



SLOVENSKI STANDARD
oSIST prEN IEC 62746-4:2024
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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

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SECRETARIAT: Germany	SECRETARY: Mr Heiko Englert
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 23K	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
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TITLE:

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

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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

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

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

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1

INTRODUCTION

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

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

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

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

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14 **SYSTEMS INTERFACE BETWEEN**
15 **CUSTOMER ENERGY MANAGEMENT SYSTEM AND**
16 **THE POWER MANAGEMENT SYSTEM –**

17 **Part 4: Demand Side Resource Interface**

18 **1 Scope**

19 **1.1 Scope of full standard**

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

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

30 **1.2 Scope of this document**

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

33 **2 Normative references**

34 The following documents are referred to in the text in such a way that some or all of their content
35 constitutes requirements of this document. For dated references, only the edition cited applies.
36 For undated references, the latest edition of the referenced document (including any
37 amendments) applies.

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

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

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

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

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

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

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

54 **3 Terms, definitions, and acronyms**

55 **3.1 Term Definitions**

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

57 **3.1.1 Aggregation**

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

61 **3.1.2 Aggregator Energy Management System**

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

64 **3.1.3 Customer Energy Management System**

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

67 **3.1.4 Distributed Energy Resource**

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

71 **3.1.5 Operator Role**

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

74 **3.1.6 Resource Role**

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

77 **3.1.7 Service Procurement System**

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

80 **3.1.8 Technical Role**

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

85 **3.1.9 Virtual Resource**

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

89 as VPP, PV, factory, building, home, etc. Since the Virtual Resource can include both energy
 90 consumer and energy provider, the related “net load curve” can be positive (in this case the
 91 Virtual Resource acts as a consumer which consumes electrical power), or negative (in this
 92 case the Virtual Resource acts as generation assets to produce electrical power). (IEC 62746-
 93 3)

94 3.2 Acronyms

95

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

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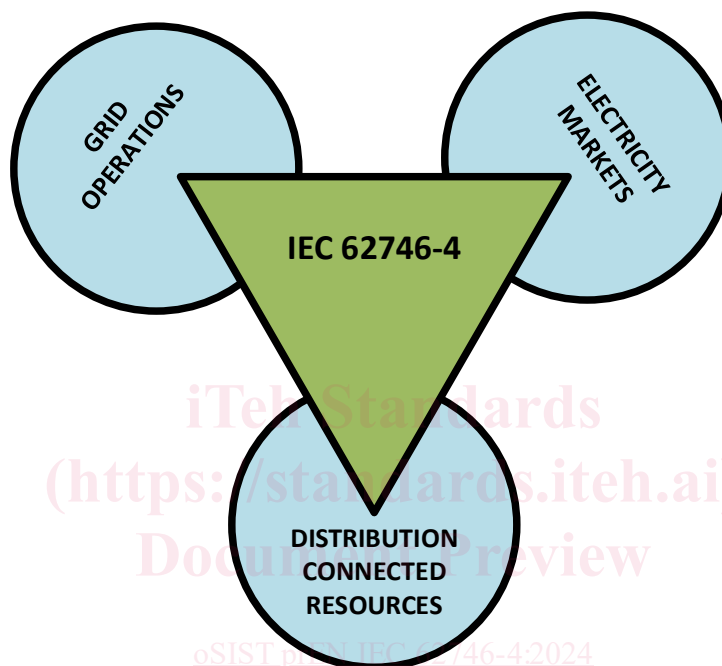
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98 4 Reference and Information Models

99 4.1 General Approach

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

107 **Figure 1: IEC 62746-4 Representation**



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

- 111 • Electricity market operators,
- 112 • Transmission system operators (TSOs),
- 113 • Wholesale electricity service providers,
- 114 • Wholesale electricity service consumers,
- 115 • Distribution grid operators (DSOs),
- 116 • Service aggregators, and
- 117 • Electricity consumers

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

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