Scope: Elc = Electrical, 1 = Physical, 2 - 7 = OSI Stack, Sv = Abstract services, Sm = Semantic Model, Bu = Business policy/procedures, In = Introductory, Cs = Cybersecurity, Gu = Guidelines, Tst = Testing

Type: Std = Standard, IS = International Standard, TS = Technical Specification, Rd2 = Second Edition, Rec = Recommended Practice, TR = Technical Report, DTR = Draft Technical Report, Und = Under development, Pl = Planned, Ob = Obsolete

Security technologies generally applicable only to OSI Layers

	Standard	Status	Elc	1	2	3	4	5-7	Sv	Sm	Bu	In	Cs	Gu	Tst	Brief Description	Domain	Security References	NISTIR Interfaces	SGCC (CSWG) Recommendations	Comments & Issues
1	ANSI/ASHRAE 135-2008/ISO 16484-5 BACnet - A Data Communication Protocol for Building Automation and Control Networks	Std			X	X	X	X		X						BACnet defines an information model and messages for building system communications at a customer's site. BACnet incorporates a range of networking technologies, using IP protocols, to provide scalability from very small systems to multi-building operations that span wide geographic areas.	Customer: Building appliances	None	U44, U43		
2	ANSI C12.1	Std		X											X	Performance- and safety-type tests for revenue meters.	Customer: metering		U64, U24		
3	ANSI C12.18/IEEE P1701/MC1218	Std		X												Transport of measurement device data over telephone networks.	Customer: metering		U64, U24		
4	ANSI C12.19/MC1219	Std								X						Revenue metering End Device Tables.	Customer: metering		U64, U24		
5	ANSI C12.20	Std		X											X	Revenue metering accuracy specification and type tests.	Customer: metering		U64, U24		
6	ANSI C12.21/IEEE P1702/MC1221	Std		X												Protocol and optical interface for measurement devices.	Customer: metering		U64, U24		
7	ANSI C12.22	Std			X	X	X						X			Metering protocol	Customer: metering	Listed in ANSI C12.22	U64, U24		
8	ANSI/CEA 709 and CEA 852.1 LON Protocol Suite:				X	X	X									This is a general purpose local area networking protocol in use for various applications including electric meters, street lighting, home automation, and building automation.	Customer: metering, appliances	??	U44, U120		
9	ANSI/CEA 709.1-B-2002 Control Network Protocol Specification				X	X	X									Overall network specification	Customer	??	U44		
10	ANSI/CEA 709.2-A R-2006 Control Network Power Line (PL) Channel Specification			X												This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.	Customer	??	U44		
11	ANSI/CEA 709.3 R-2004 Free-Topology Twisted-Pair Channel Specification			X												This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.	Customer	??	U44		
12	ANSI/CEA-709.4:1999 Fiber-Optic Channel Specification			X												This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.	Customer	??	U44		
13	CEA-852.1:2009 Enhanced Tunneling Device Area Network Protocols Over Internet Protocol Channels				X	X	X									This protocol provides a way to tunnel local operating network messages through an IP network using the User Datagram Protocol (UDP), thus providing a way to create larger internetworks.	Customer	??	U44		
14	IEEE 1815 (DNP3) Serial	Std			X	X	X	X		X						This document specifies the DNP3 protocol structure, functions, and application alternatives. In addition to defining the structure and operation of DNP3, the standard defines three application levels that are interoperable. The simplest application is for low-cost distribution feeder devices, and the most complex is for full-featured master stations. The intermediate application level is for substation and other intermediate devices. The protocol is suitable for operation on a variety of communication media consistent with the makeup of most electric power communication systems. The simpler version addresses *serial* links for substation and feeder device automation, as well as	Distribution, Transmission	IEC 62351-5, ISO/IEC 9798-4	U65, U117, U108, U137, U112, U82, U81, U111		
15	IEEE 1815:2012 (DNP3) Network	Std						X		X			X			This standard is used for *networks* for substation and feeder device automation, as well as for communications between control centers and substations.	Distribution, Transmission	IEC 62351-5, IEC 62351-3, ISO/IEC 9798-4	U65, U117, U108, U137, U112, U82, U81, U111		
16	IEEE 1815.1 Draft Standard for Exchanging Information between networks Implementing IEC 61850 and IEEE 5 Std 1815 (DNP3)	Und								X						This document specifies the mapping rules for building and configuring a system using both IEC 61850 and IEEE 1815 (DNP3) protocols by utilizing gateways in-between IEC 61850 and DNP3 devices / subsystems. The objective is to enable operational run-time data exchange among these devices / subsystems, and to automate the configuration of a gateway as much as possible. Within the capability of each protocol, some configuration attributes (IEC 61850 attributes with functional constraint CF) are also mapped in addition to the operational real-time data. The rules specified in this document are based on the published standards, and will not make any proposed changes to either standard. It does not specify any rules for a 61850 device to directly communicate with an IEEE 1815 device and vice versa, except	Distribution, Transmission, Generation (DER)	??	U65, U117, U108, U137, U112, U82, U81, U111		
17	IEC 60870-6 / TASE.2 / ICCP Part 503 TASE.2 Services and protocol	IS Ed2 2002						X	X							This part of IEC 60870 specifies a method of exchanging time-critical control centre data through wide-area and local-area networks using a full ISO compliant protocol stack. It contains provisions for supporting both centralized and distributed architectures. This standard includes the exchange of real-time data indications, control operations, time-series data, scheduling and accounting information, remote program control and event notification. Though the primary objective of TASE.2 is to provide control centre (telecontrol) data exchange, its use is not restricted to control centre data exchange. It may be applied in any other domain having comparable requirements. Examples of such domains are power plants, factory automation, process control automation, and others.	Transmission, Distribution	IEC 62351-3, IEC 62351-4	U115, U83, U89, U116, U56, U80		
18	IEC 60870-6-702 Functional profile for providing the TASE.2 application service in end systems	IS 1998						X								This profile for telecontrol application service element (TASE.2, also known as inter-control centre communications protocol, ICCP) is an application-class profile (A-profile) providing communications capabilities to control centre applications. The TASE.2 in the application layer is specified in IEC 60870-6-503. The present standard refines the application layer protocol to meet interoperability requirements and specifies requirements on the presentation and session layers support for TASE.2. TASE.2 operates in a connection mode, so this A-profile	Transmission, Distribution				
19	IEC 60870-6 / TASE.2 / ICCP Part 802 TASE.2 Object models	IS Ed2 2005								X						This standard defines the object models for TASE.2/ICCP data. These object models are simple, being based on typical SCADA data types with analog, digital, and state points. Therefore there are 3 basic SCADA object models: indication point, control point, and protection equipment event point. Additional object models are defined for some specific types of data, such as wheeling, accounting information,	Transmission, Distribution	IEC 62351-3, IEC 62351-4	U115, U83, U89, U116, U56, U80		
20	IEC 61850-1 Introduction and Overview	TR 2003										X				The IEC 61850 series of standards define object models, abstract services, and mappings to communications protocols for field devices and systems. The scope of IEC 61850 includes information exchanges within substations, for protective relaying, between substations, between substations and control centers, within hydro power plants, for distribution automation, for managing distributed energy resources (generation and storage), and for managing charging of electric vehicles.	Transmission & Distribution Substations, Generation (DER), Electric Vehicles	IEC 62351-3, IEC 62351-4, IEC 62351-6, IEC 61850-8			See IEC 62351 for details on these security standards
21	IEC 61850-2 Glossary	TS 2003										X				This part contains the glossary of specific terminology and definitions used in the context of Substation Automation Systems within the various parts of the standard	T&D Substations				
22	IEC 61850-3 General requirements	IS 2002									X		X			The specifications of this part pertain to the general requirements of the communication network, with emphasis on the quality requirements, such as reliability, availability, maintainability, security, data integrity and others that apply to the communication systems that are used for monitoring, configuration and control of processes within the substation. It also deals with guidelines for environmental conditions and auxiliary services, with recommendations on the relevance of specific requirements from other standards and specifications.	T&D Substations				This document identifies denial of service and illigitimate use (e.g. unauthorized use) as the two main security issues for substation automation.
23	IEC 61850-4 System and project management	IS 2002									X					The specifications of this part pertain to the system and project management with respect to the engineering process and its supporting tools; the life cycle of the overall system and its IEDs; and the quality assurance beginning with the development stage and ending with discontinuation and decommissioning of the SAS and its IEDs	T&D Substations				
24	IEC 61850-5 Communication requirements for functions and device models	IS 2003									X					This part defines the communication requirements for functions and device models for substations. The functions of a substation automation system (SAS) refer to tasks, which have to be performed in the substation. These are functions to control, monitor and protect the equipment of the substation and its feeders. In addition, there exist functions, which are needed to maintain the SAS, i.e. for system configuration, communication management or software management. However, since substation configurations can vary significantly while interoperability is still desired, the communication requirements need to be flexibly but clearly defined. Specifically, the goal for interoperability for devices from different suppliers implies the following aspects: a) the devices shall be connectable to a common bus with a common protocol (syntax); b) the devices shall understand the information provided by other devices (semantics); c) the devices	T&D Substations				
25	IEC 61850-6 Ed2 System Configuration Language (SCL)	IS Ed2 2009								X						This part specifies a file format for describing communication-related IED (Intelligent Electronic Device) configurations and IED parameters, communication system configurations, switch yard (function) structures, and the relations between them. The main purpose of this format is to exchange IED capability descriptions, and SA system descriptions between IED engineering tools and the system engineering tool(s) of different manufacturers in a compatible way. The defined language is called System Configuration description Language (SCL). The IED and communication system model in SCL is XML-based and is according to IEC 61850-5 and IEC 61850-7-x. Some aspects may need to be updated for the 7-4xx parts. Implementations of SCL tools by vendors are the primary method for implementing IEC 61850, providing interoperability across vendors and standardized methods for coordinating the information structures and services across multiple devices and systems. Some aspects of	T&D Substations		U81, U135		

26	IEC 61850-7-1 Basic communication structure - Principles and models	IS Ed2 2011											X		This part of the IEC 61850 series is intended for all stakeholders of standardized communication and standardized systems in the utility industry. It provides an overview of and an introduction to the abstract models and services in IEC 61850-7-4, IEC 61850-7-3, IEC 61850-7-2, IEC 61850-6, and IEC 61850-8-1. This part of the IEC 61850 series uses simple examples of functions to describe the concepts and methods applied in the IEC 61850 series and describes the relationships between other parts of the IEC 61850 series. Finally this part defines how interoperability is reached.	Substations and other field equipment: Hydro plants, DER, DA, EV				
27	IEC 61850-7-2 Ed2 Communication networks and systems for power utility automation – Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI)	IS Ed2 2010							X						This part defines the abstract communication service interface (ACSI) for use in the utility application domain that requires real-time cooperation of intelligent electronic devices. The ACSI has been defined so as to be independent of the underlying communication systems. Specific communication service mappings1) (SCSM) are specified in IEC 61850-8-x and IEC 61850-9-x. It covers the following abstract messaging services: • Real-time data access and retrieval • Device control • Reporting by exception • Event logging • Publish/subscribe • Self-description of devices (device data dictionary) • Data typing and discovery of data types	Substations and other field equipment: Hydro plants, DER, DA, EV	IEC 62351-3, IEC 62351-4, IEC 62351-6, IEC 62351-8	Between multiple Actor 46s: Transmission IED		
28	IEC 61850-7-3 Common Data Classes (CDCs)	IS Ed2 2010								X					This part specifies the hierarchy of abstract classes, starting with standard data types, "constructed attribute", and common data classes (CDCs) which can be used to build data objects within Logical Nodes contained in Logical Devices (see Figure 1). In particular, this part specifies the names and structures for: • Standard data types (e.g. integers, floating points, binary, etc.) • Attribute types (e.g. quality codes) • CDCs for status information (e.g. value, quality code, and timestamp) • CDCs for measured information • CDCs for control • CDCs for status settings	Substations and other field equipment: Hydro plants, DER, DA, EV		Between multiple Actor 46s: Transmission IED		
29	Communication networks and systems for power utility automation – Part 7-4: Basic communication structure – Compatible logical node classes and data object classes	IS Ed2 2010								X					This part specifies the abstract information model of devices and functions, consisting of data objects contained in Logical Nodes (LNs). This part was initially just for substation automation, but has been expanded to include the common Logical Nodes used in many different domains, including: • Intra-substation information exchanges • Substation-to-substation information exchanges • Substation-to-control centre information exchanges • Power plant-to-control centre information exchanges • Information exchange for distributed generations • Information exchange for distributed automations • Information exchange for metering. This part also specifies normative naming rules for multiple instances and private, compatible extensions of logical node (LN) classes and	Substations and other field equipment: Hydro plants, DER, DA, EV		Between multiple Actor 46s: Transmission IED		
30	IEC 61850-7-410 Hydroelectric power plants	IS 2007								X					This part specifies the additional common data classes, logical nodes and data objects required for the use of IEC 61850 in a hydropower plant. The Logical Nodes and Data Objects address the following functions: • Electrical functions. This group includes LN and DO used for various control functions, essentially related to the excitation of the generator. New LN and DO defined within this group are not specific to hydropower plants; they are more or less general for all types of larger power plants. • Mechanical functions. This group includes functions related to the turbine and associated equipment. The specifications of this document are intended for hydropower plants, modifications might be required for application to other types of generating plants. Some more generic functions are though defined under Logical Node group K. • Hydrological functions. This group of functions includes objects related to water flow, control and management of reservoirs and dams. Although specific for hydropower plants, the LN and DO defined here can also be used for other types of utility water management systems.	Hydro plants		Between Actor 1 components: Plant Control System		
31	IEC 61850-7-420 Communication networks and systems for power utility automation – Part 7-420: Basic communication structure – Distributed energy resources logical nodes	IS 2009								X					This part defines the IEC 61850 information models (Logical Nodes, Data Objects, and Common Data Classes) to be used in the exchange of information with distributed energy resources (DER), which comprise dispersed generation devices and dispersed storage devices, including • Reciprocating engines • Fuel cells • Photovoltaic systems • Combined heat and power • Batteries The DER information model standard utilizes existing IEC 61850-7-4 logical nodes where possible, but also defines DER-specific logical nodes where needed. This standard will be updated to Edition 2 after Technical Reports of different new DER types and capabilities are issued – see IEC 61850-90-	Distributed Energy Resources (DER)		U130, U45, U32, U88, U92, U95, U137, U65		
32	IEC 61850-7-5 IEC 61850 modeling concepts	Und										X		X	This part will contain the general concepts and guidelines for modeling with IEC 61850, while the 7-5xx parts will provide the guidelines for modeling specific applications.					
33	IEC 61850-7-500 Guidelines for using LNs to model substations functions	Und												X	Guidelines for using IEC 61850 LNs in Substations. Still being drafted	T&D Substations				
34	IEC 61850-7-510 Guidelines for using LNs to model hydroelectric power plant functions	Und												X	Guidelines for using IEC 61850 LNs in Hydro plants -Still being drafted	Hydro plants				
35	IEC 61850-7-520 Guidelines for using LNs to model Distributed Energy Resources (DER) functions	Und												X	Guidelines for using IEC 61850 LNs in DER - Currently a rough white paper	DER				
36	IEC 61850-8-1 Mapping ACSI to MMS (ISO/IEC 9506) and Ethernet (ISO/IEC 8802-3)	IS 2004			X			X							This part is intended to provide inter-device operation of a variety of substation and other field devices to create and exchange concrete ("bits-and-bytes") communication messages by mapping the abstract services (ACSI, specified in IEC 61850-7-2) and the abstract logical nodes and common data models (specified in IEC 61850-7-4 and IEC 61850-7-3) to the Manufacturing Messaging Specification (MMS) over Ethernet. This standard also defines additional protocols for the mapping of time-critical information exchanges (GOOSE messages, specified in IEC	All 61850 domains	IEC 62351-4	All interfaces with field devices		
37	IEC 61850-9-1 Sampled values over serial unidirectional multidrop point-to-point link	IS 2003			X	X		X							This part specifies a mapping of the abstract service for the transmission of sampled values (as defined in IEC 61850-7-2) on a serial unidirectional multidrop point to point link. Sampled values are rapidly sampled measurements typically from current and voltage transformer (CTs and PTs) that are used by substation equipment such as protection relays	T&D Substations	IEC 62351-6			
38	IEC 61850-9-2 Mapping sampled values over Ethernet (ISO/IEC 8802-3)	IS 2004			X	X		X							This part specifies a mapping of the abstract service for the transmission of sampled values (as defined in IEC 61850-7-2) on Ethernet. Sampled values are rapidly sampled measurements typically from current and voltage transformer (CTs and PTs) that are used by substation equipment such as protection relays	T&D Substations				
39	IEC 61850-10 Conformance testing	IS 2005												X	This part of IEC 61850 specifies standard techniques for testing of conformance of implementations, as well as specific measurement techniques to be applied when declaring performance parameters. In general, conformance testing of the communication behavior of an IED should address the functional requirements and performance requirements of typical applications supported by these devices in substation automation. IEC 61850-4 defines a general classification of quality tests, which are used within this part. This part of IEC 61850 defines: • The methods and abstract test cases for conformance testing of devices used in substation automation systems	T&D Substations				
40	IEC 61850-80-1 Guideline to exchange information from CDC-based model using IEC 60870-5 101/104	TS 2008											X		This technical specification gives a guideline on how to exchange information from a CDC-based data model (for example IEC 61850) while using IEC 60870-5-101 or IEC 60870-5-104 between substation(s) and control center(s). Mostly guidelines for functions needed in a substation gateway device are given	European, since this is a mapping to IEC 610870-5	IEC 62351-5			

41	IEC 61850-90-1 Using IEC 61850 between substations	TR 2010									X			X		This part provides a comprehensive overview on the different aspects that need to be considered while using IEC 61850 for information exchange between substations, such as for distance relaying. In particular, this technical report: • Defines use cases that require an information exchange between substations; • Describes the communication requirements; • Gives guidelines for the communication services and communication architecture to be used; • Defines data as a prerequisite for interoperable applications; • Does not define implementations which guarantee interoperability between different IEDs; • Describes the usage and enhancements of the configuration language SCL.	T&D Substations distance relaying	IEC 62351-3, IEC 62351-6	Between multiple Actor 46s: Transmission IED		
42	IEC 61850-90-2 Using IEC 61850 between substations and control centres	TR - Und			X	X	X	X								This technical report provides a comprehensive overview of the different aspects that need to be considered while using IEC 61850 for information exchange between substations and control centres or other system level applications. In particular, this technical report: - defines use cases that require an information exchange between substations and control centres - describes the communication requirements - gives guidelines for the selection of communication services and architectures compatible with IEC 61850 - describes the modelling aspects, including compatibility with IEC 61970-301 - describes the usage of the configuration language of IEC 61850-6 - describes the engineering workflow	T&D Substations	IEC 62351-3, IEC 62351-4, IEC 62351-6	U81, U82		
43	IEC 61850-90-3 Using IEC 61850 for condition monitoring	TR - Und												X		This part develops the use cases and requirements for defining the logical nodes needed for condition monitoring. This first step is taken to ensure that any changes to existing LNs are warranted, and to then add new LNs as necessary.	Substations and other field equipment: Hydro plants, DER, DA, EV		U81, U82, U117, U109, U67, U135, U136		
44	IEC 61850-90-4 Network engineering guideline	TR - Und												X		This Technical Report provides guidelines for the engineering of Ethernet networks within substations	T&D Substations		Between multiple Actor 46s: Transmission IED		
45	IEC 61850-90-5 Using IEC 61850 for transmitting synchrophasor data, based on IEEE C37.118	DTR								X			X			The primary scope of this document is to provide a way of exchanging synchrophasor data between PMUs, PDCs WAMPAC (Wide Area Monitoring, Protection, and Control), and between control center applications. The data, to the extent covered in IEEE C37.118-2005, is transported in a way that is compliant to the concepts of IEC 61850. However, given the primary scope and use cases, this document also provides routable profiles for IEC 61850-8-1 GOOSE and IEC 61850-9-2 SV packets. These routable packets can be utilized to transport data	Synchrophasor	Included in IEC 61850-90-5	U79		See Tab on 90-5 for details
46	IEC 61850-90-6 Using IEC 61850 for distribution automation	TR - Und								X				X		This Technical Report contains use cases for distribution automation to determine what if any modifications or additions are needed to substation LNs.	Distribution automation		U117, U3, U109		
47	IEC 61850-90-7 Using IEC 61850 for inverter functions	TR expected 2011								X				X		This Technical Report describes the functions for inverter-based Distributed Energy Resources (DER) devices, including photovoltaic systems (PV), battery storage systems, electric vehicle (EV) charging systems, and any other DER with a controllable inverter. It then defines the IEC 61850 information models to be used in the exchange of information between these inverter-based DER devices and the utilities, Energy Service Providers (ESPs), or other entities. The inverter functions covered include: • Immediate control functions for inverters, such as connect/disconnect, adjust maximum generation level up/down, charge/discharge storage, request action through pricing signal • Volt-var management modes to provide curves for autonomous actions by inverters to modify vars based on local voltage levels • Frequency-watt management modes to provide curves for autonomous actions by inverters to modify active power on high or low frequency • Dynamic grid support during abnormally high or low voltage levels to provide volt-var support during abnormally high or low voltage levels • Functions for "must disconnect" and "must stay connected" to provide curves indicating how long inverters must stay connected during voltage anomalies • Watt-power factor management modes to modify power factor based on the watts being output • Voltage-watt management modes to smooth voltage deviations by watt management, including charging/discharging storage	DER systems with inverters		U130, U45, U32, U88, U92, U95, U137, U65		
48	IEC 61850-90-8 Using IEC 61850 for electric vehicle chargers	TR - Und								X				X		This Technical Report describes the background and modeling of new logical nodes and data objects for Electric Vehicle Supply Equipment (EVSE) chargers, including the Electric Vehicle (EV), when it is plugged in. The main focus for this technical report is to describe how the existing standardization work for Electric Road Vehicles and Vehicle-to-Grid (V2G) Communication Interfaces can be linked to the IEC 61850-7-420 standards for Distributed Energy Resources. The basic information modeling in IEC 61850 and IEC 61850-7-420 can cover a lot of the needs for EVSE (EV) and the missing parts can easily be modeled as new logical nodes and data objects.	Electric vehicles		U49, U62, U32, U88, U92, U95		
49	IEC 61850-90-9 Using IEC 61850 for batteries	TR - Und								X				X		This Technical Report describes the requirements and logical nodes needed to model DER Storage Batteries	DER Storage Batteries		U130, U45, U32, U88, U92, U95, U137, U65		
50	IEC 61850-90-10 IEC 61850 scheduling functions	TR - Und								X				X		This Technical Report describes the requirements and logical nodes needed for modeling scheduling, to be used for scheduling the energy and ancillary services of DER systems, as well as other intelligent field devices.	Scheduling		U130, U45, U49, U62 U32, U88, U92, U95, U137, U65		
	IEC 61400-25-1 Overall description of principles and models	IS 2006										X				The focus of the IEC 61400-25 series is on the communications between wind power plant components such as wind turbines and actors such as SCADA systems. Internal communication within wind power plant components is outside the scope of the IEC 61400-25 series. The IEC 61400-25 series is designed for a communication environment supported by a clientserver model. Three areas are defined, that are modelled separately to ensure the scalability of implementations: 1) wind power plant information models, 2) information exchange model, and 3) mapping of these two models to a standard communication profile.	Wind power				
51	IEC 61400-25-2 Communications for monitoring and control of wind power plants – Information models	IS 2006								X						IEC 61400-25-2 specifies the information model of devices and functions related to wind power plant applications. In particular, it specifies the compatible logical node names, and data names for communication between wind power plant components. This includes the relationship between logical devices, logical nodes and data. The names defined in the IEC 61400-25 series are used to build the hierarchical object references applied for communicating with components in wind power plants. This part of IEC 61400-25 specifies common attribute types, common data classes, data objects, and logical nodes related to wind turbine applications. In particular it specifies (nouns): • Setpoint values • Status values • Alarms • Commands • Event counting • State timing • Alarm set status	Wind power				Although these object models are labeled "61400" they are actually IEC 61850 models. It is expected that the next edition will reflect that.
	IEC 61400-25-3 Information exchange models	IS 2006							X							This part of IEC 61400-25 provides the information exchange models that can be applied by a client and a server to access the content and structure of the wind power plant information model defined in IEC 61400-25-2. These services are equivalent to IEC 61850-7-2 ACSI.	Wind power				
52	IEC 61400-25-4 Mapping of 61850 services to web services, DNP3, OPC-UA	IS 2008			X	X	X	X	X							The mapping of the information model defined in IEC 61400-25-2 and information exchange model, defined in IEC 61400-25-3, are specified in this part of IEC 61400-25 with specific mappings given in five Annexes: • Mapping to web services • Mapping to OPC XML-DA • Mapping to IEC 61850-8-1 MMS • Mapping to IEC 60870-5-104	Wind power				
	IEC 61400-25-5 Conformance testing	IS 2006													X	This part of IEC 61400-25 specifies standard techniques for testing of conformance of implementations, as well as specific measurement techniques to be applied when declaring performance parameters. The use of these techniques will enhance the ability of users to purchase systems that integrate easily, operate correctly, and support the applications as intended.	Wind power				
	IEC 61400-25-6 Logical node classes and data classes for condition monitoring	IS 2010								X						This part of the IEC 61400-25 series specifies the information models related to condition monitoring for wind power plants and the information exchange of data values related to these models.	Wind power				

53	IEC 61968-1 Interface architecture and general requirements	IS 2003										X				The IEC 61969 series of CIM-based standards define requirements, integration architecture, and interfaces for the major elements of a utility's Distribution Management System (DMS) and other associated external IT systems within the utility enterprise. The IEC 61968 series is intended to facilitate inter-application integration of the various distributed software application systems supporting the management of utility electrical distribution networks within a utility's enterprise systems environment. The IEC 61968 series of standards supports this integration by developing information exchange standards using the Common Information Model (CIM), normative message structures, additional normative parameters, and informative recommendations and examples. Standard interfaces are being defined for each class of applications identified in the IEC 61968-1 Interface Reference Model (IRM). A series of normative CIM-based XML message payloads have been and are being defined for each Part. This set of standards is limited to the definition of interfaces and is implementation independent. They provide for interoperability among different computer systems, platforms, and languages. Methods and technologies used to implement functionality conforming to these	Distribution	No security requirements are defined for any part of IEC 61968 since this series of standards addresses only CIM abstract object models			
54	IEC 61968-2 Glossary	IS 2003												X		This part of IEC 61968 identifies and explains terms and abbreviations used in the remaining parts of IEC 61968.	Distribution				
55	IEC 61968-3 Interface for network operations	IS 2004, Und as Ed2								X						This part specifies the information content of a set of message types that can be used to support many of the business functions related to network operations. Typical uses of the message types defined in this part include data acquisition by external systems, fault isolation, fault restoration, trouble management, maintenance of the plant, and the commissioning of the plant.	Distribution		U9, U11, U131		Edition 1 was not found adequate for normative implementation and testing. However, the time table for Edition 2 depends on priority, industry interest, and availability of experts provided by the National Committees.
56	IEC 61968-4 Interfaces for records and asset management	IS 2007, Und as Ed2								X						This Part of IEC 61968 specifies the information content of a set of message types that can be used to support many of the business functions related to records and asset management. Typical uses of the message types defined in this Part of IEC 61968 include network extension planning, copying feeder or other network data between systems, network or diagram edits and asset inspection	Distribution		U12		Edition 1 was not found adequate for normative implementation and testing. However, the time table for Edition 2 depends on priority, industry interest, and availability of experts provided by the National Committees.
57	IEC 61968-5 Interfaces for Operational planning and optimisation (OP)	Postponed								X						This Part of IEC 61968 specifies the information content of messages types that can be used in operational planning	Distribution		U114, U9		Postponed until experts from 5 countries are provided. Also, part 5 should be based on the
58	IEC 61968-6 Interfaces for Maintenance and construction (MC)	Und								X						This document is Part 6 of the IEC 61968 standard and specifies the information content of a set of message types that can be used to support business functions related to Maintenance and Construction. Typical uses of the message types defined in Part 6 include planned maintenance, unplanned maintenance, conditional maintenance, work \management, new service requests, etc. Message types defined in other Parts of IEC61968 may also be relevant to these use cases.	Distribution		U104		Time table depends on priority, industry interest, and availability of experts provided by the National
59	IEC 61968-7 Interfaces for Network extension planning (NE)	Postponed								X						This Part of IEC 61968 specifies the information content of messages types that can be used in network extension planning.	Distribution		U114		Postponed until experts from 5 countries are provided. Also, part 7 should be based on the revised parts 3 & 4 and coordinated with part 6
60	IEC 61968-8 Interfaces for Customer Support (CS)	Und								X						This Part of IEC 61968 specifies the information content of messages types that can be used for customer support by the distribution utility.	Distribution		U38, U37, U39, U40, U125		The time table depends on priority, industry interest, and availability of experts provided by the National
61	IEC 61968-9 Interfaces for Meter reading and control (MR)	IS 2009, Und as Ed2								X						This document is Part 9 of the IEC 61968 standard and specifies the information content of a set of message types that can be used to support many of the business functions related to meter reading and control. Typical uses of the message types include meter reading, meter control, meter events, customer data synchronization and customer switching. The purpose of this document is to define a standard for the integration of metering systems (MS), which includes traditional manual systems, and (one or two-way) automated meter reading (AMR) systems, with other systems and business functions within the scope of IEC 61968. The scope of this International Standard is the exchange of information between a metering system and other systems within the utility enterprise.	Distribution		U2, U22, U7, U26, U21		Plan for CDV of Edition 2 in September 2011
62	IEC 61968-10 (Cancelled)	Cancelled																			
63	IEC 61968-11 Common information model (CIM) extensions for distribution	IS 2010								X						This part specifies the distribution extensions of the Common Information Model (CIM) specified in IEC 61970-301. It defines a standard set of extensions of common information model (CIM), which support message definitions in Parts 3 to 9 of IEC 61968, IEC 61968-13 and IEC 61968-14). The scope of this standard is the information model that extends the base CIM for the needs of distribution networks, as well as for integration with enterprise-wide information systems typically used within electrical utilities. The information model is defined in UML which is platform-independent and electronically processable language that is then used to create message payload definitions in	Distribution		U114		
64	IEC 61968-12 (Cancelled)	Cancelled																			
65	IEC 61968-13 CIM RDF Model Exchange Format for Distribution	IS 2008								X						This part of IEC 61968 specifies the format and rules for exchanging modeling information based upon the CIM (Common Information Model) and related to distribution network data. The intention of this part of IEC 61968 is to allow the exchange of instance data in bulk. Thus, the imported network model data should be sufficient to allow performing network connectivity analysis, including network tracing, outage analysis, load flow calculations, etc. This part could be used for synchronizing geographical information system databases with	Distribution		U114		
66	IEC 61968-14 CIM-MultiSpeak Mapping	Und								X						This part is separated into additional sub-parts which will ultimately map between MultiSpeak and each of the IEC 61968 parts. Part 14-1 explains how to do a mapping from CIM to MultiSpeak using an XML mapping tool, and the inclusion of an example project that gives practical guidance on the interoperability and mapping of source and destination applications through an ESB using an on demand meter read as the archetype. Sub-part 14-9 contains the mapping of 1st Edition IEC 61968-9 profiles to equivalent MultiSpeak v4.1 message	Distribution		U2, U26, U22, U21, U12, U114		
	IEC 61968-100 Implementation Profile for IEC 61968	Und							X					X		This part specifies an implementation profile for the application of the other parts of 61968 using common integration technologies, including JMS and web services. Guidance is also provided with respect to the use of Enterprise Service Bus (ESB) technologies. This provides a means to derive interoperable implementations of IEC 61968 parts 3 through 9					
67	IEC 61970-1 Common Information Model (CIM) Guidelines and General Requirements	IS 2005										X		X		These families of standards define information exchanged among control center systems using common information models. They define application-level energy management system interfaces and messaging for distribution grid management in the utility space.	Transmission	No security requirements are defined in the IEC 61970 series since they address only CIM			
68	IEC 61970-2 Glossary	TS 2004										X				This Technical specification provides a glossary for the volume of work produced as part of the IEC 61970 series of documents. Terms and abbreviations that are either specific to the series, or that require explanation because of the way that they are used in it, are supplied.	Transmission				

69	IEC 61970-301 CIM Base	IS Ed2 2009								X					This part provides a snapshot of Common Information Model (CIM) which is a UML model currently modeled with the Enterprise Architect tool. The CIM is an abstract model that represents all the major objects in an electric utility enterprise typically involved in utility operations. By providing a standard way of representing power system resources as object classes and attributes, along with their relationships, the CIM facilitates the integration of energy management system (EMS) applications developed independently by different vendors, between entire EMS systems developed independently, or between an EMS system and other systems concerned with different aspects of power system operations, such as generation or distribution management. SCADA is modeled to the extent necessary to support power system simulation and inter-control center communication. The CIM facilitates integration by defining a common language (i.e. semantics and syntax) based on the CIM to enable these applications or systems to access public data and exchange information independent of how	Transmission				
70	IEC 61970-401: Energy management system application program interface (EMS-API) – Part 401: Component interface specification (CIS) framework	TS 2005								X		X			This technical specification specifies the framework for the specification of Component Interface Specifications (CIS) for Energy Management System Application Program Interfaces (EMS-API). A CIS specifies the interfaces that a component (or application) should implement to be able to exchange information with other components (or applications) and/or to access publicly available data in a standard way. This part of IEC 61970 specifically provides a framework for the specification of the Level 1 Functional Requirements documents. It explains the separation of these specifications into two major groups. One group of standards defines the generic services that a component can use for exchanging information with another component or for accessing public data. The other group defines the information content of messages that a component or system exchanges with other components. IEC 61970-401 also provides an overview of the functionality included in the CIS standards. This functionality is described as a set of generic services using narrative text and Unified Modeling Language (UML) notation. These generic services can be used by any	Transmission				
71	IEC 61970-452: Energy Management System Application Program Interface (EMS-API) – Part 452: CIM Static Transmission Network Model Profile	Und								X					The purpose of this document is to rigorously define the subset of classes, class attributes, and roles from the CIM necessary to execute state estimation and power flow applications.	Transmission				
72	IEC 61970-453: Energy management system application program interface (EMS-API) – Part 453: CIM based graphics exchange	IS 2008								X					Included in this part of IEC 61970 are the general use cases for exchange of graphic schematic display definitions, and guidelines for linking the schematic definitions with CIM data. Guidelines for management of schematic definitions through multiple revisions are also included.	Transmission				
73	IEC 61970-456 Ed. 1.0 Energy management system application program interface (EMS-API) - Part 456: Solved power system state profiles	Und								X					The purpose of this document is to rigorously define the subset of classes, class attributes, and roles from the CIM necessary to describe the result of state estimation, power flow and other similar applications that produce a steady-state solution of a power network, under a set of use cases which are included informatively in this standard	Transmission				
74	IEC 61970-501 CIM RDF Schema	IS 2006								X					This International Standard specifies a Component Interface Specification (CIS) for energy management systems application program interfaces. This part of IEC 61970 specifies the format and rules for producing a machine readable form of the Common Information Model (CIM) as specified in the IEC 61970-301 standard. It describes a CIM vocabulary to support the data access facility and associated CIM semantics	Transmission				
75	IEC 61970-552 Ed.1: Energy Management System Application Program Interface (EMS-API) – Part 552: CIM XML Model Exchange Format	Und								X					This part specifies the format and rules for exchanging modeling information based upon the CIM. It uses the CIM RDF Schema presented in IEC 61970-501 as the meta-model framework for constructing XML documents of power system modelling information. The style of these documents is called CIM XML format.	Transmission				
76	IEC 62351-1 Security for TC57 Standards and End-to-End Security	TS 2007										X	X		The scope of the IEC 62351 series is information security for power system control operations. The primary objectives are two-fold: Undertake the development of standards for security of the communication protocols defined by IEC TC 57, specifically the IEC 60870-5 series, the IEC 60870-6 series, the IEC 61850 series, the IEC 61970 series, and the IEC 61968 series. Undertake the development of standards and/or technical reports on end-to-end security issues. Specific objectives include: • IEC 62351-1 provides an introduction to the remaining parts of the standard, primarily to introduce the reader to various aspects of information security as applied to power system operations. • IEC 62351-3 to IEC 62351-6 specify security standards for the IEC TC 57 communication protocols. These can be used to provide various levels of protocol security, depending upon the protocol and the parameters selected for a specific implementation. They have also been design for backward compatibility and phased implementations. • IEC 62351-7 addresses one area among many possible areas of end-to-end information security, namely the enhancement of overall management of the communications networks supporting power system operations. • Other parts are expected to follow to address more areas of information security	Cybersecurity				
77	IEC 62351-2 Glossary	TS 2007										X	X		The Glossary of Terms focuses on the key terms used in these standards documents, and is not meant to be a definitive list. Most terms used for cyber security are formally defined by other standards organizations, and so are included here with references to where they were originally defined	Cybersecurity				
78	IEC 62351-3 Security Using Transport Layer Security (TLS)	TS 2007					X						X		This part of IEC 62351 specifies how to secure TCP/IP-based protocols through constraints on the specification of the messages, procedures, and algorithms of Transport Layer Security (TLS) (defined in RFC 2246) so that they are applicable to the telecontrol environment of IEC TC 57. It specifies how to provide confidentiality, tamper detection, and message level authentication for SCADA and telecontrol protocols that make use of TCP/IP as a message transport layer	Cybersecurity				Update efforts for Edition 2 are starting
79	IEC 62351-4 Security for Manufacturing Messaging Specification (MMS)	TS 2007						X					X		This part of IEC 62351 specifies procedures, protocol extensions, and algorithms to facilitate securing ISO 9506 – Manufacturing Message Specification (MMS) based applications. It is intended that this technical specification be referenced as a normative part of other IEC TC57 standards that have the need for using MMS in a secure manner and represents a set of mandatory and optional security specifications to be implemented for conformance when using MMS	Cybersecurity				Update efforts for Edition 2 are starting
80	IEC 62351-5 Security for IEC 60870-5 and DNP3	TS 2009			X	X	X	X					X		This part of IEC 62351 specifies messages, procedures and algorithms for securing the operation of all protocols based on or derived from the standard IEC 60870-5 Parts 101 and 104, and "derivatives" such as IEC 1815 (DNP3).	Cybersecurity				An amendment has been developed to provide the cryptographic requirements that are generally called for. This amendment has been coordinated with the DNP3 cybersecurity cryptographic reviews and updates to ensure
81	IEC 62351-6 Security for IEC 61850	TS 2007			X	X		X					X		This part of IEC 62351 specifies messages, procedures, and algorithms for securing the operation of all protocols based on or derived from the standard IEC 61850, including all three types of services: ACSI, GOOSE, and Sampled Values. For applications using GOOSE and IEC 61850-9-2 and requiring 4 ms response times, multicast configurations and low CPU overhead, encryption is not recommended. Instead, the communication path selection process (e.g. the fact that GOOSE and SMV are supposed to be restricted to a logical substation LAN) shall be used to provide confidentiality for information exchanges. However, this specification does define a mechanism for allowing confidentiality for applications where the 4 ms delivery criterion is not a concern.	Cybersecurity				Update efforts for Edition 2 are starting
82	IEC 62351-7 Network and System Management Objects	TS 2010								X			X	X	This part of IEC 62351 defines abstract object models for network and system health information. Power systems operations are increasingly reliant on information infrastructures, including communication networks, intelligent electronic devices (IEDs), and self-defining communication protocols. Therefore, management of the information infrastructure has become crucial to providing the necessary high levels of security and reliability in power system operations. Using the concepts developed in the IETF simple network management protocol (SNMP) standards for network management, IEC/TS 62351-7 defines network and system management (NSM) data object models that are specific to power system operations. These NSM data objects will be used to monitor the health of networks and systems, to detect possible security intrusions, and to manage the	Cybersecurity				

83	IEC 62351-8 Role-based Access Control	DTS 2011								X		X	X		This part of IEC 62351 specifies role-based access control (RBAC) requirements. The scope of this technical specification is the access control of users and automated agents –in the following called subjects – to data objects in power systems by means of role-based access control (RBAC). RBAC is not a new concept; in fact, it is used by many operating systems to control access to system resources. RBAC is an alternative to the all-or-nothing super-user model. RBAC is in keeping with the security principle of least privilege, which states that no subject should be given more rights than necessary for performing that subject's job. RBAC enables an organization to separate super-user capabilities and package them into special user accounts termed roles for assignment to specific individuals according to their job needs. This enables a variety of security policies, networking, firewall, back-ups, and system operation. A site that prefers a single strong administrator but wants to let more sophisticated users fix portions of their own system can set up an advanced-user role. RBAC is not confined to users	Cybersecurity					
84	IEC 62351-9 Cyber security key management for power system equipment	Und			X	X	X	X				X	X		This part of IEC 62351 specifies the key management process for power system remote systems and devices. Key management defines the process to assure secure and correct handling of cryptographic key material as well as supporting security parameters (e.g. passwords, IVs, shared secrets, etc.) for their entire lifecycle. The lifecycle is encapsulated by secure generation, establishment, use, transmission (over communication medium or direct entry), storage, distribution, and destruction of key material and supporting security parameters. Cryptographic key material is essential to protect data and command communication between devices. This technical specification provides specifications for asymmetric and symmetric key management systems, and supporting cipher suites to be used across the "Smart Grid".	Cybersecurity					
85	IEC 62351-10 Security Architecture Guidelines for TC 57 Systems	DTR 2011								X		X	X		This part of IEC 62351 describes the security architecture for IEC TC57 information models and protocols, and provides guidelines for security systems using these standards. This document targets the description of security architecture guidelines for power systems based on essential security controls, i.e., on security-related components and functions and their interaction. Furthermore, the relation and mapping of these security controls to the general system architecture of power systems is provided as guideline to support system integrators to securely deploy power generation, transmission, and distribution systems applying available standards.	Cybersecurity					
86	IEEE 1547	Rec	X												This family of standards defines physical and electrical interconnections between utility and distributed generation (DG) and storage.						
87	IEEE 1547.1 IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems	2005	X											X	IEEE Std 1547.1 provides conformance test procedures to establish and verify compliance with the requirements of IEEE Std 1547. When applied, the IEEE 1547.1 test procedures can provide a means for manufacturers, utilities, or independent testing agencies to confirm the suitability of any given interconnection system (ICS) or component intended for use in the interconnection of DR with the EPS.						
88	IEEE 1547.2 IEEE Application Guide for IEEE Std 1547(TM), IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems	2008	X										X		IEEE Std 1547.2-2008 provides application details to support the understanding of IEEE Std 1547-2003 and is intended to serve DR owners and operators as well as area EPS staff. IEEE Std 1547.2-2008 provides technical background, application details and guidance, requirements rationale, schematics, and examples to facilitate the use of IEEE Std 1547-2003.						
89	IEEE 1547.3 IEEE Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems	2007	X									X	X		IEEE Std 1547.3 is intended to facilitate interoperability of distributed resources interconnected with an area electric power system. It is intended to help stakeholders in distributed resource installations implement optional approaches for monitoring, information exchange, and control to support the operation of their distributed resources and transactions among the stakeholders associated with the distributed resources. This guide describes functionality, parameters, and methodologies for monitoring, information exchange, and control related to distributed resources interconnected with an area electric power system. The focus is on monitoring, information exchange, and control data exchanges between distributed resource controllers and stakeholder entities with direct communication interactions. This guide incorporates information modeling and use case approaches, but it is also compatible with historical approaches to establishing and satisfying monitoring, information exchange, and control needs for distributed resources interconnected with an area						
90	IEEE 1547.4 IEEE Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems	2011?	X											X	This document provides alternative approaches and good practices for the design, operation, and integration of distributed resource (DR) island systems with electric power systems (EPS). This includes the ability to separate from and reconnect to part of the area EPS while providing power to the islanded EPSs. This guide includes the distributed resources, interconnection systems, and participating electric power systems. This document covers intentional islands in electric power systems (EPSs) that contain distributed resources. IEEE created a new term "DR island systems" to generically call all intentional island systems that could include local and/or area EPS. The term "DR island systems", sometimes referred to as microgrids, is used for these intentional islands. DR island systems are EPSs that: (1) have DR and load, (2) have the ability to disconnect from and parallel with the area EPS, (3) include the local EPS and may include portions of the area EPS, and (4) are intentionally planned. DR island systems can be either local EPS islands or area EPS islands.						
91	IEEE 1547.5 Guidelines for Interconnection of Electric Power Sources Greater than 10MVA to the Power Transmission Grid	Und	X											X	This document provides guidelines regarding the technical requirements, including design, construction, commissioning acceptance testing and maintenance /performance requirements, for interconnecting dispatchable electric power sources with a capacity of more than 10 MVA to a bulk power transmission grid.						
92	IEEE 1547.6 IEEE Draft Recommended Practice for Interconnecting Distributed Resources with Electric Power Systems Distribution Secondary Networks	2011?	X												This standard builds upon IEEE Standard 1547 for the interconnection of distributed resources (DR) to distribution secondary network systems. This standard establishes recommended criteria, requirements and tests, and provides guidance for interconnection of distribution secondary network system types of area electric power systems (Area EPS) with distributed resources (DR) providing electric power generation in local electric power systems (Local EPS).						
93	IEEE 1547.7 Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection	Und	X											X	This guide describes criteria, scope, and extent for engineering studies of the impact on area electric power systems of a distributed resource or aggregate distributed resource interconnected to an area electric power distribution system.						
94	IEEE 1547.8 Recommended Practice for Establishing Methods and Procedures that Provide Supplemental Support for Implementation Strategies for Expanded Use of IEEE Standard 1547	Und	X												The purpose of the methods and procedures provided in this recommended practice is to provide more flexibility in determining the design and processes used in expanding the implementation strategies used for interconnecting distributed resources with electric power systems. Further, based on IEEE Std 1547 requirements, the purpose of this recommended practice is to provide the knowledge base, experience, and opportunities for greater utilization of the interconnection and its applications.						
95	IEEE C37.118-2005 (To be published as IEEE C37.118.1 and IEEE C37.118.2 in its new revision)	Und													This standard defines phasor measurement unit (PMU) performance specifications and communications for synchrophasor data.						
96	IEEE 1588 IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems	2008													This standard defines a protocol enabling precise synchronization of clocks in measurement and control systems implemented with technologies such as network communication, local computing, and distributed objects. The clocks communicate with each other over a communication network. The protocol generates a master–slave relationship among the clocks in the system. All clocks ultimately derive their time from a clock known as the grandmaster clock.						
97	IEEE PC37.238 Draft Standard Profile for Use of IEEE Std. 1588 Precision Time Protocol in Power System Applications	Und													This standard specifies a common profile for use of IEEE 1588-2008 Precision Time Protocol (PTP) in power system protection, control, automation and data communication applications utilizing an Ethernet communications architecture. In addition to distributing global time that is traceable to a recognized standard time source, the profile has a provision for distributing local time for the cases when connectivity to recognized standard time sources is lost. The profile can be used for precise time synchronization of the devices in a substation, and between substations in a larger geographical area, if performance requirements of this standard are met.						
98	Internet Protocol Suite including, but not limited to: IETF RFC 2460 (IPv6), IETF RFC 791 (IPv4), Internet Protocols for the Smart Grid RFC														The foundation protocol for delivery of packets in the Internet network. IPv6 is a new version of the Internet Protocol that provides enhancements to IPv4 and allows a larger address space.						
99	Multispeak	Version 4.1 2010													MultiSpeak was developed by NRECA in collaboration with key industry vendors, with rural electric cooperatives as the primary users. It currently covers applications of interest to distribution utilities and to the distribution portion of vertically integrated utilities, moving towards support for transmission.						
100	NAESB WEQ19, REQ18, Energy Usage Information														The standards specify two-way flows of energy usage information based on a standardized information model.						
101	OpenADR														The specification defines messages exchanged between the Demand Response (DR) Service Providers (e.g., utilities, ISOs) and customers for price-responsive and reliability-based DR.						
102	OPC-UA Industrial														A platform-independent specification for a secure, reliable, high-speed data exchange based on a publish/subscribe mechanism. Modern SOA designed to expose complex data and metadata defined by other information model specifications (e.g. IEC 61850, BACnet, OpenADR). Works with existing binary and XML schema defined data.						
103	Open Geospatial Consortium Geography Markup Language (GML)														A standard for exchange of location-based information addressing geographic data requirements for many Smart Grid applications.						
104	Smart Energy Profile Specification ZigBee Profile: 1.x	Std			X	X	X	X		X			X		This profile defines device descriptions and standard practices for Demand Response and Load Management "Smart Energy" applications needed in a Smart Energy based residential or light commercial environment. Installation scenarios range from a single home to an entire apartment complex. The key application domains included in this initial version are metering, pricing and demand response and load control applications. Other applications will be added in future versions.	Customer					

105	ZigBee Smart Energy Profile 2.0 Technical Requirements Document	Und			X	X	X								The purpose of this document is to provide a clear set of technical requirements for implementing ZigBee Smart Energy Profile 2.0 on ZigBee, HomePlug, Wi-Fi, Ethernet, and other IP-capable platforms. These technical documents are based on marketing requirements provided in the ZigBee+HomePlug Smart Energy 2.0 MRD [ZBHP MRD], or inferred by the technical team. To the extent that the ZigBee and HomePlug networking technologies are specifically mentioned in the MRD, appropriate requirements for their support of ZigBee Smart Energy Profile 2.0 are defined in this document. Throughout this document, other MAC/PHYs may be mentioned by name as illustrative examples or partial lists. These references are not intended to convey any preference for the named MAC/PHY(s) over any other MAC/PHY(s) that may support ZigBee Smart Energy Profile 2.0. It is the intent of ZigBee Smart Energy Profile 2.0 to unify the mix of communication technologies that will be present in the customer premises network domain with a common, IP stack based, application layer. To this end, as described in the MRD guiding principles, the requirements defined in this document reflect a cleanly layered architectural model in which the layers are loosely coupled.	Customer				
106	Smart Energy Profile 2.0 Public Application Protocol Standard v1.0: 2013	Std			X	X	X	X		X			X			The purpose of this document is to define the application protocol used by the Smart Energy Profile release 2.0. The Smart Energy Profile Application Protocol 2.0 is designed to meet the requirements stated in the Smart Energy Profile 2.0 Marketing Requirements Document (SEP 2 MRD) [ZB 09-5162] and the Smart Energy Profile 2.0 Technical Requirements Document (SEP 2 TRD) [ZB 09-5449]. Per Req[DataModel-1], this application protocol is an IEC 61968 common information model [61968] profile, mapping directly where possible, and using subsets and extensions where needed, and follows a RESTful architecture [REST].	Customer	TLS with one ECC cipher suite No CRL or OCSP			Provides partial security for appliances in the Home Area Network, but does not specify complete security requirements, which are left up to the various vendors and implementers.
107	IEEE 1686-2007	Std											X			The IEEE 1686-2007 is a standard that defines the functions and features to be provided in substation intelligent electronic devices (IEDs) to accommodate critical infrastructure protection programs. The standard covers IED security capabilities including the access, operation, configuration, firmware revision, and data retrieval					
108	NERC CIP 002-009	Std/ Und											X			These standards cover physical and cyber security standards for the bulk power system.					
109	NIST Special Publication (SP) 800-53 Recommended Security Controls for Federal Information Systems and Organizations	SP											X	X		The purpose of this publication is to provide guidelines for selecting and specifying security controls for information systems supporting the executive agencies of the federal government to meet the requirements of FIPS 200, Minimum Security Requirements for Federal Information and Information Systems. The guidelines apply to all components11 of an information system that process, store, or transmit federal information					
	NIST SP 800-82 Guide to Industrial Control Systems (ICS) Security	SP											X	X		This document provides guidance for establishing secure industrial control systems (ICS). These ICS, which include supervisory control and data acquisition (SCADA) systems, distributed control systems (DCS), and other control system configurations such as skid-mounted Programmable Logic Controllers (PLC) are often found in the industrial control sectors. ICS are typically used in industries such as electric, water and wastewater, oil and natural gas, transportation, chemical, pharmaceutical, pulp and paper, food and beverage, and discrete manufacturing (e.g., automotive, aerospace, and durable goods.) SCADA systems are generally used to control dispersed assets using centralized data acquisition and supervisory control. DCS are generally used to control production systems within a local area such as a factory using supervisory and regulatory control. PLCs are generally used for discrete control for specific applications and generally					
110	ITU Recommendation G.9960 (G.hn)	Std														In-home networking over power lines, phone lines, and coaxial cables.					
111	IEEE P1901	Std														Broadband communications over Powerline medium access control (MAC) and physical layer (PHY) protocols.					
112	Global Positioning System (GPS) Standard Positioning Service (SPS) Signal Specification	Std														Standard for using GPS to establish accurate geospatial location and time.					
113	IEEE 802 Family of Wireless Standards for Local and Metropolitan Area Networks	Std		X	X											This includes standards developed by the IEEE 802 Local Area and Metropolitan Area Network Standards Committee. A set of open, mature standards for wired and wireless LLC/MAC/PHY protocols developed by IEEE include those developed by Industry fora such as WiFi Alliance, WiMAX Forum, and Zigbee Alliance to promote the use of these standards and to provide implementation testing and certification					