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Decentralized electrical energy systems roadmap

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DECENTRALIZED ELECTRICAL ENERGY SYSTEMS ROADMAP

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IEC TR 63410 has been prepared by subcommittee 8B: Decentralized Electrical Energy Systems, of IEC technical committee 8: System aspects for electrical supply. It is a Technical Report.

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Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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- withdrawn,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

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INTRODUCTION

Decentralized Electrical Energy Systems are intended to support the development of safe, secure and reliable systems with decentralized management for electrical energy supply, alternative/complement/precursor to traditional large interconnected and highly centralized systems.

Decentralized electrical energy systems have applications for developing countries (focusing on access to electricity) as well as for developed countries (focusing on higher reliability, black-out recovery and/or services). Interactions within Decentralized (Multi) Energy Systems are also considered.

- Microgrids

A microgrid is an independent system composed of distributed energy resources, which normally connected with main grid with tie-line. Due to the imbalance between supply and load, a microgrid can either connect with main grid or operate independently.

- Non-conventional distribution systems

Non-conventional distribution systems include grid-tied local system, multi-energy local system and DC distribution system.

A grid-tied local system means a group of interconnected loads and distributed energy resources with defined electrical boundaries forming a local electric power system at distribution voltage levels, that is not intended to be disconnected from a wider electric power system.

A multi-energy local system is composed of distributed power networks (such as electrical power supply, gas supply, and cooling/heat supply networks), energy exchange segments (such as CCHP unit, generator, boiler, air conditioner, and heat pump, etc.), distributed energy storage segments (such as electricity storage, heat storage, gas storage, cooling storage, etc.) and users.

One DC distribution system is an electrical power system formed by connecting the DC electrical power supply, DC lines, DC converter stations, DC loads and monitoring systems in the way of direct current, mainly completing DC electrical power distribution and consumption.

- Virtual Power Plants

A Virtual power plant achieves Distributed Energy Resources (DER) aggregation and coordination optimization (such as DG, energy storage systems, controllable load, and electric cars, etc.) through advanced ICT and software systems. It is considered as a special power plant participating in electricity market and power grid operation.

- Decentralized DC distribution system

The decentralized DC distribution system is mostly distributed in the strong demand DC power supply area or in the area of high DC load density, and in the areas where DC power supply and DC load exist simultaneously. The decentralized DC distribution systems are distributed in AC power supply areas. [Source: IEC SC 8B, WG5]

DECENTRALIZED ELECTRICAL ENERGY SYSTEMS ROADMAP

1 Scope

IEC TR 63410, which is a Technical Report, aims to prepare a road map for categorizing Decentralized Electrical Energy Systems and identifying gaps in the existing standards relevant to Decentralized Electrical Energy Systems. The task of IEC Subcommittee 8B is to develop IEC publications enabling the development of secure, reliable and cost-effective systems with decentralized management for electrical energy supply, which are alternative, complementary or precursors to traditional large interconnected and highly centralized systems. This includes but is not limited to AC, DC, AC/DC hybrid decentralized electrical energy system, such as distributed generation, distributed energy storage, dispatchable loads, virtual power plants and electrical energy systems having interaction with multiple types of distributed energy resources.

2 Normative references

There are no normative references in this document.