

Company Directive

POLICY DIRECTIVE: DSO7/0

Distribution System Operations

Summary

This directive and its subordinate Standard Techniques set policy for the Distribution System Operator's Energy Management Centre (DSO-EMC) and its interface with the Distribution Network Operator's Control Centre (DNO-CC).

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Approved by



Benjamin Godfrey
Director of Distribution System Operator

Date: 21/11/2023

Target Staff Group	Energy Management Centre Engineers, Control Engineers and any other staff responsible for the operational control and coordination of the Distribution System and its interfaces with other Systems. Staff responsible for systems that support these functions
Impact of Change	Blue: Codifies the role of the Energy Management Centre in the operation of NGED's Distribution System.
Planned Assurance checks	The authors will monitor implementation with the managers responsible for the DSO Energy Management Centre and the DNO Control Centre.

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IMPLEMENTATION PLAN

Introduction

This directive and its subordinate Standard Techniques set policy for the Distribution System Operator's Energy Management Centre (DSO-EMC) and its interface with the Distribution Network Operator's Control Centre (DNO-CC).

Main Changes

This is a new directive.

Impact of Changes

Target Staff Group	Energy Management Centre Engineers, Control Engineers and any other staff responsible for the operational control and coordination of the Distribution System and its interfaces with other Systems. Staff responsible for systems that support these functions
Impact of Change	Blue: Codifies the role of the Energy Management Centre in the operation of NGED's Distribution System.

Implementation Actions

The authors shall brief the line managers of the target staff group and the DNO-CC Shift Managers. These managers shall brief their staff.

The authors have created a presentation with voiceovers explaining the changes, which is available [here](#)

Implementation Timetable

This directive shall be implemented on issue.

REVISION HISTORY

DOCUMENT REVISION & REVIEW TABLE			
Issue	Date	Comments	Author
0	21/11/2023	Initial issue of POL:DSO7	Stephen Quinn and Joe Davey

CONTENTS

1.0	INTRODUCTION.....	5
2.0	REMITTS AND RESPONSIBILITIES.....	6
3.0	CUSTOMER AND STAKEHOLDER RELATIONSHIP MANAGEMENT	8
4.0	TECHNICAL REQUIREMENTS	8
	APPENDIX A: GLOSSARY	9
	APPENDIX B: DSO7 STANDARD TECHNIQUES ROADMAP	15
	APPENDIX C: SUPERSEDED DOCUMENTATION.....	15
	APPENDIX D: RECORD OF COMMENT DURING CONSULTATION	15
	APPENDIX E: KEYWORDS.....	15

1.0 INTRODUCTION

1.1 About the Distribution System Operator

National Grid Distribution System Operator (**the DSO**) is a directorate of National Grid Electricity Distribution. It was created to fulfil the roles of the Distribution System Operator identified by Ofgem in the *DSO Incentive Governance Document*¹.

The DSO comprises the following departments:

- **Modelling and Analysis**, responsible for:
 - The provision of network models, derived datasets, and network analysis tools; and
 - Whole System interfaces including the Statement of Works interface with the Electricity System Operator.
- **System Planning**, responsible for forecasting customer load and strategic planning of the primary and secondary distribution system.
- **Commercial and Operability**, responsible for the commercial and operational aspects of using Flexibility Services to alleviate distribution system constraints. This department incorporates the **Energy Management Centre**, whose remit and responsibilities are set by this directive.
- **DSO Strategy and Stakeholder Engagement**, responsible for communicating the purpose and direction of DSO to internal and external stakeholders.

More information about the DSO can be found at:

- <https://sharepoint.westernpower.co.uk/sites/wpd/dso/public/SitePages/Distribution-System-Operator---DSO.aspx> (internal only)
- <https://www.nationalgrid.co.uk/dso> (external)

1.1.1 Purpose of the Energy Management Centre

Electricity distribution networks have traditionally been operated passively. Networks were designed to permit customers to operate freely within their agreed supply capacities while they remained energised. Network operation was focused on coordinating safe access to the network for work activities and responding to network faults to manage safety and minimise interruptions.

The rollout of distributed generation, electricity storage and low-carbon technologies is increasing the utilisation of electricity distribution networks. Flexibility Services and Curtailment are being used to manage customer behaviour within network capability. While Flexibility Services and Curtailment can improve the efficiency and economy of the distribution system, they require coordination. Ofgem have recognised this requirement in their *DSO Incentive Governance Document* as Role 2, Network Operation. This is subdivided into two Activities:

- 2.1: Promote operational network visibility and data availability
- 2.2: Facilitate efficient dispatch of distribution flexibility services

¹Implemented via special condition 4.8 of the Electricity Distribution Licence, published at <https://www.ofgem.gov.uk/publications/decision-proposed-modifications-riio-2-electricity-distribution-licences> in Associated Documents.

The Energy Management Centre has been established by NGED's DSO to carry out these and related activities. This directive and its subordinate Standard Techniques set policy for the Distribution System Operator's Energy Management Centre (DSO-EMC) and its interface with the Distribution Network Operator's Control Centre (DNO-CC).

1.2 Glossary

Terms are defined in the DSO Glossary, which is available internally at <https://sharepoint.westernpower.co.uk/sites/wpd/dso/public/Lists/DSO%20Glossary> .

Definitions for key terms are also given in Appendix A: Glossary for convenience.

1.3 Variations

Where any difficulty is encountered with the application of this directive, the authors shall be notified, who will consider whether to recommend a variation to the Responsible Executive Manager of the DSO suite.

2.0 REMITS AND RESPONSIBILITIES

The operation and control of a distribution system can be divided into two categories:

- Operational Control, for which remit and responsibility are split between DSO-EMC and DNO-CC in 2.1 below; and
- Safety Control, which is outside of the scope of this directive, as described in 2.2 below.

The terms Operational Control and Safety Control are defined in Appendix A: Glossary.

2.1 Operational Control of NGED's Distribution System

The following Operational Control matters shall be the responsibility of the DSO-EMC under the authority of the Director of Distribution System Operator:

1. Policy relating to Security of Supply, Curtailment and Flexibility Services in the Operational Planning Phase, Programming Phase, Control Phase and Post-Control Phase.²
2. The Operational Planning Phase, Programming Phase and Post-Control Phase of all Flexibility Services;
3. The Operational Planning Phase, Programming Phase and Post-Control Phase of Curtailment where the DSO-EMC has identified:
 - a. An opportunity to improve NGED's performance in the RIIO-ED2 Curtailment incentive (CEt);
 - b. An opportunity to reduce the exceedance of DCUSA Schedule 2D Curtailment Limits; or
 - c. A risk to Security of Supply related to Curtailment.

² Collectively, the Operational Planning Phase, Programming Phase, Control Phase and Post-Control Phase are the operational phases. They are shown in Figure 1 – Timeline of operational phases (based on Figure 1 of Distribution Operating Code 2, Appendix 3). They do not include System Planning or Network Design, which are outside of the scope of this directive.

The DSO-EMC may also instruct the DNO-CC to restrict or alter running arrangements and post-fault contingencies where this is necessary to ensure the efficacy of Flexibility Services under point 2 or Curtailment under point 3.

All other Operational Control matters shall remain the responsibility of the DNO-CC under the authority of the Director of Asset Management and Operations Support.

2.1.1 Coordination in the Control Phase

Note: To ensure efficient coordination of the system and provide 24/7 support, the DNO-CC's responsibilities include the Control Phase of Flexibility Services and Curtailment.

The DNO-CC may request assistance from the DSO-EMC with Flexibility Services and Curtailment in the Control Phase, such assistance will be provided on a reasonable endeavours basis subject to staff availability.

The DSO-EMC shall not dispatch Flexibility Services or Curtailment in the Control Phase without the agreement of the DNO-CC.

Detailed procedures for coordination in the Control Phase relevant to particular tasks will be included in subordinate Standard Techniques to this Policy Directive.

2.1.2 Operational Planning and Liaison

The DSO-EMC shall notify the DNO-CC by the end of the Programming Phase of:

1. Any actions relating to Flexibility Services or Curtailment that DSO-EMC requires them to take in the subsequent Control Phase;
2. Any Flexibility Services that will be available to DNO-CC to dispatch in mitigation of any technical constraints which arise in the subsequent Control Phase; and
3. Any restrictions to running arrangements and post-fault contingencies that are necessary to ensure the efficacy of Flexibility Services or Curtailment in the subsequent Control Phase.

The DNO-CC shall notify the DSO-EMC of any faults or other events on the DNO's Distribution System and on the immediately adjacent parts of adjoining Systems which have had (or may have had), or will have (or may have) a detrimental effect on the efficacy of Flexibility Services or Curtailment.

Notifications may be made by any method mutually agreed between DSO-EMC and DNO-CC. A record shall be made of all notifications, which shall include:

- Who is sending the notification;
- Who the notification is sent to;
- The date and time the message was sent; and
- The contents of the message.

A phone call via DNO-CC's approved call management system or an email via NGED's email system can be assumed to meet this requirement.

Where necessary, confirmation of receipt and understanding of the message shall also be provided.

Detailed procedures for Operational Liaison relevant to particular tasks will be included in subordinate Standard Techniques to this Policy Directive.

2.2 **Safety Control of NGED's Distribution System**

This directive and its subordinate Standard Techniques do not apply to Safety Control. Safety Control remains the responsibility of the **Designated Person** as set in NGED's Distribution Safety Rules.

3.0 **CUSTOMER AND STAKEHOLDER RELATIONSHIP MANAGEMENT**

System operation is ultimately for the benefit of customers and stakeholders. Consideration of the needs of all stakeholders is critical to ensure that stakeholders' expectations of the system, both in terms of safety and performance are achieved. Engagement with stakeholders, both external and within NGED, is essential to both understand and manage their expectations and ensure compliance with our external obligations.

Unless otherwise specified in a subordinate Standard Technique, responsibility for customer and stakeholder interactions in a process shall fall to the team with responsibility for carrying out that process.

4.0 **TECHNICAL REQUIREMENTS**

Detailed technical requirements for distribution system operation are set below and in this directive's subordinate Standard Techniques.

4.1 **System Operability**

While the electricity distribution system should be planned in such a way as to facilitate its subsequent operation in accordance with this directive, operations staff must not assume that planning and design assumptions remain valid in all prevailing system conditions.

4.2 **Constraint Management**

All constraints shall be managed by following these steps:

1. **Detect** the constraint.
2. **Calculate** how to resolve or mitigate the constraint.
3. **Instruct** the resolution or mitigation.
4. **Actuate** the resolution or mitigation.
5. **Record** the constraint and how it was resolved or mitigated.

These steps are equally applicable in operational and investment planning timescales.

APPENDIX A: GLOSSARY

Key definitions are tabulated below. These definitions are taken from the DSO Glossary, which is available internally at

<https://sharepoint.westernpower.co.uk/sites/wpd/dso/public/Lists/DSO%20Glossary> .

Term	Definition	Notes
Constraint	<p>Distribution constraint means any limit on the ability of the licensee's Distribution System, or any part of it, to transmit the power supplied onto the licensee's Distribution System to the location where the demand for that power is situated, such limit arising as a result of any one or more of:</p> <p>(a) the need to not exceed the thermal rating of any asset forming part of the licensee's Distribution System;</p> <p>(b) the need to maintain voltages on the licensee's Distribution System; and</p> <p>(c) the need to maintain the transient and dynamic stability of electricity plant, equipment and systems directly or indirectly connected to the licensee's Distribution System and used by the licensee to operate the licensee's electricity distribution system in accordance with the Act, this licence, or any other requirement of law;</p>	
Control Phase	<p>The period 0-24 hours inclusive ahead of real time operation. The Control Phase follows on from the Programming Phase and covers the period down to real time.</p>	<p>For the avoidance of doubt, this includes the period of real-time operation.</p>

Term	Definition	Notes
Curtailment	Curtailment means any action taken by the Company to restrict the flow of electricity at the Connection Point, except where that restriction is caused by an Interruption of the Customer's Supply	<p>This definition is a generalisation of the DCUSA Schedule 2D definition which includes the additional exception "(b) curtailment as a result of constraints on the transmission network".</p> <p>Curtailment can be applied to each of the import and export capacities of a connection.</p>
Network Integrity	The ability of a network to operate within thermal, voltage and other technical limits, excluding frequency-related limits, under both Intact Network and outage conditions.	
Operational Control	<p>Actions required to manage the flow of electricity within a System and across its interfaces with other Systems, such that:</p> <ul style="list-style-type: none"> • Network Integrity and System Frequency Integrity are maintained for <ul style="list-style-type: none"> ○ Prevailing network running arrangements and load, ○ Credible changes in network load, ○ Next credible fault and • contractual and regulatory Customer Security and access rights obligations are met 	<p>Actions that are within the scope of Operational Control include:</p> <ul style="list-style-type: none"> • Managing load within the System and across its boundaries with other Systems • Deciding if and how to load assets or sections of the network • Managing system voltages in operational timescales
Operational Planning Phase	The period from 8 weeks to 3 years inclusive ahead of real time operation.	
Post-Control Phase	The period following real time operation.	Grid Code definition used in absence of Distribution Code definition.

Term	Definition	Notes
Programming Phase	The period between the Operational Planning Phase and the Control Phase . It starts at the 8 weeks ahead stage and finishes at 17:00 on the day ahead of real time.	
Safety Control	<p>Actions required to manage a System such that:</p> <ul style="list-style-type: none"> • Safety from the inherent dangers of the System is achieved and maintained and • System access via approved procedures may be achieved 	<p>Actions that are within the scope of Safety Control include:</p> <ul style="list-style-type: none"> • Instruction and confirmation of switching to achieve: Isolation and earthing • Providing the authority to issue Safety Documents and recording the issue and cancellation of Safety Documents • Deciding if an asset or section of network can safely be energised or if it is no longer safe for an asset or section of network to remain energised

Term	Definition	Notes
Safety Document	<p>Safety Documents, being one of the following:</p> <p>(i) Limitation-of-Access (LoA)</p> <p>A Safety Document of a format indicated in the DSRs which defines the limits and nature of work which may be carried out when verbal instructions are not considered sufficient for that purpose, and where a Permit-to-Work or Sanction-for-Test is not applicable.</p> <p>(ii) Permit-to-Work (PTW)</p> <p>A Safety Document of a format indicated in the DSRs specifying the High Voltage Apparatus which has been made safe to work on and the work which is to be carried out.</p> <p>(iii) Sanction-for-Test (SFT)</p> <p>A Safety Document of a format indicated in the DSRs specifying the High Voltage Apparatus which has been made safe for the testing described in the Safety Document to proceed and the conditions under which the testing is to be carried out.</p>	<p>This definition is sourced from the 2022 edition of NGED's Distribution Safety Rules.</p> <p>Other types of Safety Document are defined in ST:OS6E for safety coordination at the interface between NGED and customers' networks.</p>

Term	Definition	Notes
System	An electrical network running at various voltages.	<p>Various different documents have slight variations in the definition of the term system.</p> <p>Within the context of the DSO, system is generally used to refer to a whole electrical system including its connected demand, generation and Electricity Storage, and any associated Load Management Schemes. In this context network is generally used to refer to the physical electrical assets and the configuration of the network.</p>
System Frequency Integrity	The ability of the GB system to operate within acceptable frequency-related technical limits under both Intact Network and outage conditions.	

A.2 Timeline of operational phases

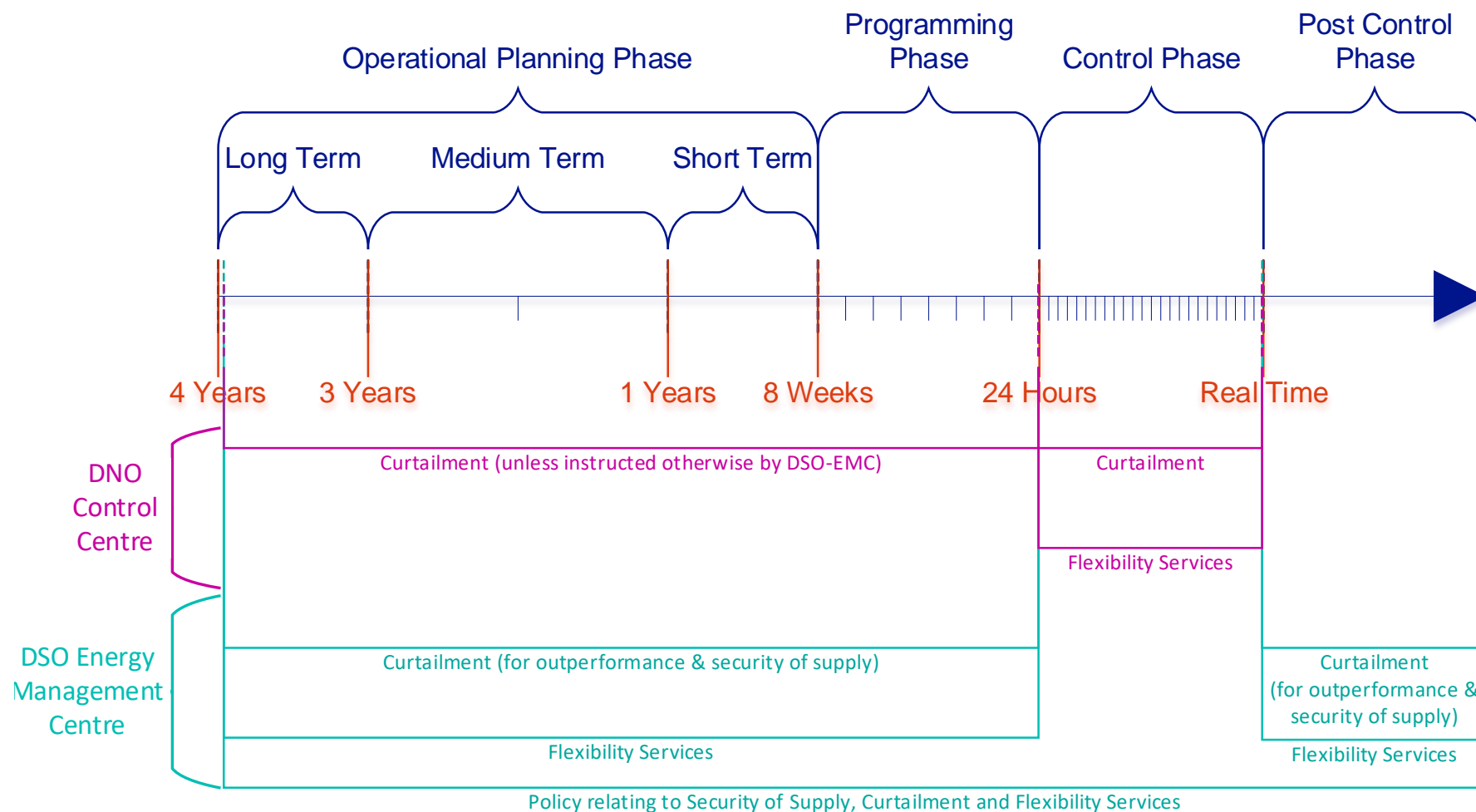


Figure 1 – Timeline of operational phases (based on Figure 1 of Distribution Operating Code 2, Appendix 3)

APPENDIX B: DSO7 STANDARD TECHNIQUES ROADMAP

The DSO7 suite is being expanded to achieve the aims and objectives of the Policy Directive. Standard Techniques on the following subjects are under development at the time of writing:

- *Security of Supply in Operational Timescales*
- *Operational Liaison and Practice*
- *Management of Curtailment*
- *Dispatch Decision Making*
- *Operational Forecasting*

APPENDIX C: SUPERSEDED DOCUMENTATION

None.

APPENDIX D: RECORD OF COMMENT DURING CONSULTATION

[Comments – POL: DSO7/0](#)

APPENDIX E: KEYWORDS

DSO, Distribution System Operator, Distribution System Operations, EMC, Energy Management Centre, Curtailment, Flexibility Services, Security of Supply, Operational Control