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Analysis package for assessing generation security capability – Users' guide

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Amendments since publication

Issue	Date	Amendment
Issue 2	December, 2012	Cosmetic revision of Issue 1 to align with the new ENA Engineering Report (EREP) template and Engineering Recommendation G0 Issue 1 2012 *Rules for structure, drafting and presentation of ENA engineering documents*. This issue does not include any principal technical changes. Details of all other technical, general and editorial amendments are included in the associated Document Amendment Summary for this Issue (available on request from the Operations Directorate of ENA).

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Foreword

This Engineering Report (EREP) is published by the Energy Networks Association (ENA) and comes into effect from the date of publication. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “EREP 131”, which replaces the previously used abbreviation “ETR 131”.

This engineering document is classed as a “qualifying standard” being listed in Appendix 2 of the Distribution Code (DCode). The revision of this engineering document has been modified in accordance with Standard Procedure 1 – Governance of Qualifying Standards as detailed in the *Constitution and Rules of the Distribution Code Review Panel.*

This issue supersedes ENA Engineering Report 131 Issue 1 2006, which is withdrawn.

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Introduction

This Engineering Report (EREP) describes how to use the computer spreadsheet, which was developed as part of the FES funded project for updating Engineering Recommendation P2/5. Initially, this computer spreadsheet was required in order to analyse many DG scenarios and to perform the wide range of sensitivity studies required for that work. The output of these studies provided the required input into the development of ER P2/6 [N1]. However it was anticipated that there could be a need to perform special studies in the future either to confirm previously tabulated values or to consider specific DG scenarios that are outside the range of the tabulated results in ER P2/6 [N1]. Such special studies are referred to in ETR 130 [N2] as Approach 3. They were permissible under ER P2/5 although P2/5 did not provide the detailed approaches or models for undertaking them.

The spreadsheet described in this EREP is only of a simple form, and has not been given either the presentation or user support that would be expected with commercial grade software. It is not commercially supported by the University of Manchester (formerly UMIST) or by the ENA. It is structured as a simple spreadsheet, automated by Visual Basic code which an engineer with a reasonable knowledge of the approach can use.

The spreadsheet calculates the contribution to System Security from DG connected to a particular network. The calculation of the contribution to System Security by DG continuously operating is explained in Clause 6 and that by DG not operating continuously in Clause 9. Clause 10 contains examples.

The capacity contribution calculation summates the outputs from multiple DG units and/or plants before calculating expected energy not supplied (EENS). This is different, and more accurate, than Approaches 1 and 2 described in ETR 130 [N2] where the respective contributions are summated after the individual EENS are derived. Where Wind Farms are part of this generation mix, 5-minute data must be used for accurate results. Alternatively 30 minute data can be used, provided correction factors are used (see 10.2.2 and 10.3.1).

1 Scope

The purpose of this Engineering Report is to support Engineering Recommendation P2/6 [N1] and Engineering Technical Report 130 [N2] by providing guidance on the use of a software package (hereafter referred to as the “spreadsheet”) developed for assessing the security capability of Distributed Generation (DG). The spreadsheet was developed by UMIST (now the University of Manchester) under contract to Future Energy Solutions (FES) as part of the development work for ER P2/6 [N1].

This Engineering Report provides guidance on how to use the spreadsheet developed by UMIST [N3] to assess the contribution to System Security from Distributed Generation (DG) assets as required under Approach 3 in ETR 130 [N2].

2 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Other publications

[N1] Engineering Recommendation P2/6, *System Security 2006*

[N2] Engineering Technical Report 130, *Application Guide for Assessing the Capacity of Networks Containing Distributed Generation*

[N3] Generation Security Capability Version 1.0 dated 06-06-19. Assessment programme developed by UMIST under contract to FES and available free of charge from ENA, see www.energynetworks.org

[N4] Developing the P2/6 Methodology, April 2004. Final report by UMIST for FES. Project DG/CG/00023/00/00

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE: Defined terms are capitalised where they are used in the main text of this report.

3.1
Declared Net Capability (DNC)
declared gross capability of a DG plant, measured in MW, less the normal total parasitic power consumption attributable to that plant

NOTE 1: Declared Net Capability (DNC) as used in this Engineering Report should not be confused with declared net capacity (DNC) as used in the Electricity Act and Statutory Instrument 2001 3270.

NOTE 2: For the purpose of this definition the term “parasitic power consumption” refers to the electrical demand of the auxiliary equipment, which is an integral part of the DG, essential to the DG’s operation. For the avoidance of doubt “parasitic power consumption” does not include demand supplied by the DG to an on-site customer.

NOTE 3: The DNC of Intermittent Generation is taken as the aggregate nameplate capacity of all the units within the DG plant, less any parasitic load.

3.2
Distributed Generation (DG)
generating plant connected to the distribution network, where a generating plant is an installation comprising one or more generating units

3.3
First Circuit Outage (FCO)
a fault or an arranged Circuit outage

NOTE: For classes of supply C to F in ER P2/6 [N1] supplies to consumers should not be interrupted by arranged outages.

3.4
Generator
a person who generates electricity under licence or exemption from Section 4.1(a) of the Electricity Act 1989 or the Electricity (Northern Ireland) Order 1992