the relevant reporting cycle. The DSO also captures any issues identified through that review for follow-up through the appropriate process or team. Where the applicable connection arrangement gives rise to any customer reporting or compensation process, the DSO Flexibility Team works with the DNO Network Planning team to support or manage that process as required.

This step does not include re-checking, after the event, whether individual curtailment actions were consistent with scheme arrangements and customer access rights as a standard post-event validation activity. It is instead focused on recording, aggregation, reporting, and any follow-up processes required under the applicable arrangements.

Output: Curtailment actions are validated, recorded, and reported through the relevant post-event and periodic reporting processes, with any customer reporting or compensation processes completed where required under the applicable arrangement. Any operational issues identified through the review are also captured for follow-up through the appropriate process or team.

Responsibility: DSO Data Team and DSO Flexibility Team

Timescale: Post-event / periodic reporting cycle

11.10 Step 8: DNO reviews performance and update operational practices

Scope: Following post-event review, the DNO reviews CMZ operational performance and any issues arising from scheme operation. This includes considering any non-response, communications issues, visibility issues, or wider scheme performance concerns identified through live operation, investigation, or subsequent review.

The DNO records those concerns and identifies any changes needed to procedures, settings, records, governance, or scheme design. It then uses that learning to improve operational practice, scheme performance, and future CMZ deployment. Where the outcome of that review affects how curtailment information should be presented or structured in DSO datasets or reporting outputs, the DSO Data Team updates data visibility accordingly. This reflects the current arrangement, where the DNO leads the operational review and improvement process, while the DSO role is limited to updating data visibility and published reporting where needed.

Output: Operational improvements are identified through post-event review and implemented where appropriate, with any necessary changes made to DNO operational practices, scheme settings, records, governance, or future CMZ deployment, and any corresponding updates made to DSO data visibility.

Responsibility: DNO Network Planning and Network Digitisation, and DSO Data team

Timescale: Following post-event review

Task	DNO	DSO	SLA	Output
Step 1: DNO maintains CMZ/ANM operational readiness	R		Continuous	CMZ / ANM availability is confirmed, with any outages, communications issues, degraded functionality, or other operational restrictions identified, so that the DNO has a clear view of whether the scheme is fully available for live operation and what limitations, if any, need to be taken into account and what maintenance needs to be carried out.

Step 2: DNO shares planned operational changes affecting CMZ operation	R		Continuous	Planned operational changes affecting CMZ operation are identified and communicated to the relevant DSO teams and, where relevant, NESO, so that the impact on CMZ operation is understood in advance and the necessary records, datasets, and supporting visibility arrangements can be updated in line with the planned change.
Step 3: DSO maintains records and visibility of CMZs, ANM-connected customers and access rights	I	R	Continuous	The DSO has an up-to-date view of CMZs, ANM-connected customers, access rights, curtailable connection arrangements, and CMZ operational status through current records, datasets, and visibility tools.
Step 4: DNO updates scheme configuration where required	R	I	Continuous	CMZ records, operational settings, control room visibility tools, and supporting records are kept up to date, and any required scheme configuration changes are implemented through the appropriate DNO process.
Step 5: ANM system monitors network conditions and issues curtailment where required	R		Continuous	Network conditions are monitored continuously and curtailment instructions are issued automatically where required, in line with approved scheme logic and the applicable principles of access.
Step 6: DNO Control Room oversees live operation and intervenes where required	R		Continuous	Live CMZ and ANM operation is overseen through the Control Room, and operational interventions are made where required. Coordination with NESO and other control rooms is maintained where relevant.
Step 7: DSO validates, records and reports curtailment actions	I	R	Post-event/periodic reporting cycle	Curtailment actions are validated, recorded, and reported through the relevant post-event and periodic reporting processes, with any customer reporting or compensation processes completed where required under the applicable arrangement. Any operational issues identified through the review are also captured for follow-up through the appropriate process or team.
Step 8: DNO reviews performance and update operational practices	R		Following post-event review	Operational improvements are identified through post-event review and implemented where appropriate, with any necessary changes made to DNO operational practices, scheme settings, records, governance, or future CMZ deployment, and any corresponding updates made to DSO data visibility.

11.11 ANM Schemes and CMZ Infrastructure

An ANM Scheme is a distributed control system used to manage Curtailable Connections. Its role is to monitor network conditions, identify when thermal or voltage limits are at risk of being exceeded, and

automatically reduce customer import or export where required to keep the network within existing limits. This may be done through a trim, where import or export is reduced while the customer remains connected, or a trip, where the site is disconnected, with trim typically used first. Where multiple ANM-connected customers contribute to the same constraint, curtailment is applied in line with the agreed principles of access.

ANM Schemes deployed under the CMZ architecture consist of five main components:

1) The CANMOP is the central controller for all ANM CMZs within a licence area (SPD and SPM respectively), with one live instance and one standby instance for disaster recovery. It receives topology and wider network flow data from the DNO Control Room's PowerOn control system, passes the relevant information needed to make decisions to local CMZ Controllers, coordinates across CMZs where needed, and provides feedback to the Control Room on control actions. It does not determine which individual customers are curtailed - that sits with the relevant CMZ Controller. Network Planning is responsible for scheme design and customer connections, while Network Digitisation is responsible for deploying and operating the CANMOP and associated control infrastructure.
2) The **CMZ Controller**. This is the second level of control (after the CANMOP) – logically there is one of these per CMZ. Each instance can either be a physical server, or a virtualised server hosted on infrastructure with other CMZ Controllers. It is only responsible for the ANM Scheme within its CMZ (unlike the CANMOP, which covers multiple CMZs). The CMZ Controller combines the data it receives from the CANMOP with local measurement points it gathers directly, and uses this data with pre-programmed algorithms to determine which ANM customer(s) to curtail and by how much. It then sends curtailment signals to the relevant customer(s) (specifically to their ANM Outstation).
3) The CMZ Controller is the second level of control after the CANMOP, and is the local controller for an individual CMZ, and can either be a physical server, or a virtualised server hosted on infrastructure with other CMZ Controllers. It combines data from the CANMOP with local measurement data and uses pre-programmed scheme logic to determine which ANM customer or customer(s) to curtail, and by how much, then sends the relevant curtailment signals to the customer(s) ANM Outstations. The DNO Network Digitisation team is responsible for deploying the CMZ Controller infrastructure.
4) **Customer ANM Outstation**. Each ANM-customer has one of these at their site to communicate with the CMZ Controller. It's these Customer ANM Outstations which receive the curtailment signals from the CMZ Controller and enact them by sending instructions to the customer's control system (specifically to the customer's Local Control System (LCS)).
5) **Network Measurement Points**. These provide the real time measurements of network power flows, which are sent to the CMZ Controller, either directly or via the CANMOP.
6) **The communication network**. This connects the CANMOP, Local CMZ Controllers, Customer ANM Outstations, and Network Measurement Points together to allow them to interface with each other.

An outline diagram of our CMZ architecture is shown in Figure 3.

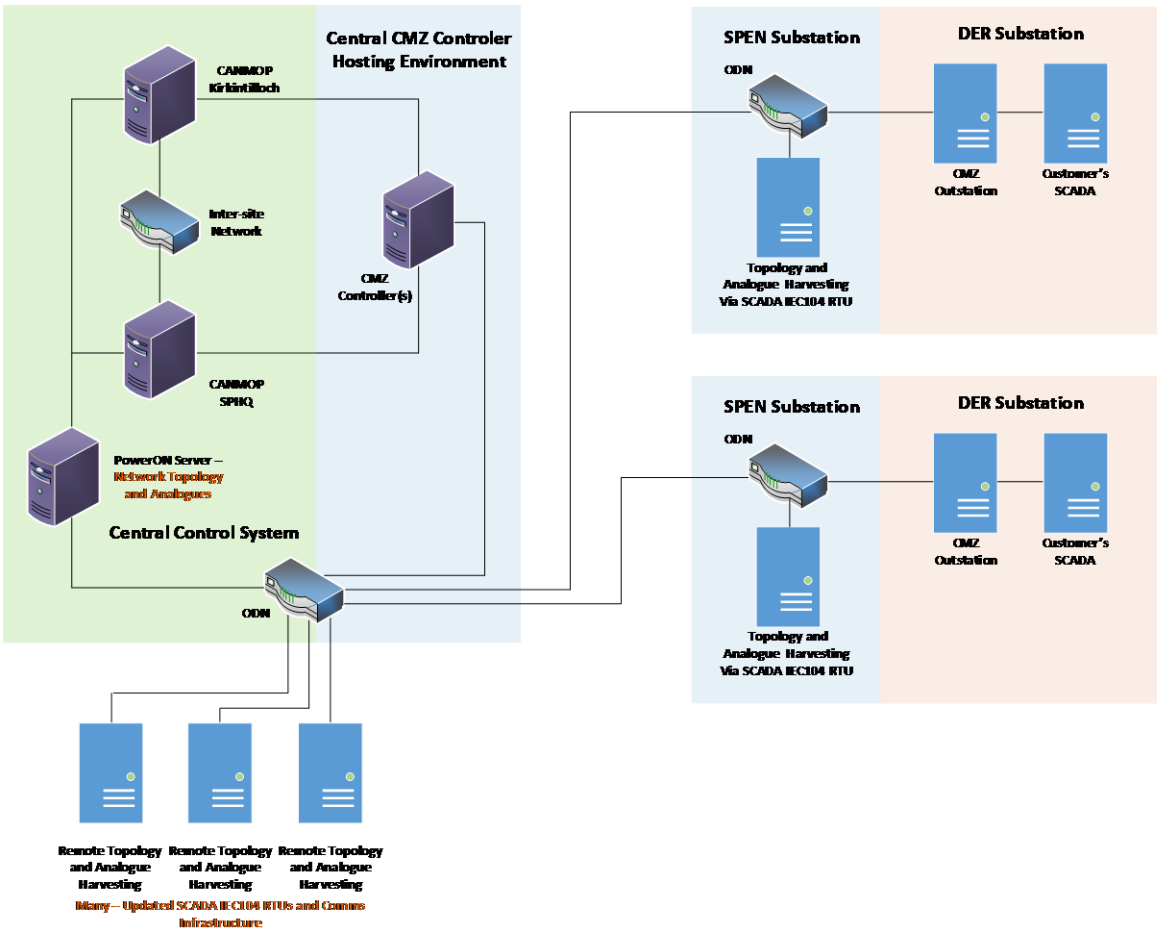

Figure 3: Outline diagram of CMZ architecture - example for SPD Licence

Figure 5 shows the connectivity of each of the CMZ layers, including the CANMOP connectivity to NESO Control Centre via SPEN's SCADA system. These links provide visibility to the SPEN Control Room for any ANM operation of DERs. The connection between the CANMOP and the SCADA system is via an Inter-Control Centre Communications Protocol (ICCP) link. Similarly, an ICCP link to the NESO Control Centre can share information as required via any data sharing agreements.

In addition the CANMOP keeps a record of any Curtailment instructions issued to ANM connected DERs. This information is aggregated and shared on a quarterly basis via SPEN's Open Data Portal.

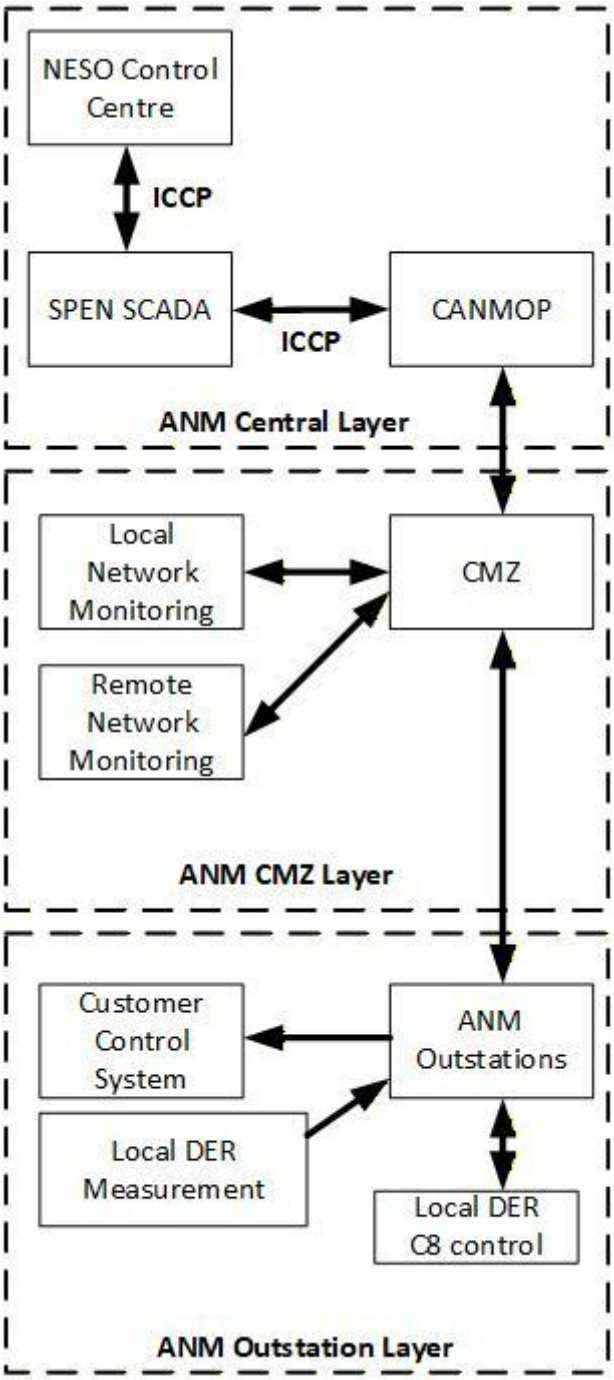

Figure 5: CMZ layer connectivity and CANMOP connectivity to NESO Control Centre via SPEN SCADA.

12. ESCALATION PROCESS

The processes set out in this policy involve the DSO reviewing DNO outputs and operational actions, and require the DNO and DSO to agree on some outputs. There may be instances in which there is a difference of opinion between DNO and DSO.

12.1 Resolving disagreements

The following process shall be used.

1. In the first instance, this should be resolved at a working level, i.e. at the level at which the dispute arose. If this cannot be resolved within eight working days, or sooner if it is clear agreement cannot be reached, it is escalated to step 2.
2. A meeting will be held between the relevant DSO Lead and DNO head of department within seven working days of being escalated from step 1. At least three working days before the meeting, each side shall prepare a statement of facts and identify the point or points on which the disagreement arises, and send this to the DSO Lead and DNO head of department. The DSO Lead and DNO head of department shall endeavour to resolve it within the meeting. If it cannot be resolved within eight working days after the meeting, or sooner if it is clear agreement cannot be reached, it is escalated to step 3.
3. A meeting will be held between the Head of DSO and [relevant senior DNO lead / Director of Network Planning and Regulation / Head of Network Operations] within seven working days of being escalated from step 2.
4. In the event of no resolution being agreed, executive-level escalation will take place to the SPEN Executive team and CEO.