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Engineering Recommendation G59

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RECOMMENDATIONS FOR THE CONNECTION OF GENERATING PLANT TO THE DISTRIBUTION SYSTEMS OF LICENSED DISTRIBUTION NETWORK OPERATORS

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PUBLISHING AND COPYRIGHT INFORMATION

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Amendments since publication

Issue	Date	Amendment
G59/1	1991	Revised incorporating Amendment 1 (1992) and Amendment 2 (1995)
G59/2	Aug 2010	Revised - replaced two previous Engineering Recommendations, ER G59/1 and its associated Engineering Technical Report ETR 113, and ER G75/1.
G59/2-1	March 2011	Revised Amendment 1 – Appendix A13.1 - Change to DC injection current limits
G59/3	Sept 2011	Major revision to the document to align with G83/2 and to cater for type tested equipment upto 50kW. Other areas revised included: • *Connection application and commissioning procedures* • *Connection and Commissioning Procedure for Power Stations above EREC G83/2 limits but less than 50kW or 17kW per phase using Type Tested Generating Units only* • *Connection and Commissioning Procedure for Power Stations above 50kW which use Type Tested Generating Units only* • *Voltage Unbalance* • *Generation capacity for single and split phase supplies* • *Generating Unit performance requirements for Type Tested Units* • *Over and Under Voltage Stability Tests* • *Frequency Drift and Step Change Stability Test.* • *Protection Settings* • *Revised Forms* • *Simplified application form*

G59/3	Nov 2013	Correction of error. The error relates to the British Standard which is to be used to determine the 'flicker' contribution from small wind turbines. References to this standard are found at 9.6.2.1 and 13.8.5.5 of ER G59/3. The standard that should be referred to is BS EN 61400-12. However, the standard that was referred BS EN 61400-21was incorrect. Therefore, to correct this error, the two references (i.e. at 9.6.2.1 and 13.8.5.5) have been changed and the description of the standard corrected at 3.2 (page 9) of ER G59/3. This will now read: ***BS EN 61400-12-1:2006*** *Wind turbines. Power performance measurements of electricity producing wind turbines.*
G59/3-1	Aug 2014	Revised RoCoF settings in Section 10.5.7
G59/3-2	Sept 2015	Revocation of Section 12.4 (f) – It is no longer a requirement to undertake an additional functional check of the LoM protection by removing one phase of the supply to the Generating Unit. Revision to section 12.3.1 (g) to include the provision of two options to carry out a functional test confirming that the Interface Protection has operated. Testing of RoCoF elements in Appendix 13.3. A discrepancy has been corrected between the wording contained in Section 12.4 and the testing requirements contained in Appendix 13.3 on how to undertake the test . Section 13.8.3.2 is repeated on page 130. Change to 13.8.3.3 and revise subsequent numbering.
G59/3-3	Feb 2018	Modifications to prevent the use of vector shift protection on all new installations from 01/02/2018, and setting out the requirements for RoCoF settings, again for installations commissioned on or after 01/02/2018. Consequential changes to the following clauses. Foreword; 2.10; 10.3.12-14; 10.5.1; 10.5.2; 10.5.7; 10.5.8; 12.4.1; 13.1; 13.3; 13.7.1; 13.7.3; 13.11 (13.11 deleted)
G59/3-4	Jul 2018	Modification to disallow the use of VS protection and to provide new RoCoF requirements for type tested generation. Changes to the following clauses: Foreword; 1.1, 2.10, 9.3.7, 10.3.13, 13.1 Protection (b), 13.8.3.6
G59/3-5	TBA	Note added to the foreword and to 2.11 to make it clear that generation connected on or after 27 April 2019 must comply with G99.

Contents

Foreword

This Engineering Recommendation (EREC) is published by the Energy Networks Association (ENA) and comes into effect from 01 July 2018. It has been prepared and approved for publication under the authority of the Great Britain Distribution Code Review Panel.The approved abbreviated title of this engineering document is “EREC G59”, which replaces the previously used abbreviation “ER G59”.

Generation commissioned on after 27 April 2019 must comply with EREC G99. EREC G59 is not applicable to generation commissioned on or after that date.

1 Purpose

1.1 The purpose of this Engineering Recommendation (EREC) is to provide guidance on the connection of **Generating Plant** to the **Distribution Systems** of licensed **Distribution Network Operators (DNOs)**. It is intended to address all aspects of the connection process from standards of functionality to site commissioning, such that **Customers, Manufacturers** and **Generators** are aware of the requirements that will be made by the local **DNO** before the **Generating Plant** will be accepted for connection to the **Distribution System**. This Engineering Recommendation replaces Engineering Recommendations G59/3, G59/3-1, G59/3-2 and G59/3-3.

1.2 The guidance given is designed to facilitate the connection of **Generating Plant** whilst maintaining the integrity of the **Distribution System**, both in terms of safety and supply quality. It applies to all **Generating Plant** within the scope of Section 2, irrespective of the type of electrical machine and equipment used to convert any primary energy source into electrical energy.

1.3 This EREC is intended to provide guidance to **Generator**s and **DNO**s. The mandatory requirements governing the connection of Distributed **Generating Plant** are generally set out in the Distribution Planning and Connection Code 7 (DPC7) of the **Distribution Code** and in the Connection Conditions (CC) of the **Grid Code**. In the event of any conflict with this EREC, the provisions of the **Distribution Code** and **Grid Code** will prevail.

2 Scope

2.1 This EREC provides guidance on the technical requirements for the connection of **Generating Plant** to the **Distribution System**s of licensed **DNO**s. For the purposes of this EREC, a **Generating Plant** is any source of electrical energy, irrespective of the prime mover and **Generating Unit** type. This EREC applies to all **Generating Plant** which is not in the scope of EREC G83 or is not compliant with EREC G83 requirements.[1] EREC G59 describes a simplified connection procedure for connection of a **Type Tested single Generating Unit** of less than 17kW per phase or 50kW three phase, or the connection of multiple **Type Tested Generating Units** with a maximum aggregate capacity of less than 17kW per phase or 50kW three phase, per **Customer** installation, provided that any existing connected **Generating Units** are also **Type Tested.** It is effective from 1 July 2018.

2.2 This EREC does not provide advice for the design, specification, protection or operation of **Generating Plant** itself. These matters are for the owners of plant to determine.

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[1] Engineering Recommendation EREC G83 – Recommendations for the connection of small-scale embedded generators (up to and including 16 A per phase) in parallel with public low-voltage distribution networks. This Engineering Recommendation provides guidance on the technical requirements for the connection of **Generating Units** rated up to and including 16 A per phase, single or multi-phase, 230/400 Volts AC. The recommendations cover the connection of **Generating Units**, either single or multi-phase within a single Customer's installation up to the limit of 16A per phase, and multiple **Generating Unit**s in a close geographic region with a limit of 16A per phase in each customer installation, under a planned programme of work.

2.3 Specific separate requirements apply to **Generating Plant** comprising **Generating Unit**s less than or equal to 16A per phase and these are covered in EREC G83. However, **Generating Unit**s ≤16A per phase that have not been **Type Tested** in accordance with EREC G83 or whose technology type is not covered by one of the EREC G83 annexes should comply with the requirements set in this document. Section 6 of this document provides more guidance on how to apply this document to **Generating Unit**s that are below the 16A threshold but do not meet the requirements of EREC G83.

2.4 The connection of mobile generation owned by the **DNO**, EREC G83 compliant **Generating Unit**s or offshore **Transmission System**s containing generation are outside the scope of this Engineering Recommendation.

2.5 This document applies to systems where the **Generating Plant** can be paralleled with a **Distribution System** or where either the **Generating Plant** or a **Distribution System** with **Generating Plant** connected can be used as an alternative source of energy to supply the same electrical load.

2.6 The generic requirements for all types of **Generating Plant** within the scope of this document relate to the connection design requirements, connection application and notification process including confirmation of commissioning. The document does not attempt to describe in detail the overall process of connection from application, through agreement, construction and commissioning. It is recommended that the ENA publications entitled – "*Distributed Generation Connection Guides*" are consulted for more general guidance.

2.7 **Medium and Large Power Station**s are, in addition to the general requirements of this EREC, bound by the requirements of the **Grid Code**. In the case of **Large Power Station**s, the **Grid Code** will generally apply in full. For **Medium Power Station**s, only a subset of the **Grid Code** applies directly, and the relevant clauses are listed in DPC7 of the **Distribution Code**.

2.8 This EREC is written principally from the point of view of the requirements in Great Britain. There are some differences in the requirements in Great Britain and Northern Ireland, which are reflected in the separate Grid Codes for Great Britain and Northern Ireland, and the separate Distribution Code for Northern Ireland. These documents should be consulted where necessary, noting that the numbering of sections within these documents is not necessarily the same as in the **Distribution Code** for Great Britain and the **Grid Code** for Great Britain.

2.9 The separate synchronous network operating in the Shetland Isles has specific technical challenges which are different to those of the Great Britain synchronous network. This EREC is not in itself sufficient to deal with these issues

2.10 EREC G59/3-4 (ie this version of G59) has been updated to remove vector shift as an allowed loss of mains (LoM) technique for type-tested generation. This follows changes to non-type-tested generation which were made with effect from February 2018.

2.11 Generation commissioned on after 27 April 2019 must comply with EREC G99. EREC G59 is not applicable to generation commissioned on or after that date.