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Microgrids –
Part 1: Guidelines for microgrid projects planning and specification

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CONTENTS

FOREWORD 5
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms and definitions 8
4 General principles 13
4.1 General 13
4.2 Preliminary study 14
4.3 Overall microgrid planning and design process 14
5 Purpose and application of microgrids 15
5.1 Application classification 15
5.2 Application of non-isolated microgrids 16
5.3 Application of isolated microgrids 16
6 Resource analysis and generation forecast 16
6.1 Resource analysis 16
6.1.1 General 16
6.1.2 Non-dispatchable resource analysis 17
6.1.3 Dispatchable resource analysis 17
6.2 Generation forecast 17
6.2.1 General 17
6.2.2 Technical requirements 18
6.2.3 Data processing 18
7 Load forecast 19
7.1 General 19
7.2 Load analysis 19
7.3 Classification of load forecast 19
7.4 Technical requirements 20
8 Distributed energy resource planning 20
8.1 Ratio of renewable energy 20
8.2 Renewable generation configuration 20
8.3 Energy storage 20
8.4 Electric power and energy balancing 21
8.5 Dispatchable generation configuration 21
9 Microgrid power system planning 21
9.1 Voltage level 21
9.2 Typical topology of a microgrid 21
9.2.1 Typical topology for a non-isolated microgrid 21
9.2.2 Typical topology for an isolated microgrid 23
9.3 Electrical parameter calculations 23
10 Technical requirements for DER in microgrids 24
10.1 General 24
10.2 Technical requirements for DER in grid-connected mode 24
10.3 Technical requirements for DER in isolated microgrids and island mode of non-isolated microgrids 24
11 Technical requirements for distribution lines in microgrids 25
12 Technical requirements for microgrid connection to distribution networks 25

12.1 General 25
12.2 Interface protection 25
12.3 Microgrid earthing 25
12.3.1 General 25
12.3.2 Technical requirements for microgrid earthing 25
12.4 Power quality at POC 26
12.4.1 General 26
12.4.2 Power quality monitoring 26
13 Technical requirements for control, protection and communication systems 26
13.1 Microgrid control 26
13.1.1 General 26
13.1.2 Control scheme 26
13.2 Protection relays and automatic protection devices 27
13.2.1 General 27
13.2.2 DER component protection 27
13.2.3 Component protection for all users in a microgrid 27
13.2.4 Load shedding in a microgrid 27
13.3 Microgrid communication 28
13.3.1 Communication within microgrid subsystem 28
13.3.2 Microgrid communication with connected distribution system 28
13.4 Information exchange 28
14 Evaluation of microgrid projects 28
14.1 General 28
14.2 Reliability of power supply 28
14.3 Economic benefits 29
14.4 Environmental benefits 30
14.5 Scalability 30
14.6 Integration to the wider electric power system 30
14.7 Life-time energy balance of resources 30
Annex A (informative) Business use case A Guarantee a continuity in load service by islanding with microgrids 31
A.1 General 31
A.2 Purpose 31
A.3 Objectives 31
Annex B (informative) Business use case B Optimize local resources to provide services to customers inside the microgrid 32
B.1 General 32
B.2 Purpose 32
B.3 Objectives 32
Annex C (informative) Business use case C Electrify remote areas using renewable energy sources 33
C.1 General 33
C.2 Purpose 33
C.3 Objectives 33
C.4 Basic functions 33
C.5 Advanced functions 33
Annex D (informative) Business use case D Optimize local resources to provide services to the grid/disaster preparedness 34
D.1 General 34

D.2 Scope 34
D.3 Objectives 34
D.4 Basic functions 34
D.5 Advanced functions 34
Annex E (informative) Background information into energy economics' cost calculation 35
E.1 ntroduction into energy economics' cost calculation 35
E.2 Derivation of the minimum cost 36
E.3 Examples 37
Bibliography 39

Figure 1 – Overall microgrid planning and design process 15
Figure 2 – Single bus structure microgrid 22
Figure 3 – Multiple bus structure microgrid 22
Figure 4 – Multilevel structure microgrid 23
Figure 5 – Typical topology for an isolated microgrid 23
Figure E.1 − Overall costs of a power plant depending on the economic characteristic as base load, medium load or peak load plant 35

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MICROGRIDS –

Part 1: Guidelines for microgrid projects planning and specification

FOREWORD

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IEC TS 62898 edition 1.1 contains the first edition (2017-05) [documents 8/1445/DTS and 8/1460/RVDTS] and its amendment 1 (2023-08) [documents 8B/165/DTS and 8B/179/RVDTS].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62898, which is a Technical Specification, has been prepared by IEC technical committee 8: Systems aspects for electrical energy supply.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62898 series, published under the general title *Microgrids*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Microgrids can serve different purposes depending on the primary objectives of their applications. They are usually seen as means to manage reliability of supply in a grid contingency and local optimization of energy supply by controlling distributed energy resources (DER). Microgrids also present a way to provide electricity supply in remote areas and to use clean and renewable energy as a systemic approach for rural electrification.

This part of IEC 62898 defines the guidelines for the general planning and design of microgrids, ~~and~~ IEC TS 62898-2[1] defines the general technical requirements for operation and control of microgrids, IEC TS 62898-3-1 defines the technical requirements for protection and dynamic control of microgrids, IEC TS 62898-3-2 defines the technical requirements for energy management systems of microgrids, IEC TS 62898-3-3 defines the technical requirements for self-regulation loads of microgrids, and IEC TS 62898-3-4 defines the technical requirements for microgrid monitoring and control systems. IEC TC8/SC8B/JWG1 is responsible for the development of these TS.

This document mainly covers the following issues:

- determination of microgrid purpose and application;
- preliminary study used for microgrid planning, including resource analysis, load forecast, DER planning and microgrid power system planning;
- principles of microgrid technical requirements that should be specified during planning stage;
- microgrid evaluation to select an optimal planning scheme for a microgrid project.

IEC TS 62898-2 mainly covers the following issues:

- operation requirements and control targets of microgrids under different operation modes;
- basic control strategies and methods under different operation modes;
- requirements of energy storage, monitoring and communication under different operation modes;
- power quality.

Microgrids can be stand-alone or be a sub-system of the smart grid. The technical requirements in this document and in IEC TS 62898-2 are intended to be consistent and in line with:

- system requirements from IEC System Committee Smart Energy,
- technical requirements from IEC 62786 for connection of generators intended to be operated in parallel with the microgrid,
- basic rules from IEC TC 64 and TC 99 for safety and quality of power distribution (essentially selectivity, through coordination of protective devices) in installations,
- basic rules from IEC TC 77/SC 77A for electromagnetic compatibility (EMC) issues,
- IEC TS 62257 (all parts) with respect to rural electrification,
- IEC TS 62749 with respect to power quality.

Local laws and regulations can overrule the requirements of this document.

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[1] ~~Under preparation. Stage at the time of publication: IEC CD 62898-2:2017.~~

MICROGRIDS –

Part 1: Guidelines for microgrid projects planning and specification

1 Scope

The purpose of this part of IEC 62898, which is a Technical Specification, is to provide guidelines for microgrid projects planning and specification. Microgrids considered in this document are alternating current (AC) electrical systems with loads and distributed energy resources (DER) at low or medium voltage level. This document does not cover direct current (DC) microgrids.

Microgrids are classified into isolated microgrids and non-isolated microgrids. Isolated microgrids have no electrical connection to a wider electric power system. Non-isolated microgrids can act as controllable units to the electric power system and can operate in the following two modes:

- grid-connected mode;
- island mode.

This document will cover the following areas:

- microgrid application, resource analysis, generation forecast, and load forecast;
- DER planning and microgrid power system planning;
- high level technical requirements for DER in microgrids, for microgrid connection to the distribution system, and for control, protection and communication systems;
- evaluation of microgrid projects.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60038, *IEC standard voltages*

IEC 60364 (all parts), *Low voltage electrical installations*

IEC 61936 (all parts), *Power installations exceeding 1 kV AC*

IEC TS 62749, *Assessment of power quality - Characteristics of electricity supplied by public networks*

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CONTENTS

FOREWORD 5
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms and definitions 8
4 General principles 13
4.1 General 13
4.2 Preliminary study 14
4.3 Overall microgrid planning and design process 14
5 Purpose and application of microgrids 15
5.1 Application classification 15
5.2 Application of non-isolated microgrids 16
5.3 Application of isolated microgrids 16
6 Resource analysis and generation forecast 16
6.1 Resource analysis 16
6.1.1 General 16
6.1.2 Non-dispatchable resource analysis 17
6.1.3 Dispatchable resource analysis 17
6.2 Generation forecast 17
6.2.1 General 17
6.2.2 Technical requirements 18
6.2.3 Data processing 18
7 Load forecast 19
7.1 General 19
7.2 Load analysis 19
7.3 Classification of load forecast 19
7.4 Technical requirements 20
8 Distributed energy resource planning 20
8.1 Ratio of renewable energy 20
8.2 Renewable generation configuration 20
8.3 Energy storage 20
8.4 Electric power and energy balancing 21
8.5 Dispatchable generation configuration 21
9 Microgrid power system planning 21
9.1 Voltage level 21
9.2 Typical topology of a microgrid 21
9.2.1 Typical topology for a non-isolated microgrid 21
9.2.2 Typical topology for an isolated microgrid 23
9.3 Electrical parameter calculations 23
10 Technical requirements for DER in microgrids 24
10.1 General 24
10.2 Technical requirements for DER in grid-connected mode 24
10.3 Technical requirements for DER in isolated microgrids and island mode of non-isolated microgrids 24
11 Technical requirements for distribution lines in microgrids 25
12 Technical requirements for microgrid connection to distribution networks 25

12.1 General 25
12.2 Interface protection 25
12.3 Microgrid earthing 25
12.3.1 General 25
12.3.2 Technical requirements for microgrid earthing 25
12.4 Power quality at POC 26
12.4.1 General 26
12.4.2 Power quality monitoring 26
13 Technical requirements for control, protection and communication systems 26
13.1 Microgrid control 26
13.1.1 General 26
13.1.2 Control scheme 26
13.2 Protection relays and automatic protection devices 27
13.2.1 General 27
13.2.2 DER component protection 27
13.2.3 Component protection for all users in a microgrid 27
13.2.4 Load shedding in a microgrid 27
13.3 Microgrid communication 28
13.3.1 Communication within microgrid subsystem 28
13.3.2 Microgrid communication with connected distribution system 28
13.4 Information exchange 28
14 Evaluation of microgrid projects 28
14.1 General 28
14.2 Reliability of power supply 28
14.3 Economic benefits 29
14.4 Environmental benefits 30
14.5 Scalability 30
14.6 Integration to the wider electric power system 30
14.7 Life-time energy balance of resources 30
Annex A (informative) Business use case A Guarantee a continuity in load service by islanding with microgrids 31
A.1 General 31
A.2 Purpose 31
A.3 Objectives 31
Annex B (informative) Business use case B Optimize local resources to provide services to customers inside the microgrid 32
B.1 General 32
B.2 Purpose 32
B.3 Objectives 32
Annex C (informative) Business use case C Electrify remote areas using renewable energy sources 33
C.1 General 33
C.2 Purpose 33
C.3 Objectives 33
C.4 Basic functions 33
C.5 Advanced functions 33
Annex D (informative) Business use case D Optimize local resources to provide services to the grid/disaster preparedness 34
D.1 General 34

D.2 Scope 34
D.3 Objectives 34
D.4 Basic functions 34
D.5 Advanced functions 34
Annex E (informative) Background information into energy economics' cost calculation 35
E.1 ntroduction into energy economics' cost calculation 35
E.2 Derivation of the minimum cost 36
E.3 Examples 37
Bibliography 39

Figure 1 – Overall microgrid planning and design process 15
Figure 2 – Single bus structure microgrid 22
Figure 3 – Multiple bus structure microgrid 22
Figure 4 – Multilevel structure microgrid 23
Figure 5 – Typical topology for an isolated microgrid 23
Figure E.1 − Overall costs of a power plant depending on the economic characteristic as base load, medium load or peak load plant 35

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