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Decentralized Multiple Energy Systems -
Part 1: General

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Decentralized Multiple Energy Systems - Part 1: General

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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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– revised.

INTRODUCTION

A Decentralized Multiple Energy System (DMES) integrates various forms of energy, such as electricity, water, heat or cold energy, gas, and hydrogen. By optimizing energy production, storage, distribution, and utilization, the DMES achieves efficient complementarity and collaborative management, enhancing the system's flexibility, reliability, and sustainability. Compared to centralized energy systems, the DMES is more suitable for the integration of distributed energy sources, offering significant advantages in addressing energy supply fluctuations and improving energy utilization. Furthermore, by providing customized energy solutions, the DMES can better satisfy the user demand in various application scenarios, such as industrial parks, urban communities, and remote areas.

Although a number of standards have been intensively established for different energy systems, there are still gaps in existing standards to guide the synergy and coordination of multiple energy systems due to the standard barrier between various industries. To address this issue, this report aims to analyse the applicability of existing standards in supporting the DMES development and identifying gaps and future standard needs.

1 Scope

This document presents general features, typical cases, and key technologies related to DMES. It analyses the existing standards and identifies the gaps and needs for DMES development from the perspectives of the equipment layer, the communication layer, the information layer, the management system layer, and the application layer. This document also provides information on future standardization needs in the area.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

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

– ISO Online browsing platform: available at https://www.iso.org/obp
– IEC Electropedia: available at http://www.electropedia.org/

3.2 Abbreviated terms

AD	anaerobic digester
AMI	advanced metering infrastructure
CCHP	combined cooling, heating, and power unit
CHP	combined heat and power
CIM	common information model
DMES	decentralized multiple energy system
EES	electrical energy storage
EMS	energy management system
EMS-API	energy management system application program interface
ESMS	energy storage management systems
HES	home electronic system
IIoT	industrial internet of things
LCA	life cycle analysis
P2G	power to gas
PV	photovoltaic
UPS	uninterruptible power systems
WWTP	wastewater treatment plant