57/818/CDV

COMMITTEE DRAFT FOR VOTE (CDV)
PROJET DE COMITÉ POUR VOTE (CDV)

Project number Numéro de projet	IEC 61850-7-420 Ed.1	
IEC/TC or SC: **TC57** CEI/CE ou SC:		Secretariat / Secrétariat **Germany**
☒ Submitted for parallel voting in CENELEC Soumis au vote parallèle au CENELEC	Date of circulation Date de diffusion **2006-04-28**	Closing date for voting (Voting mandatory for P-members) Date de clôture du vote (Vote obligatoire pour les membres (P)) **2006-09-29**
Also of interest to the following committees Intéresse également les comités suivants TC 4/TC 8/TC 65/TC 82/TC 88/TC 95/TC 105 and ISO/TC 184/SC 5	Supersedes document Remplace le document 57/750/CD & 57/817/CC	

Functions concerned
Fonctions concernées

☐ Safety Sécurité	☐ EMC CEM	☐ Environment Environnement	☐ Quality assurance Assurance qualité

CE DOCUMENT EST TOUJOURS À L'ÉTUDE ET SUSCEPTIBLE DE MODIFICATION. IL NE PEUT SERVIR DE RÉFÉRENCE.

LES RÉCIPIENDAIRES DU PRÉSENT DOCUMENT SONT INVITÉS À PRÉSENTER, AVEC LEURS OBSERVATIONS, LA NOTIFICATION DES DROITS DE PROPRIÉTÉ DONT ILS AURAIENT ÉVENTUELLEMENT CONNAISSANCE ET À FOURNIR UNE DOCUMENTATION EXPLICATIVE.

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.

Title : Communication networks and systems in substations – Part 7-420: Communications systems for distributed energy resources (DER) - Logical nodes

Introductory note

The project number has been changed from 62350 to 61850-7-420, and the title has been adjusted in accordance.

The French National Committee will not provide a French translation for this project.

ATTENTION
VOTE PARALLÈLE
CEI – CENELEC

L'attention des Comités nationaux de la CEI, membres du CENELEC, est attirée sur le fait que ce projet de comité pour vote (CDV) de Norme internationale est soumis au vote parallèle.
Un bulletin de vote séparé pour le vote CENELEC leur sera envoyé par le Secrétariat Central du CENELEC.

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) for an International Standard is submitted for parallel voting.
A separate form for CENELEC voting will be sent to them by the CENELEC Central Secretariat.

Copyright © 2006 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

1906-2006 The electric century

Draft IEC 62350 *{Tentatively to be renumbered as IEC 61850 Part 7-420}*

Committee Draft for Vote (CDV1)

April 2006

Communications Systems for Distributed Energy Resources (DER)

Part IEC 61850 Part 7-420 DER Logical Nodes

Notes to this first Committee Draft for Vote (CDV1)

This is the first CDV for these DER object models, and reflects the many discussions with IEC TC57 WG10 and WG18 members over the last year. This draft was reviewed in the March 2006 meeting in Mérida, Mexico. As agreed there, this document will be issued as a CDV.

Additional versions will definitely follow this first CDV in order to model additional DER devices and subsystems or to make generally agreed upon corrections. In particular, no implementations or pilot projects have actually used the objects other than in two mapping laboratory tests. Therefore, these object models are not yet field-validated. However, this document does present IEC 61850 object models for DER devices that have been reviewed by a number of IEC and vendor groups, and are therefore considered as ready for review by a larger community.

In this first CDV, DER systems as a whole, and the “energy conversion” technologies of reciprocating engines (piston engines), fuel cells, and photovoltaic systems have been addressed in full. Combined heat and power (CHP) has been tentatively addressed, but requires significant review by CHP experts.

A number of Logical Nodes for metering and physical measurements are being proposed, but these will be reviewed in a larger context since they are not DER-specific. Additional CDCs have also been proposed.

A number of DER technologies have not been addressed at all yet. The decision was made not to wait on these other DER technologies before submitting the document for review, in order to get this basic information out to reviewers. Additional sections or possibly separate documents may be sent in the future as “domain experts” become available to discuss and provide the key data items that can be used to create the object models of these other DER technologies … Any support on these will be greeted with enthusiasm.

The working group would like to get substantive feedback on these object models: all comments and suggestions are welcome, from the editorial, to those related to modeling techniques, and to technical DER device issues.

The informative Annex A provides more information on the context of these object models.

Contents

Figures

Tables

INTERNATIONAL ELECTROTECHNICAL COMMISSION

Distributed Energy Resources (DER) Logical Nodes –

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organisation for standardisation comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardisation in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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 organisations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organisation for Standardisation (ISO) in accordance with conditions determined by agreement between the two organisations.
2) The formal decisions or agreements of the 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 National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

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.

This working draft of the International Standard IEC 61850 Part 7-xxx has been prepared by IEC technical committee 57: Working Group 17 on Distributed Energy Resources Object Modeling.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

INTRODUCTION

1 Scope (Informative)

The scope of this document is the specification of the object models of DER information that can be exchanged between DER devices and any systems which monitor, control, maintain, audit, and generally operate the DER devices. An informative Annex A titled "*Communications Systems for Distributed Energy Resources (DER) – Informative Annex on DER Modeling*" provides the background, identification of DER functions that will use these normative DER object model standards, and discussions as to how these object model standards will be used by different types of DER devices.

Simply put, "object models" are standardized formats or templates for exchanging data between different equipment or systems. Standard object models, combined with standard service models (methods for sending the data, e.g. report-by-exception, periodic, control commands) and standard protocols (the bits and bytes actually send over the communication channel), permit different systems to interact with minimal customization and greater interoperability. The combination of object model, service model, and protocol profiles can be termed the "information model".

These DER information models are based on open-system language, semantics, services, protocols, and architecture, which have been standardized by IEC 61850, but they include some extensions to IEC 61850. The DER object models will eventually be provided to the IEC as a draft set of object models for international standardization. In order to ensure the standardization process is simplified, these DER information models are compatible with IEC 61850, IEC61970 (CIM), IEC60870-5 (telecontrol protocol, which also formed the base for DNP), and IEC60870-6 (ICCP/TASE.2) standards.

The object models in this draft document are ready for trial use by vendors in order to provide feedback and updates. However, it must be understood that these are still draft object models and are subject to change.

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 who manage both the plant and the individual DER units. This is illustrated in Figure 1-1.

Although this document addresses only the IEC 61850 object models, additional modeling efforts will be needed for DER (and other domain areas) in the CIM/CFL areas.

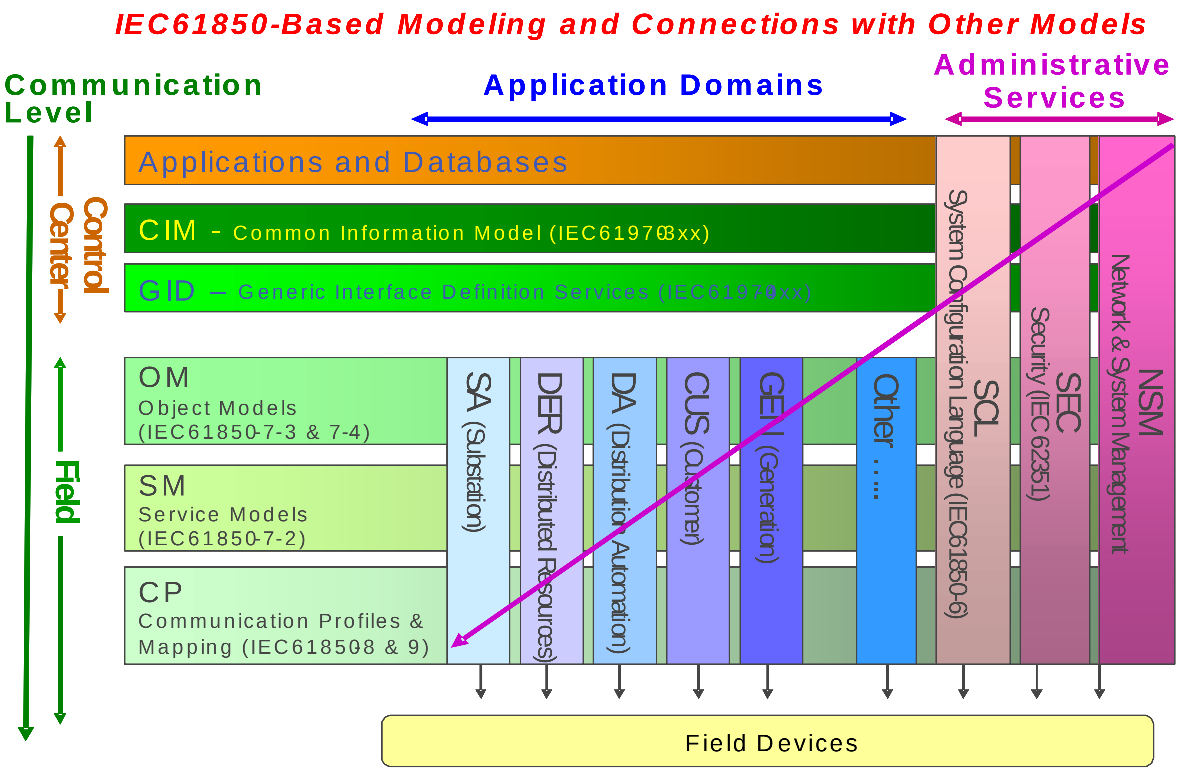

Figure 1-2: IEC 61850 Modeling and Connections with Other IEC TC57 Models

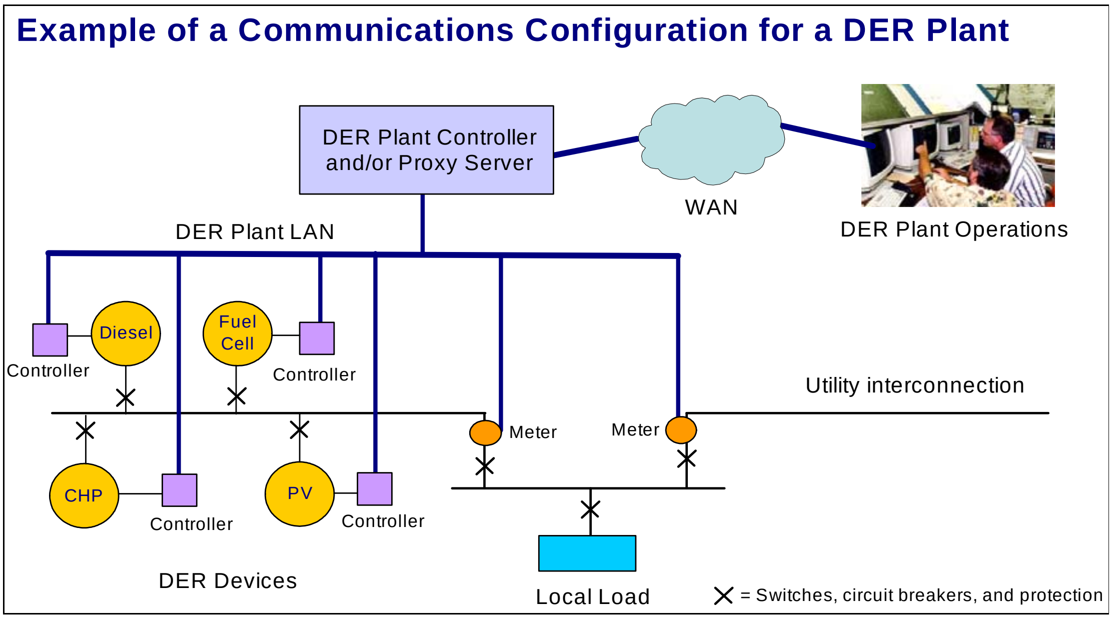

Figure 1-1: Example of a Communications Configuration for a DER Plant

There is a growing interest in implementing DER devices throughout the world. As the DER technology evolves, nations recognize 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 utility system. In the past, DER manufacturers developed their own proprietary communication technology. However, as utilities and other energy service providers start to manage DER devices which are interconnected with the utility power system, they are finding that coping with these different communication technologies present major technical difficulties, implementation costs, and maintenance costs. Therefore, utilities, DER manufacturers, and the customers they serve are increasingly interested in having one international standard that would define 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.

At the same time, the object modeling technology has developed within the last few years to become well-established as the most effective method for managing information exchanges. In particular, the IEC 61850 object models for the exchange of information within substations have moved through the standardization process, and are now formally designated as the IEC 61850 International Standard. Many of the components of this standard can be reused for object models of other types of devices. Some new components are also needed, but these can follow the rules for creating these new components, thus making them compatible with the existing IEC 61850 standards.

The interrelationship between IEC TC57 modeling standards is illustrated in Figure 1-2.This illustration shows as horizontal layers the three components to an information exchange model for retrieving data from the field, namely, the communication protocol profiles, the service models, and the object models. Above these layers is the information model of utility-specific data, termed the Common Information Model (CIM), as well as all the applications and databases needed in utility operations. Vertically, different areas are shown: substation automation, DER, distribution automation, customer services, generation (including large hydro plants), etc.