SLOVENSKI STANDARD
oSIST prEN IEC 62746-4:2024

01-februar-2024

Sistemski vmesnik med sistemom upravljanja z energijo odjemalca in sistemom upravljanja moči - Del 4: Vmesnik virov na strani povpraševanja

Systems interface between customer energy management system and the power management system - Part 4: Demand Side Resource Interface

Interface entre le système de gestion de l'énergie côté client et le système de gestion de puissance - Partie 4: Interface de ressources côté demande

Ta slovenski standard je istoveten z: **prEN IEC 62746-4:2023**

ICS:

29.240.30	Krmilna oprema za elektroenergetske sisteme	Control equipment for electric power systems

oSIST prEN IEC 62746-4:2024 **en**

57/2625/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62746-4 ED1**	
DATE OF CIRCULATION: **2023-12-08**	CLOSING DATE FOR VOTING: **2024-03-01**
SUPERSEDES DOCUMENTS: **57/2585/CD, 57/2605A/CC**	

IEC TC 57: POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE

SECRETARIAT: Germany	SECRETARY: Mr Heiko Englert
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 23K	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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TITLE:

Systems interface between customer energy management system and the power management system – Part 4: Demand Side Resource Interface

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SYSTEMS INTERFACE BETWEEN CUSTOMER ENERGY MANAGEMENT SYSTEM AND THE POWER MANAGEMENT SYSTEM –

Part 4: Demand Side Resource Interface

FOREWORD

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International Standard IEC 62746-4 ED1 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for the approval of this International Standard 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.

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.

The National Committees are requested to note that for this document the stability date is 20XX..

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

INTRODUCTION

The IEC 62746 series define interfaces between grid operator systems and systems located at residential, commercial, and industrial customer sites often referred to as Customer Energy Management Systems (CEMs).These interfaces are documented in detail in IEC 62746-3.

Customer owned resources may be a combination of load and generation that can respond to signals provided by grid and/or market operators. These resources may be identified and managed as individual resources with specific capabilities, or as virtual resources with an aggregated set of capabilities.

This document describes CIM profiles corresponding the Use Case described in Annex A.

Statements have been added to certain figures, tables, schemas, and enumerations throughout the document that indicate that they are reproduced with the permission of the UCA International User Group (UCAIug). These items are derived from the Common Information Model (CIM).

SYSTEMS INTERFACE BETWEEN CUSTOMER ENERGY MANAGEMENT SYSTEM AND THE POWER MANAGEMENT SYSTEM –

Part 4: Demand Side Resource Interface

1 Scope

1.1 Scope of full standard

The IEC 62746 series describes the interface between Customer Energy Management Systems (CEMs) and the grid management systems including those within Distribution System Operators (DSOs) and Transmission System Operators (TSOs). Each CEMS is designed to control resources associated with a residential, commercial, or industrial facility with the potential for a hierarchy of energy management systems.

Initial focus is on demand response and support for demand side management; later developments are expected to include storage resources as well as grid support services from new demand-side resources. The interface may also be applied to many types of communications, for example among multiple aggregators, or among an aggregator and multiple customers.

1.2 Scope of this document

This document is Part 4 of the IEC 62746 series and describes CIM profiles for Demand side Resource Interface, which is based on the Use Case shown in Annex A of this document.

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 62746-2:2015, Systems Interface between Customer Energy Management System and the Power Management System – Part 2: Use Cases and Requirements

IEC TS 62746-3:2015, Systems interface between customer energy management system and the power management system - Part 3: Architecture

IEC 61968-11:2013, Application integration at electric utilities - System interfaces for distribution management - Part 11: Common information model (CIM) extensions for distribution

IEC 61968-100:2013, System interfaces for distribution management – Part 100: Implementation Profiles

IEC 61970-301:2016, Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base

IEC 62325-301 Framework for energy market communications - Part 301: Common information model (CIM) extensions for markets.

IEC 62361-100, Power systems management and associated information exchange Interoperability in the long term – Part 100: CIM profiles to XML schema mapping

3 Terms, definitions, and acronyms

3.1 Term Definitions

For the purposes of this document the following term definitions apply:

3.1.1 Aggregation

Aggregation is the collection of the capabilities of multiple resources into a single Virtual Resource. A common use of aggregation is to collect many small resources and offer their capabilities in the form of a single larger resource to a market (IEC 62746-3)

3.1.2 Aggregator Energy Management System

A collection of hardware and/or software components which together act as an intermediary between a Service Procurement System and multiple Customer Energy Management Systems

3.1.3 Customer Energy Management System

A collection of hardware and/or software components which together coordinate the electricity usage and production among various Distributed Energy Resources

3.1.4 Distributed Energy Resource

Generators (with their auxiliaries, protection, and connection equipment), including loads having a generating mode (such as electrical energy storage systems), connected to a low-voltage or a medium-voltage network [www.electropedia.org]

3.1.5 Operator Role

The “upper” side of the DER communication chain, representing the entity which is responsible for procuring services and distributing operational controls and prices.

3.1.6 Resource Role

The “lower” side of the DER communication chain, representing the entity which is responsible for providing services and responding to operational controls and prices

3.1.7 Service Procurement System

A collection of hardware and/or software component which together procure services to make the electrical grid more reliable and/or less costly.

3.1.8 Technical Role

Actors defined by use cases have assigned roles with associated responsibilities. Technical roles are those roles that identify responsibilities associated with participation within information exchanges with other actors. Technical roles are physically realized through software and associated systems integration infrastructure. (IEC 62746-3)

3.1.9 Virtual Resource

A set of one or more physical resources that is represented as a single, aggregated resource. This may be comprised of multiple entities that may be geographically distributed. Virtual Resources can be an aggregated model of many types of load, generation and storage, such

as VPP, PV, factory, building, home, etc. Since the Virtual Resource can include both energy consumer and energy provider, the related “net load curve” can be positive (in this case the Virtual Resource acts as a consumer which consumes electrical power), or negative (in this case the Virtual Resource acts as generation assets to produce electrical power). (IEC 62746-3)

3.2 Acronyms

Table 1: List of Acronyms

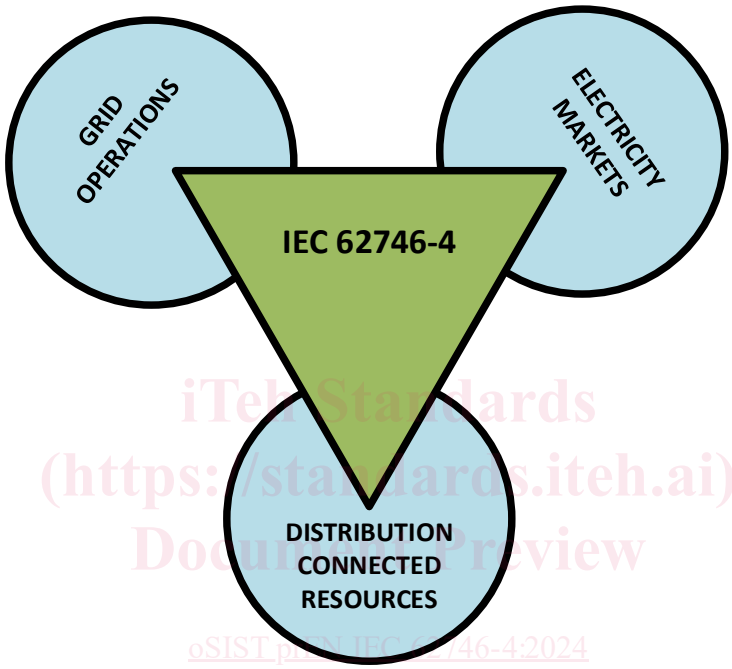
Acronym	Phrase
AEMS	Aggregator Energy Management System
CEMS	Customer Energy Management System
DER	Distributed Energy Resource
PV	Photovoltaic
SPS	Service Procurement System
UML	Unified Modeling Language
VPP	Virtual Power Plant
XML	Extensible Markup Language
XSD	XML Schema Definition

4 Reference and Information Models

4.1 General Approach

Communications between electricity markets and grid operations are enabled by shared modelling among three series of standards: IEC 61968, IEC 61970, and IEC 62325. However, none of these standards extend into the domain of controllable resources deployed on the distribution grid, and specifically to those resources “behind” the customer electricity meter. IEC 62746 remedies this situation by providing a set of message profiles designed to convey grid instructions, grid conditions, pricing signals, and resources capabilities among multiple parties within the emerging Distributed Energy Resource (DER) space.

Figure 1: IEC 62746-4 Representation



The communication requirements are challenging given the wide range of communicating parties, including:

- Electricity market operators,
- Transmission system operators (TSOs),
- Wholesale electricity service providers,
- Wholesale electricity service consumers,
- Distribution grid operators (DSOs),
- Service aggregators, and
- Electricity consumers

Additionally, there is a wide range of business processes which are established as well as many new models being devised. These processes include the communication of the time-varying changes in:

- Resource composition by grid location(s)
- Resource capability by market service
- Economic thresholds for service delivery/procurement
- Resource instructions/dispatches