

# TECHNICAL SPECIFICATION



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## Virtual power plants – Part 1: Architecture and functional requirements

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## VIRTUAL POWER PLANTS –

## Part 1: Architecture and functional requirements

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IEC TS 63189-1 has been prepared by subcommittee SC 8B: Decentralized electrical energy systems, of IEC technical committee TC 8: System aspects of electrical energy supply. It is a Technical Specification.

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

Draft	Report on voting
8B/124/DTS	8B/197/RVDTS

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 Specification 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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts in the IEC 63189 series, published under the general title *Virtual power plants*, can be found on the IEC website.

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## VIRTUAL POWER PLANTS –

### Part 1: Architecture and functional requirements

#### 1 Scope

This part of IEC 63189 covers the terms and definitions, system composition and control modes of virtual power plant (VPP). It defines the functional requirements for VPPs, including power generation forecasting, load forecasting, generation and consumption scheduling, control and management of energy storage devices and loads, coordinated optimization of distributed energy resources, status monitoring and communication, data collection and analysis, and market transactions.

Since a virtual power plant is a cluster of dispersed energy converting installations, which are aggregated, it uses additional systems to achieve its objectives (e.g. regional energy meteorology forecasting, site specific energy management systems, SCADA and other communication systems).

Local regulations, the electricity market model and the corresponding manner of organising the market related to the utilisation of controllable DER affect the management, control and operation of VPPs.

#### 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 60870-5-101, *Telecontrol equipment and systems – Part 5-101: Transmission protocols – Companion standard for basic telecontrol tasks*

IEC 60870-5-104, *Telecontrol equipment and systems – Part 5-104: Transmission protocols – Network access for IEC 60870-5-101 using standard transport profiles*

IEC 61000 (all parts): *Electromagnetic compatibility EMC*

IEC 61850 (all parts), *Communication networks and systems for power utility automation*

IEC 62351-3, *Power systems management and associated information exchange – Data and communications security – Part 3: Communication network and system security – Profiles including TCP/IP*

IEC TS 62351-5, *Power systems management and associated information exchange – Data and communications security – Part 5: Security for IEC 60870-5 and derivatives*