SVENSK STANDARD SS-EN IEC 61850-7-420

Fastställd	Utgåva	Sida	Ansvarig kommitté
2022-02-16	2	1 (1+551)	SEK TK 57

Kommunikationsnät och system för kraftföretagsautomation – Del 7-420: Grundläggande kommunikationsstruktur – Logiska noder för decentraliserad elförsörjning

Communication networks and systems for power utility automation –
Part 7-420: Basic communication structure –
Distributed energy resources logical nodes

Som svensk standard gäller europastandarden EN IEC 61850-7-420:2021. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 61850-7-420:2021.

Nationellt förord

Europastandarden EN IEC 61850-7-420:2021

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61850-7-420, Second edition, 2021 - Communication networks and systems for power utility automation - Part 7-420: Basic communication structure - Distributed energy resources logical nodes**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61850-7-420, utgåva 1, 2010, gäller ej fr o m 2024-11-17.

ICS 33.200.00

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61850-7-420

November 2021

ICS 33.200

Supersedes EN 61850-7-420:2009 and all of its amendments and corrigenda (if any)

English Version

Communication networks and systems for power utility automation - Part 7-420: Basic communication structure - Distributed energy resources and distribution automation logical nodes (IEC 61850-7-420:2021)

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques - Partie 7-420: Structure de communication de base - Ressources énergétiques décentralisées et nœuds logiques d'automatisation de la distribution (IEC 61850-7-420:2021)

Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung - Teil 7-420: Grundlegende Kommunikationsstruktur-verteilte Energieerzeuger und und logische Knoten der Verteilungsautomation (IEC 61850-7-420:2021)

This European Standard was approved by CENELEC on 2021-11-17. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 61850-7-420:2021 E

European foreword

The text of document 57/2392/FDIS, future edition 2 of IEC 61850-7-420, prepared by IEC/TC 57 “Power systems management and associated information exchange” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61850-7-420:2021.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2022–08–17
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2024–11–17

This document supersedes EN 61850-7-420:2009 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 61850-7-420:2021 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61400-25-2 NOTE Harmonized as EN 61400-25-2

IEC 61850-7-410 NOTE Harmonized as EN 61850-7-410

IEC 62933 (series) NOTE Harmonized as EN IEC 62933 (series)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61557-12	2018	Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC - Equipment for testing, measuring or monitoring of protective measures - Part 12: Power metering and monitoring devices (PMD)	FprEN 61557-12[1]	2018
IEC/TS 61850-2	-	Communication networks and systems for power utility automation - Part 2: Glossary	-	-
IEC 61850-7-2	2010	Communication networks and systems for power utility automation - Part 7–2: Basic information and communication structure - Abstract communication service intervance (ACSI)	EN 61850-7-2	2010
/AMD1	2020		/A1	2020
IEC 61850-7-3	2010	Communication networks and systems for power utility automation - Part 7–3: Basic communication structure - Common data classes	EN 61850-7-3	2011
/AMD1	2020		/A1	2020
IEC 61850-7-4	2010	Communication networks and systems for power utility automation - Part 7–4: Basic communication structure - Compatible logical node classes and data object classes	EN 61850-7-4	2010
/AMD1	2020		/A1	2020
IEC/TS 62786	-	Distributed energy resources connection with the grid	-	-

[1] At draft stage.

IEEE 1547	2018	IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces	-	-
ISO 4217	-	Codes for the representation of currencies and funds	-	-
		Requirements for generating plants to be connected in parallel with distribution networks	EN 50549	series

IEC 61850-7-420

Edition 2.0 2021-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Communication networks and systems for power utility automation – Part 7-420: Basic communication structure – Distributed energy resources and distribution automation logical nodes

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques – Partie 7-420: Structure de communication de base – Ressources énergétiques décentralisées et nœuds logiques d'automatisation de la distribution

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.200

ISBN 978-2-8322-1019-0

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-420: Basic communication structure – Distributed energy resources and distribution automation logical nodes

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International standard IEC 61850-7-420 has been prepared by IEC Technical Committee 57: Power system control and associated communications.

This second edition cancels and replaces the first edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Generic approach of modelling to support any kinds of DER including generation, storage and controllable loads;
b) Generic approach to support physical and virtual aggregation of DERs;
c) Full support of a wide range of operational functions to cover in particular grid codes functions as expressed in IEEE 1547 and EN 50549 or IEC 62786.

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

FDIS	Report on voting
57/2392/FDIS	57/2403/RVD

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 International Standard 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/standardsdev/publications.

A list of all parts of the IEC 61850 series, under the general title: *Communication networks and systems for power utility automation*, can be found on the IEC website.This IEC standard includes Code Components i.e. components that are intended to be directly processed by a computer.

Such content is any text found in Annex A.

The purchase of this IEC standard carries a copyright license for the purchaser to sell software containing Code Components from this standard to end users either directly or via distributors, subject to IEC software licensing conditions, which can be found at: http://www.iec.ch/CCv1.

Table 1 shows all tracking information of IEC 61850-7-420:2019A namespace building-up.

Table 1 – Tracking information of IEC 61850-7-420:2019A namespace building-up

Attribute	Content
Namespace IEC specific information	
Version of the UML model used for generating the document (informative)	WG17build8
Date of the UML model used for generating the document (informative)	2021-09-09
Autogeneration software name and version(informative)	j61850DocBuilder 01v04 based on jCleanCim noNS beta8 (derived from jCleanCim 02-02)
Namespace Changes	
Version from which the list of Tissues is built	2009
Revision of the version from which the list of Tissues is built	A
List of Applied Tissues	642-646, 648, 651, 654, 666, 701, 703, 704, 888-889, 903-907, 916, 917, 921-923, 945-947, 955-960, 975-976, 978-989, 992-995, 999-1001, 1003-1006, 1008-1024, 1027-1028, 1031-1033, 1035, 1073-1074, 1087-1090, 1094-1115, 1124, 1126, 1132, 1134, 1153, 1158, 1182, 1183, 1206, 1210, 1215-1219, 1225, 1314, 1320, 1323, 1366, 1392-1394, 1414
Namespace History	
List of merged namespaces into this namespace release	IEC/TR 61850-90-7, IEC/TR 61850-90-9

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Increasing numbers of DER (distributed energy resources) systems are being interconnected to electric power systems throughout the world. As DER technology evolves and as the impact of dispersed generation on distribution power systems becomes a growing challenge – and opportunity – nations worldwide are recognizing the economic, social, and environmental benefits of integrating DER technology within their electric infrastructure.

The manufacturers of DER devices are facing the age-old issues of what communication standards and protocols to provide to their customers for monitoring and controlling DER devices, in particular when they are interconnected with the electric power system. In the past, DER manufacturers developed their own proprietary communication technology. However, as distribution system operators (DSOs), aggregators, and other energy service providers start to manage DER devices which are interconnected with the power system, they are finding that coping with these different communication technologies present major technical difficulties, implementation costs, and maintenance costs. Therefore, DSOs and DER manufacturers recognize the growing need to have one international standard that defines the communication and control interfaces for all DER devices. Such standards, along with associated guidelines and uniform procedures would simplify implementation, reduce installation costs, reduce maintenance costs, and improve reliability of power system operations.

The information concepts discussed in this document are focused on DERs, but may also be applicable to central-station generation installations that are comprised of groupings of multiple units of the same types of energy conversion systems that are covered in this document. This applicability to central-station generation is strongest for photovoltaics and fuel cells, due to their modular nature.

Communications for DER plants involve not only local communications between DER units and the plant management system, but also between the DER plant and the operators or aggregators who manage the DER plant as a virtual source of energy and/or ancillary services.

In particular, new DER functions are being defined, and in some cases, becoming mandatory. The mandatory "grid codes" have been defined by various groups in terms of power system interconnection and operational requirements. These grid codes have been assessed for the communication requirements which are included in this DER information model.

In basic terms and in this context, "communications" can be separated into four high-level parts:

- information modelling (the types of data to be exchanged – nouns),
- services modelling (the read, write, or other actions to take on the data – verbs),
- communication protocols (mapping the noun and verb models to actual bits and bytes),
- telecommunication media (fibre optics, radio systems, wireless systems, and other physical equipment)

The general technology for information modelling has developed to become well-established as the most effective method for managing information exchanges. In particular, the IEC 61850-7-x information models for the exchange of information have become International Standards for substation automation, for interaction with and between DER, for hydro plants and, by extension in IEC 61400-25-2, for wind power plants. Many of the new concepts developed in this document for DER can also be reused for information models in those other domains as well as for information models in new, yet-to-be-developed domains.

This document addresses the IEC 61850 information modelling for DER, although some types and aspects of DER information models have been developed or are being developed separately through technical reports before they are added to this international standard DER model. These consist of the following:

- IEC TR 61850-90-7: Object models for power converters in distributed energy resources (DER) systems – Its integration however has led to a quite in-depth re-assessment. So, from a functional perspective, functions originally covered by the IEC TR 61850-90-7 are now covered by this new edition of 61850-7-420, but in many cases the original LNs of IEC 61850-90-7 have been deprecated.
- IEC TR 61850-90-9: Use of IEC 61850 for Electrical Storage Systems

In the other way, logical nodes related to scheduling (DSCH, DSCC), originally published as part as IEC 61850-7-420:2009 have first been re-assessed within IEC TR 61850-90-10 and renamed FSCH and FSCC, and are now fully integrated into IEC 61850-7-4:2010+AMD1:2020. The coming IEC TR 61850-7-5 Edition 2[1] should provide some additional examples of case of use of these specific LNs.

Other IEC 61850 documents address the services modelling (IEC 61850-7-2) and the mapping to communication protocols (IEC 61850-8-x). In addition, systems configuration language (SCL) (IEC 61850-6) can already support in a very large extend the configuration of DER management systems, especially in the case of set of physically connected DERs.

This document provides an information model for DER that can be used in simple DER facilities as well as for more complex installations of multiple DER types with different resource capabilities, operational functions, and intra-facility interactions. This document provides significant information on how these interactions and functions are modelled, while IEC 61850-7-520 will provide additional use cases to help clarify the different interactions that this information model can support.

[1] Under preparation. Stage at the time of publication: IEC/ADTR 61850-7-5:2021.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-420: Basic communication structure – Distributed energy resources and distribution automation logical nodes

1 Scope

1.1 General

This part of IEC 61850 defines the IEC 61850 information models to be used in the exchange of information with distributed energy resources (DER) and Distribution Automation (DA) systems. DERs include distribution-connected generation systems, energy storage systems, and controllable loads, as well as facility DER management systems, including aggregated DER, such as plant control systems, facility DER energy management systems (EMS), building EMS, campus EMS, community EMS, microgrid EMS, etc. DA equipment includes equipment used to manage distribution circuits, including automated switches, fault indicators, capacitor banks, voltage regulators, and other power management devices.

The IEC 61850 DER information model standard utilizes existing IEC 61850-7-4 logical nodes where possible, while defining DER and DA specific logical nodes to provide the necessary data objects for DER and DA functions, including for the DER interconnection grid codes specified by various countries and regions.

Although this document explicitly addresses distribution-connected resources, most of the resource capabilities, operational functions, and architectures are also applicable to transmission-connected resources.

1.2 Published versions of this standard and related namespace name

Table 2 provides a reference between all IEC editions, amendments or corrigenda and the full name of the namespace:

Table 2 – Reference between published versions of the standard and related namespace name

Edition	Publication date	Webstore	Namespace NSD
Edition 1.0	2009-03	IEC 61850-7-420:2009	Not published
Edition 2.0 (this document)	2021-04	IEC 61850-7-420:2020	IEC 61850-7-420:2020

Detailed information on backward compatibility with Edition 1 are provided in Annex C.

1.3 Data model Namespace name and version

This new subclause is mandatory for any IEC 61850 namespace (as defined by IEC 61850-7-1:2011).

Table 3 shows all attributes of IEC 61850-7-420:2019A namespace.

Table 3 – Attributes of IEC 61850-7-420:2019A namespace

Attribute	Content
Namespace nameplate	
Namespace Identifier	IEC 61850-7-420
Version	2019
Revision	A
Release	4
Full Namespace Name	IEC 61850-7-420:2019A
Full Code Component Name	IEC_61850-7-420.NSD.2019A.Full
Light Code Component Name	IEC_61850-7-420.NSD.2019A.Light
Namespace Type	domain
Namespace dependencies	
includes	IEC 61850-7-4:2007B version:2007 revision:B

1.4 Data model Namespace Code Component distribution

This document is associated with Code components. Each Code Component is a ZIP package containing at least the electronic representation of the Code Component itself and a file describing the content of the package (IECManifest.xml).

The life cycle of a code component is not restricted to the life cycle of this document. The publication life cycle goes through two stages, "Version" (corresponding to an edition) and "Revision" (corresponding to an amendment). A third publication stage (Release) allows publication of Code Component in case of urgent fixes of InterOp Tissues, thus without need to publish an amendment.

Consequently, new release(s) of the Code Component(s) may be released, which supersede(s) the previous release, and will be distributed through the IEC web site at: http://www.iec.ch/tc57/supportdocuments.

The latest version/release of the document will be found by selecting the file for the code component with the highest value for VersionStateInfo, e.g. *IEC_61850-7-420.NSD.{VersionStateInfo}.Light*.

The Code Components associated with this document are reflecting the data model specified in this document formatted in NSD files as described in IEC 61850-7-7. They are available in light and full version:

- The full version is named: *IEC_61850-7-420.NSD.2019A.Full*. It contains definition of the whole data model defined in this document with the documentation associated and access is restricted to purchaser of this document.
- The light version is named: *IEC_61850-7-420.NSD.2019A.Light*. It does not contain any documentation but contains the whole data model as per full version, and this light version is freely accessible on the IEC website for download at: http://www.iec.ch/tc57/supportdocuments, but the usage remains under the licensing conditions.

The light version is freely accessible on the IEC website for download at: http://www.iec.ch/tc57/supportdocuments but its usage remains under the licensing conditions.

In case of any differences between the downloadable code and the IEC pdf published content, the downloadable code(s) is(are) the valid one; it may be subject to updates. See included history files.

1.5 Changes from IEC 61850-7-420:2009 (Edition 1)

This Edition 2 has added operational functions for many grid codes that have recently been identified as mandatory or necessary for specific operations. As a result, many deletions and modifications were made to LNs existing in Edition 1 since the change to defining operational functions caused many structural changes to the model. It is also expected that additional operational functions will be added as these are identified and better defined.

The new release of IEC 61850-7-420 includes all functions treated by IEC TR 61850-90-7, however with a different modelling approach.

Another change is the need to include different types of DER, in particular storage DERs (initially modelled in the IEC TR 61850-90-9 namespace, but this namespace is now deprecated.) and eventually controllable loads that can act as DERs.

In addition, the models for DERs needed to extend various modelling concepts since DERs are typically complex systems which are often aggregated and controlled locally by power management systems. These new concepts are discussed in more detail in Clause 3.

As a result, the Logical Nodes associated with DER plants and other higher level DER structures have been significantly altered. However, the Logical Nodes associated with individual types of DER, such as reciprocating engines, photovoltaic systems, fuel cells, and combined heat and power, have not been significantly modified.

1.6 IEC 61850-7-420 versus IEC 61850-7-520

In this document, Clause 1 covers the concepts and constructs for managing DERs that are needed to understand the IEC 61850 DER information model structure and methods. Subclause 4.3.1 and Clause 6 cover discussions of the DER resource components and the DER operational functions, while Annex A includes all of the detailed models for these two clauses. The remaining annexes cover additional modelling issues, modelling examples, a list of potential additional operational functions, and a bibliography.

The companion document, IEC 61850-7-520, will be updated to Edition 2 and will include additional supportive information such as use cases, system configuration language constructs for DER, example methods for implementing logical devices, various profiles of IEC 61850 data objects, and other implementation support.

1.7 Terminology due to historical usage of terms

Two types of terms used in this document have the same meaning but are derived from different types of DER for historical reasons.

- Generation and discharging
- Consuming and charging

In general, "generation" is associated with DER that supply energy e.g. a PV device, while "consuming" is generally associated with DER that use energy, e.g. loads. Storage devices both generate and consume energy, but the terms discharging and charging are usually used for historical reasons. Rather than trying to change the usage of these terms, this document attempts to recognize these differences in historical understanding, while still noting that the terms have the same meanings.

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 61557-12:2018, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 12: Power metering and monitoring devices (PMD)*

IEC TS 61850-2, *Communication networks and systems for power utility automation – Part 2: Glossary*

IEC 61850-7-2:2010, *Communication networks and systems for power utility automation – Part 7-2: Basic information and communication structure – Abstract communication service intervance (ACSI)*
IEC 61850-7-2:2010/AMD1:2020

IEC 61850-7-3:2010, *Communication networks and systems for power utility automation – Part 7-3: Basic communication structure – Common data classes*
IEC 61850-7-3:2010/AMD1:2020

IEC 61850-7-4:2010, *Communication networks and systems for power utility automation – Part 7-4: Basic communication structure – Compatible logical node classes and data object classes*
IEC 61850-7-4:2010/AMD1:2020

IEC TS 62786, *Distributed energy resources connection with the grid*

IEEE 1547:2018 (all parts), *IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces*

ISO 4217, *Codes for the representation of currencies and funds*

EN 50549 series, *Requirements for generating plants to be connected in parallel with distribution networks*