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| Modification proposal: | Distribution Code: DCRP/22/04 Engineering Report (EREP) P130 Issue 4 – Guidance on the application of Engineering Recommendation P2, Security of Supply | | |
| Decision: | The Authority ¹ has decided to approve ² this modification | | |
| Target audience: | Distribution licensees, Distribution Code Review Panel, distribution network users and other interested parties | | |
| Date of publication: | 31 January 2023 | Implementation date: | 01 July 2023 |

Background

The ENA³ Engineering Recommendation (EREP) 130 is listed in Annex 1 of the Distribution Code, and forms part of the Distribution Code. It provides guidance on the application of Engineering Recommendation (EREC) P2 'Security of Supply', which stipulates the minimum demand to be restored within defined time periods following the loss of supplies in different outage scenarios including network faults.

The Distribution Code Review Panel (DCRP) carried out a probabilistic Cost Benefit Analysis study in 2016 to consider changes to EREC P2. The work was completed by Imperial College London (ICL) on behalf of the Panel. This study highlighted that existing networks might be able to accommodate demand growth, in the short term, by relaxing restoration times required in EREC P2 up to the point where reinforcement of the local infrastructure becomes economically justified. In 2020, the P2 Working Group completed analysis building on the ICL study, which considered the societal, economic and environmental balance with outages at a

¹ References to the "Authority", "Ofgem", "we" and "our" are used interchangeably in this document. The Authority refers to GEMA, the Gas and Electricity Markets Authority. The Office of Gas and Electricity Markets (Ofgem) supports GEMA in its day to day work. This decision is made by or on behalf of GEMA.

² This document is notice of the reasons for this decision as required by section 49A of the Electricity Act 1989.

³Energy Networks Association [Energy Networks Association \(ENA\) - The voice of the networks](https://www.enanetworks.org/)

GB level. This concluded that for Group Demands of 1MW to 12MW (P2 Class of Supply B) supplied via HV feeders, there may be situations where the reinforcement savings of relaxed EREC P2 requirements may outweigh the increase in the societal costs of interruptions. The working group recommended this be considered further, culminating in two modification proposals: DCRP/22/03, proposing changes to EREC P2, and this modification proposal, proposing changes to EREP 130 providing guidance on the updated EREC P2 requirements. Our decision on DCRP/22/03 is published alongside this decision.

The modification proposal

This modification is proposed by the DCRP. It seeks to implement the recommendations of the P2 working group which are outlined in 'ENA Paper: Analysis of P2 Class B Security of Supply' (the ENA Paper)⁴. A summary of the paper has been included in the Final Modification Report (FMR) in Appendix 1 as part of the modification proposal⁵.

The ENA Paper assessed the impact of altering Class of Supply B⁶ requirements using a probabilistic calculation of energy that would not be supplied to customers as a consequence of a network outage. This considered a range of representative group demands, average restoration and repair times, average fault rate per length of circuit, a range of HV Feeder lengths, and load probability. The assessment considered the HV feeders against an alternate reduced network redundancy level compared to the current EREC P2 requirements. The assessment calculated the Value to Lost Load to GB per annum⁷, expected interruption time and the cost of network reinforcement. This has provided a clear direction that there was a point of efficiency to reduce the criteria for a Demand Group.

⁴ [DCRP ER P2 Working Group \(dcode.org.uk\)](https://dcode.org.uk/DCRP-ER-P2-Working-Group) – Information regarding the ENA P2 working group is published by the ENA.

⁵ [Distribution Code Modifications - 2022 \(dcode.org.uk\)](https://dcode.org.uk/Distribution-Code-Modifications-2022) – ENA paper associated with this modification are published by the ENA.

⁶ A HV feeder is part of the 11kV electricity network which typically provides supplies to a local neighbourhood. In EREC P2, a HV feeder is generally treated as a Class B supply.

⁷ [london-economics-value-of-lost-load-for-electricity-in-gb_0.pdf \(ofgem.gov.uk\)](https://www.ofgem.gov.uk/london-economics-value-of-lost-load-for-electricity-in-gb-0.pdf)

Value of Lost Load (VoLL) is the monetary value of the loss of an electricity supply which is traditionally based on asking consumers what they think the supply of electricity is worth.

Modification proposal DCRP/22/03 proposes to amend the current required minimum demand to be met within three hours of a first circuit outage for Class of supply B within EREC P2 (Group Demand 1MW to 12MW) from 'Within 3 hours group demand minus 1MW' to 'Group Demand minus 1.2MW' for circuits no longer than 1km in length, and meeting other criteria outlined in EREP 130. This modification proposal proposes changes to EREP 130 defining the criterion to be met in the applicability of the reduced P2 requirements proposed in modification proposal DCRP/22/03. These criterion are listed below:

- Where the Group Demand is supplied by a HV Circuit which is designed and operated as radial HV Circuit and not an interconnected HV Circuit.
- Where the Group Demand is not supplied by a primary substation comprising a single EHV/HV transformer (an example of a primary substation comprising a single EHV/HV transformer is a substation with a single incoming 33 kV supply equipped with one 33/11 kV transformer supplying one or more 11 kV Circuits).
- Where the total length of the radial HV Circuit is less than 1 km i.e., the length of all cable/overhead line connected, including tee-offs, between the supplying circuit-breaker at the primary substation and the open point(s).
- The 1.2 MW of demand that may remain off supply for up to 3 hours after a First Circuit Outage (FCO) shall not be part of a single class of supply A demand group i.e., the 1.2 MW of demand off supply shall be formed from two or more class of supply A demand groups. The main benefit of reducing the minimum criteria is facilitating an increase in network capacity that can be 'released' within the normal network configuration, as opposed to network capacity being reserved for use in outage scenarios.

Together, the criterion ensures that the average additional time off supply for a customer supplied from an affected HV feeder would not be greater than 10 minutes per year. The modification proposal also includes minor editorial changes to EREP 130, which are summarised below:

- Included explanation of Group Demand for class of supply A and class of supply B,
- Description of HV Circuit types added ('interconnected' and 'radial'),

- Included guidance on implementing the reduced criteria of supply for specific class of supply B demand groups in accordance with the reduction included in EREC P2/8,
- New examples added to Annex F to clarify assessment of HV Circuits; and
- New Annex H added covering an explanation of analysis carried out on HV Circuits.

The modification proposal states that the main benefit of reducing the minimum criteria is to facilitate an increase in network capacity that can be 'released' within the normal network configuration, as opposed to network capacity being reserved for use in outage scenarios. In the proposal, up to an 11% increase in customer demand could be accommodated on applicable HV feeders without incurring reinforcement costs. The modification proposal determines that the extent of cost savings on HV feeder upgrades is complex as a number of factors determine whether and when reinforcement may be required. Therefore, no Cost Benefit Analysis has been completed for the modification, however as stated above detailed analysis was undertaken by Imperial College as part of the wider review. However, the potential savings by applying the revised design parameters may be substantial based on the average RIIO-ED1 reinforcement costs⁸.

Distribution Code Review Panel (DCRP)⁹ comments and licensee recommendation

As part of the DCRP Panel review, a public consultation on the proposal was conducted between 27 June 2022 to 29 July 2022. The public consultation for this modification proposal received a total of 3 responses. All three were from Distribution Network Operators who were supportive of the proposed changes.

The Final Modification Report was presented to the panel on 06 October 2022, where the Panel recommended that this modification report should be submitted to the Authority for approval. As stated in the Final Modification Report, the panel consider that Distribution Code objectives (a), (b) and (d) are better facilitated by the modification, and that it has a neutral impact on objective (c).

⁸ Information provided within the ENA Final Modification Report submitted to the Authority.

⁹ The DCRP is established in accordance with SLC 21 of the Electricity Distribution Licence.

Our decision

We have considered the issues raised by the modification proposal and in the Final Report dated 26 October 2022. We have considered and taken into account the responses to the consultation(s) on the modification proposal which are included in the Final Report.¹⁰ We have concluded that:

- implementation of the modification proposal will better facilitate the achievement of the applicable objectives of the Distribution Code;¹¹ and
- approving the modification is consistent with our principal objective and statutory duties.¹²

Reasons for our decision

We consider this modification proposal will better facilitate Distribution Code objectives (a) and (b). It has a neutral impact on the other applicable objectives.

(a) permit the development, maintenance, and operation of an efficient, co-ordinated, and economical system for the distribution of electricity

This modification proposal seeks to increase the consumer demand that could be accommodated on applicable HV feeders, by up to 11%, without incurring reinforcement costs. Although no bespoke cost benefit analysis has been completed in support of the proposal, we agree that as a result of this modification, the cost savings for consumers as a whole by

¹⁰ Distribution Code proposals, final reports and representations can be viewed at: <http://www.dcode.org.uk/areas-of-work/> and <http://www.dcode.org.uk/consultations/>

¹¹ As set out in Standard Condition SLC 21.4 of the Electricity Distribution Licence available at: <https://epr.ofgem.gov.uk/Content/Documents/Electricity%20Distribution%20Consolidated%20Standard%20Licence%20Conditions%20-%20Current%20Version.pdf>

¹² The Authority's statutory duties are wider than matters which the Panel and licensees must take into consideration and are largely provided for in statute, principally in this case the Electricity Act 1989.

avoided reinforcement may be significant. This is because a typical HV feeder reinforcement scheme typically costs £100k based on DNO data for the RIIO-ED1 price control period¹³. We also note that the ENA Paper assessed the impacts of reduced requirements with reference to the Value to Lost Load which represents the societal cost of time off supply and concluded that this modification proposal may realise cost benefit.

Furthermore, EREC P2 prescribes the minimum design standard required. It is expected that each DNO will assess the application of the design standard against a qualifying circuit and undertake the most cost-effective action whilst considering the impact on consumers.

We note that under this proposal, the network capacity released is at the expense of potentially increased outage durations. Previous stakeholder engagement by DNOs, as part of their RIIO-ED1 and DCRP stakeholder engagement activities, has clearly demonstrated that GB customers do not support an increase in outages. The design criteria for this modification proposal limits its applicability to circa 3,600 HV Feeders supplying approximately 1.2m customers in total. They also limit the impact on affected consumers to an average increase in time off supply of 10 minutes per year; for context, the existing average time off supply due to a HV fault is circa. 60 minutes. If all applicable HV Feeders had been planned to comply with this modification proposal, the expected increase in Customer Minutes Lost (CML) for HV faults would be 1.8%. Further, this modification proposal will have no impact until the point where applicable HV feeders would have required reinforcement due to overloading under the current EREC P2 standard. Consequently, we do not consider this modification proposal will result in widespread changes to outages or resilience.

Additionally, we also note that the overall reliability of DNO networks is monitored and incentivised via our RIIO Price Controls. In RIIO-ED2¹⁴, the Interruptions Incentive Scheme contains CML targets which are not impacted by this modification. Over RIIO-ED1 to date, interruptions have fallen 10% and the duration of interruptions has reduced by 7%. Further,

¹³ [RIIO-1 Electricity Distribution Annual Report 2020-21 | Ofgem](#)

¹⁴ [RIIO-ED2 Final Determinations | Ofgem](#)

the Electricity Distribution Licence includes SLC10¹⁵. This places a duty on licensee^s to make provision for vulnerable consumers who are registered on a Priority Services Register in situations where there is disruption to supply.

The main benefit of reducing the minimum criteria is facilitating an increase in network capacity that can be 'released' for normal network configuration, as opposed to network capacity being reserved for use in outage scenarios, thus reducing the need for reinforcement. For the reasons outlined above, we consider the modification strikes a balance between this and the development of an economical distribution system. We therefore conclude that on balance this modification proposal better facilitates this objective.

(b) facilitate competition in the generation and supply of electricity

We consider that this modification has a positive impact against this objective. Network capacity, which is reserved for outages will be released through the reduction in the minimum criteria on certain HV feeder circuits. As there will be more available capacity on HV networks for these types of connections, this will enable more Low Carbon Technologies, including generation, to be connected to the networks at a quicker and more cost-effective approach.

Decision notice

In accordance with SLC 21.11 of the Electricity Distribution Licence, the Authority hereby directs that the modification to the Distribution Code set out in the Final Report to the Authority of 26 October 2022 be made.

Martin Queen

Head of Engineering Systems and Policy

Signed on behalf of the Authority and authorised for that purpose

¹⁵ [Electricity Distribution Consolidated Standard Licence Conditions \(ofgem.gov.uk\)](https://www.ofgem.gov.uk)