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SQSS Modification Proposal Form

GSR036:

System Access

Reform: Review of

the voltage limits

Overview: This modification reviews the voltage limits applicable to operational timescales and the potential for provision of increased flexibility around them.

Modification process & timetable

1	Proposal Form 08 May 2026
2	Code Administrator Consultation 25 May 2026 – 12 June 2026
3	Draft Final Modification Report 29 June 2026
4	Final Modification Report 11 August 2026
5	Implementation 10 Business Days after Authority decision

Status summary: The Proposer has raised a modification and is seeking a decision from the Panel on the governance route to be taken.

This modification is expected to have a: Medium impact

Transmission Owners (TOs), National Energy System Operator (NESO), Distribution Network Operators (DNOs), Non-Embedded Customers, Offshore Transmission Owners (OFTOs), Interconnector Operators and Generators.

Proposer's recommendation of governance route	Standard Governance modification to proceed to Code Administrator Consultation.	
Who can I talk to about the change?	Proposer: Dozie Nnabuike Dozie.Nnabuike@neso.energy 07970004786	Code Administrator Contact: Box.SQSS@neso.energy

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What is the issue?

This Proposal addresses a significant operational challenge faced by the National Energy System Operator (NESO) in managing the National Electricity Transmission System (NETS). The challenge arises from the application of stringent post-fault voltage limits, particularly on the 200 kV–300 kV network.

In practice, these limits can have a material impact on day-to-day system operation. They can delay essential network outages, require the production of Voltage Event Reports (VERs), and necessitate the operation of synchronous generation that would otherwise be unnecessary. These actions arise solely to manage the risk of post-fault voltage excursions exceeding the limits currently specified in the SQSS.

Section 6 of the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) defines the upper voltage limit applicable to the 275 kV network as +9%. This position has been in place since 2017, following a Fundamental Review of the SQSS initiated in 2010¹, which reduced the upper voltage limit for the 275 kV network from 302.5 kV (+10%) to 300 kV (+9%)². The historical background to this change is set out in Annex 1.

As the energy landscape has evolved, several factors have prompted a reassessment of the +9% limit. First, the rapid growth of renewable generation and interconnectors has increased the variability of operational conditions, requiring greater flexibility in system operation. Secondly, economic pressures to optimise outage planning and reduce reinforcement costs have highlighted the benefits of conditional flexibility³.

In practice, application of the +9% voltage threshold has become a primary driver of outage rejections, particularly where large power stations are

¹ GSR008, Work Group 4 Report, Fundamental SQSS Review, 2010
<https://www.neso.energy/document/43066/download>

² Transmission Acceleration Action Plan, Public Consultation, February 2025, page 30.

³ Transmission Acceleration Action Plan, Public Consultation, February 2025, page 30.

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unavailable, or voltage-control equipment is out of service alongside major network reinforcement works. As a result, the current voltage limits can delay the delivery of critical projects.

This Proposal supports Clean Power 2030 by introducing greater flexibility in the application of voltage limits, enabling outage planning and operational decisions to reflect actual system risk and engineering judgement. This will help essential works proceed safely and efficiently while Transmission Owners retain responsibility for determining equipment voltage capability. Where operation remains within that capability, the Proposal introduces no additional system risk assessment.

For clarity, the Proposal comprises two distinct elements. First, it increases the standard SQSS upper voltage limit from +9% to +10%, such that operation within this range is treated as compliant and part of the normal operating envelope. Second, it retains the existing arrangements under which operation above +10% may be permitted only through explicit agreement between the relevant parties, consistent with established SQSS and Grid Code processes. The first element amends the standard limit itself; the second applies only to genuinely non-standard conditions and does not alter existing escalation or approval routes.

Why change?

The current system access arrangements lack the flexibility required to support the scale and pace of transmission network development needed to meet the Clean Power 2030 and 2050 Net Zero targets. There is a view that the existing rules governing system access are overly restrictive and were not designed to accommodate the delivery of infrastructure at a rate several times greater than historical norms⁴. Achieving this acceleration will require a strategic evolution of existing regulatory frameworks including revisiting current voltage limits and establishing an appropriate operational voltage threshold.

⁴ Transmission Acceleration Action Plan, Public Consultation, 2025.

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Recent NESO studies demonstrate that the system running up to a post-fault voltage limit of +10% is feasible on the 275 kV network where the Transmission Owners (TOs) equipment is capable of operating at +10%⁵. These studies identified multiple cases where outage requests were rejected due to non-compliance with the existing 9% limit, typically involving voltages close to +10%. In some observed cases the need for a Voltage Event Report (VER) was triggered only after operational limits had already been exceeded. In certain cases, NESO sought to progress outages by requesting derogations from the SQSS, with the agreement of TOs, who confirmed that their equipment could operate safely at higher voltages than the 9% limit.

Reliance on derogations granted by Ofgem on a case-by-case basis outside the SQSS imposes significant administrative burden. In the short-term, such reliance undermines clarity, consistency, and legal certainty, making it more difficult for NESO, TOs and connected Users to make plans based on stable and predictable criteria.

The 9% limit in Table 6.3 and Table 6.4 in the SQSS was reduced from 10% to align the voltage limits of the NETS SQSS on the 275kV⁶. This limit was then extended to the whole voltage range of 200 kV to 300 kV. Historical changes to voltage limits (including alignment with IEC standards and subsequent extensions across voltage ranges) are summarised in **Annex 1**. Consistent with emerging European approaches to operational coordination and system security, the studies set out in **Annex 2** demonstrate that Proposals to revert to the previous limits are beneficial and do not compromise system security when applied under defined conditions. Additionally, Great Britain aligned its voltage ranges with the European Network Codes incorporated into the Grid Code in 2018, to ensure compatibility with the European Network Codes on Requirements for Generators (RfGs)⁷, the

⁵ See GSR 036 **Annex 2**

⁶ GSR021: Operational and Planning Criteria for 220 kV Transmission Assets | National Energy System Operator, for historical background **Annex 1**

⁷ Regulation – 2016/631 – EN – EUR-Lex

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Network Code on Requirements for Demand Connections Conditions (DCC)⁸, and the Network Code on Requirements for High Voltage Direct Current Systems (HVDC Systems)⁹. While sustained operation beyond +10% is not recommended due to potential plant risks, the European Regulation Guideline for Transmission System Operators Guidelines¹⁰ (SOGL) permits operation beyond this limit only where such operation is subject to explicit agreement between Significant Network Users and the relevant TOs upper voltage limit from +9% to +10% is consistent with the Grid Code and with the retained EU Network Codes already implemented within it, including ECC 6.1.4. Further detail on these provisions is provided in the NESO assessment in **Annex 3**

This Proposal would enable a greater number of outages and increased system access, supporting the timely delivery of construction works required for network upgrades without compromising system security. This applies to all types of outages, not solely those considered to be beneficial.

By extending the range of post-fault outage combinations that are currently rejected due to marginal voltage exceedances, the Proposal would reduce delays driven by voltage-related constraints and allow essential maintenance and reinforcement works to proceed more efficiently.

By contrast, derogations typically apply only to specific scenarios or limited time periods. They cannot be relied upon to support a broader range of outage combinations or to accommodate unforeseen operational circumstances. As a result, reliance on derogations alone perpetuates the current lack of operational flexibility.

⁸ Network Code on Requirements for Demand Connection, Regulation - 2016/1388 - EN - EUR-Lex

⁹ Network Code on Requirements for HVDC Systems, 2016/1447, <https://eur-lex.europa.eu/eli/reg/2016/1447/oj/eng>

¹⁰ European Commission, Regulation 2017/1485, System Operator Guidelines, 2017

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Reasons supporting this proposed change include:

1. **Improving outage planning flexibility and efficiency.** Expanding the permissible post-fault voltage range enables NESO and TOs to proactively accommodate a wider range of outage scenarios without repeatedly seeking derogations. This approach mitigates and reduces delays caused by voltage-driven limitations and allows outages, including those for essential maintenance or upgrade works, to proceed more promptly. Ultimately, greater flexibility supports more efficient system operation, enhances security, and fosters clearer, more coordinated decision-making across all parties, rather than relying on a restrictive and time-consuming derogation process.
2. **Updating the SQSS voltage limits in Tables 6.3 and 6.4 to reflect current best practice in system management** is a key driver for this change. NESO's case studies show that increasing the post-fault voltage limit to +10% allows outage combinations that would otherwise be rejected to proceed, avoiding the need to prepare unnecessary VERs and to take corrective actions. If this change is implemented, with agreement of affected Users there could be more efficient outage scheduling while maintaining system security and improving coordinated decision-making throughout the outage planning process. Applying this approach ensures that system security is upheld throughout the lifecycle of the network – from design and construction, through to operation and maintenance – and supports a holistic and resilient approach to system management.
3. Any directly observable financial impacts are expected to be modest; however, **operational evidence indicates that applying a +10% post-fault voltage limit at 275 kV can reduce the need to instruct generators to operate solely to provide reactive power support.** For clarity, the revised +10% upper voltage limit applies equally to both pre-fault and post-fault conditions, consistent with the SQSS voltage framework. Case studies demonstrate that the additional voltage headroom can prevent avoidable operational interventions and reduce reactive power dispatch costs, while maintaining system security. These benefits are most evident during low-demand overnight conditions, when voltage sensitivity is highest, as illustrated by the West London and North-West England and Wales

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scenarios set out in Annex 2. In these cases, voltage exceedances arise primarily from combinations of low demand and outage configurations rather than during normal or peak system operation.

4. The case studies examined in **Annex 2** show that **there may be cost efficiencies that can be achieved** by reducing reliance on generators operating solely for voltage support.
5. Moreover, the case studies demonstrate that when operating within a slightly more flexible post-fault voltage range, **system security is maintained without additional intervention**. In several examples, the proposed +10% limit would allow outages to proceed without generator instructions, without the cancellation of maintenance tasks, and without reliance on emergency operational measures. The common outcome across these scenarios is not an improvement in technical resilience¹¹ per se, but an improvement in operational efficiency, achieved by avoiding actions whose primary purpose is regulatory compliance rather than system protection. This reinforces the assumption that reducing reliance on such remedial actions leads directly to more economical system operation.
6. Implementing this change would **accelerate transmission network development** by enabling TOs to request and take outages required for reinforcement works with greater certainty. The enhanced framework allows NESO and TOs to agree defined circumstances and durations for operating within the revised standard SQSS voltage limit of +10% (rather than through non-standard arrangements), analogous to existing Operational Capacity Limit Report (OCLR) arrangements, supporting a controlled, consistent application of existing limits rather than a universal relaxation.

Overall, the Proposal is a proportionate and no regrets modification that delivers operational efficiency without materially reducing system resilience or security. It clarifies the application of existing outage planning and operational controls within the revised standard limits, without introducing enhanced risk assessment

¹¹ For clarity, “technical resilience” is used here to mean the inherent robustness of the transmission system, as planned under the SQSS, to remain within defined technical limits under credible faults, rather than the use of operational or non-standard processes to manage risk.

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processes. By establishing a consistent and transparent approach within routine processes, this Proposal reduces reliance on exceptional and administratively burdensome approvals.

What is the Proposer's solution?

This Proposal recommends restoring the upper voltage limit to +10% as a practical means of easing operational constraints and supporting the timely delivery of critical network maintenance and reinforcement works, without compromising system security or resilience. Reinstating the former voltage threshold is consistent with the objectives of the Clean Power 2030 strategy and the wider ambition to deliver a more flexible and robust electricity system. The recommendation is supported by evidence from the case studies set out in Annex 2, which demonstrate that certain outage configurations would not have been permitted under the existing +9% SQSS voltage limit but would fall within the standard operating envelope under a revised +10% limit. These findings are consistent with the conclusions of the SQSS review process, which indicated that the original voltage limit had a negligible impact on equipment performance and overall system costs.[\[Annex 2\]](#).

The case studies underpinning GSR036 show that post-fault voltage exceedances at or marginally above the current +9% limit are increasingly predictable outcomes of routine outage conditions rather than exceptional events. Treating such routine conditions as non-standard under GSR026 is therefore increasingly inefficient, leading to avoidable operational interventions and costs where voltages remain well within established equipment capability. Referencing GSR026 clarifies that these scenarios are not being reclassified as "non-standard" but are instead brought back within the standard operating envelope. More extreme or prolonged exceedances would continue to be managed through existing GSR026 arrangements.

The case studies do not suggest that all outages are constrained by the existing voltage limits, nor that all outages would benefit equally from a revised threshold. Instead, they show that specific outage combinations typically

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associated with major network reinforcement works and occurring under particular system conditions, most notably low demand and limited reactive power availability are disproportionately affected by the current +9% limit. The constraint is therefore scenario-specific rather than a general limitation on system operation.

The primary change proposed is to the SQSS itself, by setting the upper operational pre-fault and post-fault voltage limit at +10%. The supporting analysis demonstrates that voltages approaching or marginally exceeding the current +9% limit are within transmission asset capability and consistent with existing Grid Code requirements. For completeness, Table 6.3 of the SQSS defines pre-fault steady-state voltage limits, and this Proposal aligns the standard pre-fault operating envelope with the revised +10% limit. Existing post-fault and non-standard governance arrangements remain unchanged.

In considering impacts on Users, this modification relates to operational pre-fault and post-fault voltages on the transmission network under defined outage conditions. It does not imply an increase in voltages experienced by end-users or connected parties. The case studies illustrate voltages close to, or marginally above, the current +9% SQSS threshold but identify no harm to connected Users or breaches of equipment capability. Directly connected generators and demand customers continue to operate within established design tolerances, as their equipment is already required to withstand voltages up to 1.1 per unit in accordance with Grid Code CC6.1.4 and ECC6.1.4. Impacts on distribution networks and downstream Users are managed through existing voltage-control arrangements, with no evidence of uncontrolled propagation in the scenarios assessed.

To support implementation, the Proposal introduces clarifying notes to the relevant SQSS tables to confirm that, under defined circumstances, operation to the revised voltage limit may be permitted where agreed with the relevant onshore licensee for one or more nodes on that licensee's transmission system. Any such agreement would be based on a case-by-case assessment and would specify the affected nodes, the applicable voltage limit, the duration of the

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arrangement, and any conditions or restrictions on operation. This approach aligns with existing Grid Code provisions, including CC6.1.4 and ECC6.1.4.

Scope clarification

This Proposal is limited to revising the SQSS steady-state and post-fault voltage limits applicable to the 200 kV–300 kV network from +9% to +10%, reflecting equipment capability and current operational practice.

The Proposal does **not**:

- permit steady-state or post-fault operation above +10% within the SQSS standard without TO/ User agreement;
- introduce or modify any system risk assessment, either by NESO or Transmission Owners;
- amend existing Grid Code requirements or arrangements (including those established under GSR026) for non-standard voltage operation; or
- introduce amendments to the derogation processes.

Any operation above the revised SQSS limit would continue to be treated as non-standard and managed in accordance with existing arrangements outside the scope of this modification.

Legal text

The legal text for this proposed change can be found in **Annex 4**.

What is the impact of this change?

The Proposal is assessed as having a medium impact on Transmission Owners (TOs), NESO, Distribution Network Operators (DNOs), Non-Embedded Customers, Offshore Transmission Owners (OFTOs), Interconnectors, and Generators.

For **NESO and TOs**, the change increases operational flexibility to plan, approve, and implement network outages associated with reinforcement works without triggering disproportionate operational constraints. This enables system needs

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to be managed more effectively while maintaining compliance with existing technical limits and asset integrity requirements.

For **DNOs**, the Proposal supports more effective coordination at transmission–distribution interfaces, allowing a wider range of construction, connection, and outage activities to be progressed. While the case studies do not present DNO-specific metrics or identify improved project delivery as a primary objective, they demonstrate how transmission level constraints—particularly those linked to voltage management for demand security—can materially influence coordination at these interfaces.

For **Non-Embedded Customers**, impacts are expected to be minimal. The proposed change remains within standard equipment design margins, and voltages remain within existing Grid Code limits. Some customers may, however, need to review protection or alarm settings that were previously aligned to the +9% operational limit. Any benefits for this group are indirect, arising from increased system flexibility rather than from defined or quantified customer outcomes.

OFTOs, Interconnectors, and Generators may benefit from fewer outage rejections and improved timeliness of connections, as the approach enables system value to be prioritised while maintaining asset integrity. For directly connected Users, the case studies confirm that operating voltages remain within Grid Code requirements, with equipment already required to operate up to 1.1 per unit. Accordingly, the Proposal does not expose Users to conditions beyond their existing technical resilience or introduce new technical risks.

Proposer's assessment against SQSS Objectives

Relevant Objective	Identified impact
(a) facilitate the planning, development, and maintenance of an efficient, coordinated, and economical system of electricity transmission, and the operation of that system in	Positive Increasing the post-fault voltage limit to +10% would reduce unnecessary constraints that, in specific cases, lead to the rejection of otherwise deliverable outages, thereby supporting more efficient network upgrades. By reducing reliance on

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an efficient, economic, and coordinated manner;	Voltage Event Reports (VERs) and other corrective interventions, this change is expected to improve operational coordination and risk management without altering underlying security standards. The approval of GSR036 would not, in itself, grant that all previously rejected outages could proceed. However, the case studies indicate a credible potential for improved outcomes in certain circumstances.
(b) ensure an appropriate level of security and quality of supply and safe operation of the National Electricity Transmission System;	Positive Once implemented, this proposal would improve outage planning by clarifying compliant operation under the SQSS and reducing reliance on exceptional arrangements for routine scenarios. It does not introduce new risk-assessment processes; any operation beyond the revised limit remains subject to existing NESO–TO coordination and <i>Grid Code</i> governance.
(c) facilitate effective competition in the generation and supply of electricity, and (as far as consistent therewith) facilitating such competition in the distribution of electricity; and	Positive This Proposal improves outage planning by enabling transmission maintenance and upgrade work to be undertaken more efficiently, supporting a more predictable and available <i>Transmission System</i> . In doing so, it can indirectly support effective competition in generation and supply over time, while remaining consistent with existing access and governance arrangements.

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(d) facilitate Licensees to comply with any relevant obligations under Assimilated law	Positive This modification has a positive impact as it neither alters nor expands licensees' statutory duties under assimilated law. It aligns with EU Regulations, and the European Electricity Network Codes retained in UK law. Consequently, the modification enhances regulatory coherence while maintaining a neutral compliance position for licensees (see report in Annex 3).
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Proposer's assessment of the impact of the modification on the stakeholder / consumer benefit categories

Stakeholder / consumer benefit categories	Identified impact
Improved safety and reliability of the system	Positive The relaxation, applied in a controlled manner, ensures the system remains secure and resilient, reduces unnecessary delays, and supports a reliable electricity supply for consumers. Any increase in operational risk continues to be carefully managed through existing joint NESO-Transmission Owner operational arrangements and established capability limits.
Lower bills than would otherwise be the case	Positive This modification may reduce costs indirectly by enabling essential upgrades and maintenance to be delivered more

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	efficiently and with fewer delays. This reduces unnecessary constraint costs and project overruns, leading to a more cost-effective electricity system. Savings from improved planning and flexibility are ultimately passed on to consumers through lower network charges.
Benefits for society as a whole	Positive This modification might benefit society by supporting a faster transition to a cleaner, more reliable, and cost-effective electricity system. It enables timely delivery of essential upgrades and new connections, helping to meet climate goals, boost economic growth, and ensure a secure energy supply for everyone. Improved planning and flexibility also reduce disruption and costs, delivering broad social and environmental benefits.
Reduced environmental damage	Positive This modification may help mitigate climate change by reducing transmission losses associated with unnecessary voltage-control interventions and by enabling faster delivery of network reinforcements that support low-carbon generation. It also strengthens system resilience by providing more flexible voltage management under increasingly variable climate-driven operating conditions.

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Improved quality of service	Positive This modification will improve quality of service by enabling faster and more reliable delivery of network upgrades and maintenance. This reduces the likelihood of unplanned outages, ensures a more stable electricity supply, and allows consumers to benefit from a higher standard of service. Enhanced planning and flexibility also mean issues can be addressed more proactively, further supporting consistent and dependable service.
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When will this change take place?
Implementation date

Target date : Q4 2026

Date decision required by

June 2026 to achieve implementation in time for roll-out.

Implementation approach

Implementation will need to be co-ordinated and communicated with all affected parties. By design, the implementation process requires a robust and coordinated approach, supported by effective communication channels and clear procedural updates between NESO, TOs, DNOs, *Non-Embedded Customers*, interconnectors, and generators.

The core objective is to amend the SQSS standard threshold to +10%, such that operation up to this level becomes compliant by definition and does not require additional approvals beyond existing SQSS governance and operational coordination arrangements. In this context, NESO and the TOs are the relevant

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parties, responsible for system operation, security assessment, and confirmation of asset capability within established design limits. The case studies support this approach, demonstrating that voltages up to +10% remain within equipment capability and consistent with *Grid Code* assumptions.

Where operation above +10% is considered in exceptional circumstances, this would be subject to agreement through existing *Grid Code* provisions (including CC6.1.4 and ECC6.1.4). This proposal does not require amendments to the *Grid Code* and does not introduce new governance forums or approval processes.

Furthermore, the proposal is also to amend SQSS such that voltages above +10% continue to be treated as non-standard and managed through existing agreements consistent with current SQSS and Grid Code processes provided that all affected parties agree.

Proposer's justification for governance route

Although certain voltage values were revised under GSR026 in 2021¹² this Proposal responds to a materially different operational and strategic context driven by Clean Power 2030. It reflects a shift towards closer alignment with European standards and evolving voltage requirements across the *Transmission System*.

The Proposer considers the CAC appropriate as the modification is relatively straightforward and does not require extensive technical debate or detailed Workgroup assessment. The process enables a streamlined, Code Administrator-led consultation in line with the Code Administrator Code of Practice, while maintaining procedural robustness. The historical background of these subsequent modifications is available in **Annex 1** of this Proposal.

Interactions

<input checked="" type="checkbox"/> Grid Code	<input type="checkbox"/> BSC	<input checked="" type="checkbox"/> STC	<input type="checkbox"/> CUSC
<input type="checkbox"/> European	<input type="checkbox"/> Other	<input type="checkbox"/> Other	
Network Codes	modifications		

¹² [GSR026: Adding Non-Standard Voltages to the SQSS | National Energy System Operator](#)

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This Proposal is part of a broader programme of work under System Access Reform and is expected to interact with other code modifications. Concurrent changes to the STC and *Grid Code* are being considered to ensure alignment across the industry's technical and governance frameworks. These interactions are being actively scoped and coordinated to support a consistent and efficient implementation pathway, with warm-up presentations and stakeholder engagement already underway across all relevant Panels.

Acronyms, key terms, and reference material

Acronym / key term Meaning	
BSC	Balancing and Settlement Code
CUSC	Connection and Use of System Code
CP30	Clean Power 2030
DCC	Demand Connections Conditions
DNOS	Distribution Network Operators
HVDC	High Voltage Direct Current
NESO	National Energy System Operator
NETS	National Electricity Transmission System
OCLR	Operational Capability Limits Record
OFTO	Offshore Transmission Owners
STC	System Operator Transmission Owner Code
SOGL	System Operations Guidelines
SQSS	Security and Quality of Supply Standards
TO	Transmission Owners
TSO	Transmission System Operator
VERs	Voltage Event Reports

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Annex	Content
Annex 1	Historical Background to Previous Modifications Relevant to GSR036
Annex 2	GSR036 Impact Assessment
Annex 3	GSR036 Monitoring Report
Annex 4	GSR 036 Legal Text

References

- [United Kingdom Government, Clean Power 2030 Action Plan, 2024](#)
- [Electricity Networks Commissioner Companion Report, 2025](#)
- [ENTSO-E, Biennial Report on Probabilistic Risk Assessment 2025.](#)
- [European Commission, European Commission, Regulation 2016/631 European Network Code on Requirements for Generators, 2016](#)
- [European Commission, Regulation 2016/1388 on Requirements for Demand Connection, 2016](#)
- [European Commission Regulation 2016/1447, Requirements for HVDC Systems, 2016](#)
- [European Commission, Regulation 2017/1485, System Operator Guidelines, 2017.](#)
- [GSR026: Adding Non- Standard Voltages to the SQSS, 2021](#)
- [International Electrotechnical Commission 2009, International Electrotechnical Standard, 60038:2009, Standard Voltages, 2009](#)
- [System Access Reform | National Energy System Operator Website, 2025](#)
- [Transmission Acceleration Action Plan, 2025](#)
- [GSR 008, Work Group 4 Report, Fundamental SQSS Review, 2010](#)