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Microgrids

Part 1: Guidelines for microgrid projects planning and specification

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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- 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.

The text of this Technical Specification is based on the following documents:

Enquiry draft	Report on voting
8/1445/DTS	8/1460/RVDTS

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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.

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*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses: