NIST Framework and Roadmap for Smart Grid Interoperability Standards
Release1.0 / Release2.0 比較 基礎資料

Version.1 2011.11.28
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キーワード	Release1.0での定義	Release2.0での定義
Architecture	The conceptual structure and overall organization of the Smart Grid from the point of view of its use or design. This includes technical and business designs, demonstrations, implementations, and standards that, together, convey a common understanding of the Smart Grid. The architecture embodies high-level principles and requirements that designs of Smart Grid applications and systems must satisfy.	The conceptual structure and overall organization of the Smart Grid from the point of view of its use or design. This includes technical and business designs, demonstrations, implementations, and standards that together convey a common understanding of the Smart Grid. The architecture embodies high-level principles and requirements that designs of Smart Grid applications and systems must satisfy.
Harmonization	The process of achieving technical equivalency and enabling interchangeability between different standards with overlapping functionality. Harmonization requires an architecture that documents key points of interoperability and associated interfaces.	The process of achieving technical equivalency and enabling interchangeability between different standards with overlapping functionality. Harmonization requires an architecture that documents key points of interoperability and associated interfaces.
Interoperability	The capability of two or more networks, systems, devices, applications, or components to exchange and readily use information—securely, effectively, and with little or no inconvenience to the user. The Smart Grid will be a system of interoperable systems. That is, different systems will be able to exchange meaningful, actionable information. The systems will share a common meaning of the exchanged information, and this information will elicit agreed-upon types of response. The reliability, fidelity, and security of information exchanges between and among Smart Grid systems must achieve requisite performance levels.	The capability of two or more networks, systems, devices, applications, or components to exchange and readily use information—securely, effectively, and with little or no inconvenience to the user. The Smart Grid will be a system of interoperable systems; that is, different systems will be able to exchange meaningful, actionable information. The systems will share a common meaning of the exchanged information, and this information will elicit agreed-upon types of response. The reliability, fidelity, and security of information exchanges between and among Smart Grid systems must achieve requisite performance levels.
Interchangeability	An extreme degree of interoperability characterized by a similarity sometimes termed "plug and play." Interchangeable components can be freely substituted without loss of function and requiring minimum to no additional configuration.	The ability of two or more components to be interchanged through mutual substitution without degradation in system performance.
Reference Model	A set of views (diagrams) and descriptions that are the basis for discussing the characteristics, uses, behavior, interfaces, requirements, and standards of the Smart Grid. This model does not represent the final architecture of the Smart Grid; rather it is a tool for describing, discussing, and developing that architecture.	A reference model is a set of views (diagrams) and descriptions that provides the basis for discussing the characteristics, uses, behavior, interfaces, requirements, and standards of the Smart Grid. This model does not represent the final architecture of the Smart Grid; rather, it is a tool for describing, discussing, and developing that architecture.

キーワード	Release1.0での定義	Release2.0での定義
Requirement	1) A condition or capability needed by a user to solve a problem or achieve an objective. 2) A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed documents.	1) A condition or capability needed by a user to solve a problem or achieve an objective. 2) A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document.
Standards	Specifications that establish the fitness of a product for a particular use or that define the function and performance of a device or system. Standards are key facilitators of compatibility and interoperability. They define specifications for languages, communication protocols, data formats, linkages within and across systems, interfaces between software applications and between hardware devices, and much more. Standards must be robust so that they can be extended to accommodate future applications and technologies. An assortment of organizations develops voluntary standards and specifications, which are the results of processes that vary on the basis of the type of standards setting-organization and its purpose. Government regulations may incorporate or reference voluntary standards.	Specifications that establish the fitness of a product for a particular use or that define the function and performance of a device or system. Standards are key facilitators of compatibility and interoperability. They define specifications for languages, communication protocols, data formats, linkages within and across systems, interfaces between software applications and between hardware devices, and much more. Standards must be robust so that they can be extended to accommodate future applications and technologies. An assortment of organizations develops voluntary standards and specifications, which are the results of processes that vary on the basis of the type of organization and its purpose. These organizations include, but are not limited to, standards development organizations (SDOs), standards-setting organizations (SSOs), and user groups.
Energy Service Interface (ESI)	なし	**The device or application that functions as the gateway between the energy providers and consumers. Located on the consumer side of the exchange, this can have many forms. Its purpose is to facilitate communications between the consumer devices and the energy provider.** **※有線／無線／PLCその他の通信レイヤから独立したH2G/B2G/I2Gインタフェース**
Functional Requirement	なし	A requirement that specifies a function that a system or system component must be able to perform.
Legacy Systems	なし	A legacy system is an old technology, computer system, component, or application program that continues to be used, typically because it still functions for current users' needs, even though newer technology or more efficient methods of performing a task are now available.

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Mature Standard	なし	A mature standard is a standard that has been in use for long enough that most of its initial faults and inherent problems have been removed or reduced by further development.
Non-Functional Requirement	なし	A non-functional requirement is a statement that specifies a constraint about how a system must behave to meet functional requirements.
Reliability	なし	The ability of a system or component to perform its required functions under stated conditions for a specified period of time. It is often measured as a probability of failure or a measure of availability. However, maintainability is also an important part of reliability engineering.

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Expression in Blue	2.0で変更された記述

キーワード	Release1.0での定義内容	Release2.0での定義の出現順位と定義内容
1)Wide-area situational awareness	Monitoring and display of power-system components and performance across interconnections and over large geographic areas in near real time. The goals of situational awareness are to understand and ultimately optimize the management of power-network components, behavior, and performance, as well as to anticipate, prevent, or respond to problems before disruptions can arise.	2番目:Monitoring and display of power-system components and performance across interconnections and over large geographic areas in near real time. The goals of situational awareness are to understand and ultimately optimize the management of power-network components, behavior, and performance, as well as to anticipate, prevent, or respond to problems before disruptions can arise.
2)Demand response and consumer energy efficiency	Mechanisms and incentives for utilities, business, industrial, and residential customers to cut energy use during times of peak demand or when power reliability is at risk. Demand response is necessary for optimizing the balance of power supply and demand.	1番目:Mechanisms and incentives for utilities, business, industrial, and residential customers to cut energy use during times of peak demand or when power reliability is at risk. Demand response is necessary for optimizing the balance of power supply and demand. With increased access to detailed energy consumption information, consumers can also save energy at all times with efficiency behavior and investments that achieve measurable results, and learn where additional efficiency investments will pay off.
3)Energy storage	Means of storing energy, directly or indirectly. The significant bulk energy storage technology available today is pumped hydroelectric storage technology. New storage capabilities—especially for distributed storage—would benefit the entire grid, from generation to end use.	3番目:Means of storing energy, directly or indirectly. The most common bulk energy storage technology used today is pumped hydroelectric storage technology. New storage capabilities—especially for distributed storage—would benefit the entire grid, from generation to end use.
4)Electric transportation	Refers, primarily, to enabling large-scale integration of plug-in electric vehicles (PEVs). Electric transportation could significantly reduce U.S. dependence on foreign oil, increase use of renewable sources of energy, and dramatically reduce the nation's carbon footprint	4番目:Refers primarily to enabling large-scale integration of plug-in electric vehicles (PEVs). Electric transportation could significantly reduce U.S. dependence on foreign oil, increase use of renewable sources of energy, and dramatically reduce the nation's carbon footprint.
5)Cyber security	Encompasses measures to ensure the confidentiality, integrity and availability of the electronic information communication systems and the control systems necessary for the management, operation, and protection of the Smart Grid's energy, information technology, and telecommunications infrastructures.	8番目:Encompasses measures to ensure the confidentiality, integrity, and availability of the electronic information communication systems and the control systems necessary for the management, operation, and protection of the Smart Grid's energy, information technology, and telecommunications infrastructures.

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6）Network communications	The Smart Grid domains and subdomains will use a variety of public and private communication networks, both wired and wireless. Given this variety of networking environments, the identification of performance metrics and core operational requirements of different applications, actors, and domains—in addition to the development, implementation, and maintenance of appropriate security and access controls—is critical to the Smart Grid.	5番目：Refers to a variety of public and private communication networks, both wired and wireless, that will be used for Smart Grid domains and subdomains. Given this variety of networking environments, the identification of performance metrics and core operational requirements of different applications, actors, and domains—in addition to the development, implementation, and maintenance of appropriate security and access controls—is critical to the Smart Grid. FERC notes, a "… cross-cutting issue is the need for a common semantic framework (i.e., agreement as to meaning) and software models for enabling effective communication and coordination across inter-system interfaces. An interface is a point where two systems need to exchange data with each other; effective communication and coordination occurs when each of the systems understands and can respond to the data provided by the other system, even if the internal workings of the system are quite different." See Section 3.4 for further discussion on information networks.
7）Advanced metering infrastructure (AMI)	Currently, utilities are focusing on developing AMI to implement residential demand response and to serve as the chief mechanism for implementing dynamic pricing. It consists of the communications hardware and software and associated system and data management software that creates a two-way network between advanced meters and utility business systems, enabling collection and distribution of information to customers and other parties, such as the competitive retail supplier or the utility itself. AMI provides customers real-time (or near real-time) pricing of electricity, and it can help utilities achieve necessary load reductions.	6番目：Provides real-time monitoring of power usage, and is a current focus of utilities. These advanced metering networks are of many different designs and could also be used to implement residential demand response including dynamic pricing. AMI consists of the communications hardware and software, and the associated system and data management software, that together create a two-way network between advanced meters and utility business systems, enabling collection and distribution of information to customers and other parties, such as the competitive retail supplier or the utility itself. Because the networks do not share a common format, NIST is focusing on standardizing the information data models.
8）Distribution grid management	Focuses on maximizing performance of feeders, transformers, and other components of networked distribution systems and integrating with transmission systems and customer operations. As Smart Grid capabilities, such as AMI and demand response, are developed, and as large numbers of distributed energy resources and plug-in electric vehicles (PEVs) are deployed, the automation of distribution systems becomes increasingly more important to the efficient and reliable operation of the overall power system. The anticipated benefits of distribution grid management include increased reliability, reductions in peak loads, and improved capabilities for managing distributed sources of renewable energy.	7番目：Focuses on maximizing performance of feeders, transformers, and other components of networked distribution systems and integrating them with transmission systems and customer operations. As Smart Grid capabilities, such as AMI and demand response are developed, and as large numbers of distributed energy resources and plug-in electric vehicles (PEVs) are deployed, the automation of distribution systems becomes increasingly more important to the efficient and reliable operation of the overall power system. The anticipated benefits of distribution grid management include increased reliability, reductions in peak loads, and improved capabilities for managing distributed sources of renewable energy.

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No.	Release1.0で選出された標準	No.	Release2.0で選出された標準
1	ANSI/ASHRAE 135-2008/ISO 16484-5 BACnet - A Data Communication Protocol for Building Automation and Control Networks	1	ANSI/American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 135-2010/ISO 16484-5 BACnet
2	**ANSI C12 Suite** ・ANSI C12.1 ・ANSI C12.18/IEEE P1701/MC1218 ・ANSI C12.19/MC1219 ・ANSI C12.20 ・ANSI C12.21/IEEE P1702/MC1221	2	**ANSI C12 Suite** ・ANSI C12.1 ・ANSI C12.18-2006: ・ANSI C12.19-2008 ・ANSI C12.20 ・ANSI C12.21/IEEE P1702/MC1221
3	**ANSI/CEA 709 and CEA 852.1 LON Protocol Suite:** ・ANSI/CEA 709.1-B-2002 Control Network Protocol Specification ・ANSI/CEA 709.2-A R-2006 Control Network Power Line (PL) Channel Specification ・ANSI/CEA 709.3 R-2004 Free-Topology Twisted-Pair Channel Specification ・ANSI/CEA-709.4:1999 Fiber-Optic Channel Specification ・CEA-852.1:2009 Enhanced Tunneling Device Area Network Protocols Over Internet Protocol Channels	3	**ANSI/CEA 709 and Consumer Electronics Association (CEA) 852.1 LON Protocol Suite:** ・ANSI/CEA 709.1-B-2002 Control Network Protocol Specification ・ANSI/CEA 709.2-A R-2006 Control Network Power Line (PL) Channel Specification ・ANSI/CEA 709.3 R-2004 Free-Topology Twisted-Pair Channel Specification ・ANSI/CEA-709.4:1999 Fiber-Optic Channel Specification ・CEA-852.1:2009 Enhanced Tunneling Device Area Network Protocols Over Internet Protocol Channels
4	DNP3	4	IEEE 1815 (DNP3) IEEE Xplore - IEEE Std 1815-2010
5	IEC 60870-6 / TASE.2	5	IEC 60870-6 / Telecontrol Application Service Element 2 (TASE.2)
6	IEC 61850 Suite	6	IEC 61850 Suite
7	IEC 61968/61970 Suites	7	IEC 61968/61970 Suites
8	IEEE C37.118	8	IEEE C37.118-2005 (To be published as IEEE C37.118.1 and IEEE C37.118.2 in its new revision)
9	IEEE 1547 Suite	9	IEEE 1547 Suite
10	IEEE 1588	10	・IEEE 1588 ・IEEE C37.238
11	Internet Protocol Suite including, but not limited to :IETF RFC 2460 (IPv6) ・IETF RFC 791 (IPv4) ・Core Protocol in the Internet Suite, draft-baker-ietf-core-04	11	Internet Protocol Suite, Request for Comments (RFC) 6272, Internet Protocols for the Smart Grid.

No.	Release1.0で選出された標準	No.	Release2.0で選出された標準
		12	Inter-System Protocol(ISP)-based Broadband-Power Line Carrier (PLC) coexistence mechanism: (Portion of) IEEE 1901-2010 (ISP) and International Telecommunications Union Telecommunication Standardization Sector (ITU-T) G.9972 (06/2010) IEEE 1901-2010
12	Multispeak	13	Multispeak
		14	EMA Smart Grid Standards Publication SG-AMI 1-2009 – Requirements for Smart Meter Upgradeability
		15	NAESB WEQ19, REQ18, Energy Usage Information
		16	NISTIR 7761, NIST Guidelines for Assessing Wireless Standards for Smart Grid Applications
13	OpenADR	17	Open Automated Demand Response (OpenADR)
14	OPC-UA Industrial	18	OPC-UA Industrial
15	Open Geospatial Consortium Geography Markup Language (GML)	19	Open Geospatial Consortium Geography Markup Language (GML)
16	ZigBee/HomePlug Smart Energy Profile 2.0	20	Smart Energy Profile 2.0
Requirements and Guidelines			
17	OpenHAN	21	OpenHAN
18	AEIC Guidelines v2.0	22	AEIC Guidelines
		23	SAE J1772: SAE Electric Vehicle and Plug in Hybrid Electric Vehicle Conductive Charge Coupler
		24	SAE J2836/1: Use Cases for Communication Between Plug-in Vehicles and the Utility Grid
		25	SGTCC Interoperability Process Reference Manual (IPRM)
Cyber Security			
19	Security Profile for Advanced Metering Infrastructure, v 1.0, Advanced Security Acceleration Project – Smart Grid, December 10, 2009	27	Security Profile for Advanced Metering Infrastructure, v 1.0, Advanced Security Acceleration Project – Smart Grid, December 10, 2009
20	Department of Homeland Security, National Cyber Security Division. 2009, September. Catalog of Control Systems Security: Recommendations for Standards Developers.	28	Department of Homeland Security, National Cyber Security Division. 2009, September. Catalog of Control Systems Security: Recommendations for Standards Developers.
21	DHS Cyber Security Procurement Language for Control Systems	29	DHS Cyber Security Procurement Language for Control Systems

No.	Release1.0で選出された標準	No.	Release2.0で選出された標準
22	IEC 62351 Parts 1-8	30	IEC 62351 Parts 1-8
23	IEEE 1686-2007	31	IEEE 1686-2007
24	NERC CIP 002-009	32	NERC CIP 002-009
25	NIST Special Publication (SP) 800-53, NIST SP 800-82	33	NIST Special Publication (SP) 800-53
26		34	IEC 61851
27		35	NISTIR 7628 ・Introduction to NISTIR 7628 Guidelines for Smart Grid Cyber Security（Vol1、Vol2,Vol3）

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※ その他、各項目とも、詳細資料へのハイパーリンクやCommentsの追記あり

No.	Release1.0で選出された標準	Release2.0で選出された標準
1	・ANSI C12.22-2008/IEEE P1703/MC1222 ・ANSI C12.23 ・ANSI C12.24	・ANSI C12.22-2008/IEEE P1703/MC1222 ・ANSI C12.23 ・ANSI C12.24
2	CableLabs PacketCable Security Monitoring and Automation Architecture Technical Report	CableLabs PacketCable Security Monitoring and Automation Architecture Technical Report
3	Global Positioning System (GPS) Standard Positioning Service (SPS) Signal Specification	Global Positioning System (GPS) Standard Positioning Service (SPS) Signal Specification
4	HomePlug AV	
5	HomePlug C&C	
6	IEEE 61400-25	IEEE 61400-25
7	ITU Recommandation G.9960 (G.hn)	ITU Recommendation G.9960/G.9661 (G.hn)
8	IEEE P1901	IEEE P1901
		IEEE P1901.2 and ITU-T G.9955/G.9956 (G.hnem)
9	ISO/IEC 8824 ASN.1 (Abstract Syntax Notation)	ISO/IEC 8824 ASN.1 (Abstract Syntax Notation)
10	ISO/IEC 12139-1	ISO/IEC 12139-1
11	IEEE 802 Family	IEEE 802 Family
12	TIA TR-45/3GPP2 Family of Standards	TIA TR-45/3GPP2 Family of Standards
13	3GPP Family of Standards - Including 2G (CSD, HSCSD, GPRS, EDGE, EDGE Evolution), 3G (UMTS/FOMA, W-CDMA EUTRAN, HSPA, HSPA+, 4G (LTE Advanced)	3GPP Family of Standards - Including 2G (CSD, HSCSD, GPRS, EDGE, EDGE Evolution), 3G (UMTS/FOMA, W-CDMA EUTRAN, HSPA, HSPA+, 4G (LTE Advanced)
14	ETSI GMR-1 3G Family of standards	ETSI GMR-1 3G Family of standards
15	ISA SP100	ISA SP100
16	Network Management Standards - including Internet based standards such as DMTF, CIM, WBEM, ANSI INCITS 438-2008, SNMP v3, netconf, STD 62, and OSI-based standards including CMIP/CMIS	Network Management Standards - including Internet based standards such as DMTF, CIM, WBEM, ANSI INCITS 438-2008, SNMP v3, netconf, STD 62, and OSI-based standards including CMIP/CMIS
17	NIST SP 500-267	NIST SP 500-267
18	Z-wave	Z-wave

No.	Release1.0で選出された標準	Release2.0で選出された標準
19	IEEE P2030	**IEEE 2030 Standards:** ・IEEE P2030 ・IEEE P2030.1 ・IEEE P2030.2
20	IEC 60929 AC-supplied electronic ballasts for tabular fluorescent lamps – performance requirements	IEC 60929 AC-supplied electronic ballasts for tabular fluorescent lamps – performance requirements
		・IEC/TR 61000-1-2 (2002-06) Ed. 1.0 ・IEC/TR 61000-1-5 (2004-11) Ed. 1.0 ・IEC 61000-2-5 ・IEC 61000-2-9 (1996-02) Ed. 1.0 ・IEC 61000-2-10 (1998-11) Ed. 1.0 ・IEC 61000-2-11 (1999-02) Ed. 1.0 ・IEC 61000-2-13 (2005-03) Ed. 1.0 ・IEC 61000-4-2 ・IEC 61000-4-3 ・IEC 61000-4-4 ・IEC 61000-4-5 ・IEC 61000-4-6 ・IEC 61000-4-8 ・IEC 61000-4-11 ・IEC 61000-4-18 ・IEC 61000-4-23 (2000-10) Ed. 1.0 ・IEC 61000-4-24 (1997-02) Ed. 1.0 ・IEC/TR 61000-4-32 (2002-10) Ed. 1.0 ・IEC 61000-4-33 (2005-09) Ed. 1.0 ・IEC/TR 61000-4-35 (2009-07) Ed. 1.0 ・IEC/TR 61000-5-3 (1999-07) Ed. 1.0 ・IEC/TS 61000-5-4 (1996-08) Ed. 1.0 ・IEC 61000-5-5 (1996-02) Ed. 1.0 ・IEC 61000-5-6 (2002-06) Ed. 1.0 ・IEC 61000-5-7 (2001-01) Ed. 1.0 ・IEC/TS 61000-5-8 (2009-08) Ed. 1.0 ・IEC/TS 61000-5-9 (2009-07) Ed. 1.0 ・IEC 61000-6-5 ・IEC 61000-6-6 (2003-04) Ed. 1.0

No.	Release1.0で選出された標準	Release2.0で選出された標準
21	IEC 62056 Device Language Message Specification (DLMS)/Companion Specification for Energy Metering (COSEM)) Electricity metering – Data exchange for meter reading, tariff and load control	IEC 62056 Device Language Message Specification (DLMS)/Companion Specification for Energy Metering (COSEM)) Electricity metering – Data exchange for meter reading, tariff and load control
22	IEC PAS 62559	IEC PAS 62559
		IEC 60870-2-1
		IEC 60255- 22-x -1 : Relay immunity -2: ESD -3: RF immunity -4: EFT -5: Surge -6: Conducted Immunity
		IEC CISPR 22 and IEEE C63.022 – 1996
		IEC CISPR 24
		IEC 61326x series
		IEEE 1560
		IEEE 1613
		IEEE P1642
		IEEE 473
		IEEE P1775/1.9.7, March 2009
		IEEE C63.16-1993
		IEEE C37.90-2005IEEE C37.90-2005 ・C37.90.1-2002 (electrical transient immunity) ・C37.90.2-2004 (radiated EM immunity) ・C37.90.3-2001 (electrostatic discharge immunity)
23	IEEE C37.2-2008 IEEE Standard Electric Power System Device Function Numbers	IEEE C37.2-2008 IEEE Standard Electric Power System Device Function Numbers
24	IEEE C37.111-1999 IEEE Standard Common Format for Transient Data Exchange (COMTRADE) for Power Systems (COMTRADE)	IEEE C37.111-1999 IEEE Standard Common Format for Transient Data Exchange (COMTRADE) for Power Systems (COMTRADE)
25	IEEE C37.232 Recommended Practice for Naming Time Sequence Data Files	IEEE C37.232 Recommended Practice for Naming Time Sequence Data Files
26	IEEE 1159.3 Recommended Practice for the Transfer of Power Quality Data	IEEE 1159.3 Recommended Practice for the Transfer of Power Quality Data
27	IEEE 1379-2000	IEEE 1379-2000

No.	Release1.0で選出された標準	Release2.0で選出された標準
28	ISO/IEC 15045, "A Residential gateway model for Home Electronic System."	ISO/IEC 15045, "A Residential gateway model for Home Electronic System."
29	ISO/IEC 15067-3 "Model of an energy management system for the Home Electronic System."	ISO/IEC 15067-3 "Model of an energy management system for the Home Electronic System."
30	ISO/IEC 18012, "Guidelines for Product Interoperability."	ISO/IEC 18012, "Guidelines for Product Interoperability."
31	・North American Energy Standards Board (NAESB) ・Open Access Same-Time Information Systems (OASIS)	・North American Energy Standards Board (NAESB) ・Open Access Same-Time Information Systems (OASIS)
32	NAESB WEQ 015 Business Practices for Wholesale Electricity Demand Response Programs	NAESB WEQ 015 Business Practices for Wholesale Electricity Demand Response Programs
		OASIS Energy Interoperation (EI)
33	NEMA Smart Grid Standards Publication SG-AMI 1-2009 – Requirements for Smart Meter Upgradeability	
34	OASIS EMIX (Energy Market Information eXchange)	Organization for the Advancement of Structured Information Standard (OASIS) EMIX (Energy Market Information eXchange)
35	Fix Protocol, Ltd. FIXML Financial Information eXchange Markup Language	Fix Protocol, Ltd. FIXML Financial Information eXchange Markup Language
36	OASIS oBIX	OASIS oBIX
37	OASIS WS-Calendar	OASIS WS-Calendar
38	SAE J1772 Electrical Connector between PEV and EVSE	
39	SAE J2836/1-3 Use Cases for PEV Interactions	
40	SAE J2847/1-3 Communications for PEV Interactions	SAE J2847/1-3 Communications for PEV Interactions
41	W3C Simple Object Access Protocol (SOAP)	W3C Simple Object Access Protocol (SOAP)
42	W3C WSDL Web Service Definition Language	W3C WSDL Web Service Definition Language
43	W3C XML eXtensible Markup Language	W3C XML eXtensible Markup Language
44	W3C XSD (XML Definition)	W3C XSD (XML Definition)
45	W3C EXI	W3C EXI

No.	Release1.0で選出された標準	Release2.0で選出された標準
46	US Department of Transportation's Federal Highway Administration's Intelligent Transportation System (ITS) Standard NTCIP 1213, "Electrical Lighting and Management Systems (ELMS)	US Department of Transportation's Federal Highway Administration's Intelligent Transportation System (ITS) Standard NTCIP 1213, "Electrical Lighting and Management Systems (ELMS)
		OpenADE Energy Service Provider Interface
		UL-1741 The Standard for Static Inverters and Charge Controllers For use in Photovoltaic Power Systems
Cyber Security関連標準		
47	ISA SP99	ISA SP99
48	ISO27000	ISO27000
49	NIST FIPS 140-2	NIST FIPS 140-2
50	OASIS WS-Security and OASIS suite of security standards	OASIS WS-Security and OASIS suite of security standards

Expression in Geen:2.0でスマートグリッド関連標準として認定されたもの
Expression in Blue:2.0で新たにスマートグリッド関連標準としてレビュー候補に加えられたもの
Expression in Red:2.0でスマートグリッド関連標準としてレビュー候補のリストから消えたもの

No.	Release1.0時点でのPAP(What)の記述	Release2.0時点でのPAPの状況
0	なし	**Meter Upgradeability Standard** **Scope:** PAP00 defined requirements including secure local and remote upgrades of smart meters. **Output:** National Electrical Manufacturers Association (NEMA) Meter Upgradeability Standard SG-Advanced Metering Infrastructure (AMI) 1-2009. **Date:** Completed 2009
1	Given that Internet technologies play an important role in support of the Smart Grid information networks, it is critical to identify the appropriate Internet standards or Internet Engineering Task Force "requests for comments" (RFCs) that are suitable for use in the context of the Smart Grid. This action plan presents steps for developing guidelines for the use of the IP protocol suite by working with key SDO committees to determine the characteristics of Smart Grid application areas and domain types and the applicable IP protocols that are suitable for use by these applications and domains. The networking standards identified under this action plan will define a significant portion of the interfaces to Smart Grid equipment and systems for both intra-domain and inter-domain applications. NIST expects the initial guidelines, based on the existing Smart Grid requirements, to be completed by mid-year 2010.	**Role of IP in the Smart Grid** **Scope:** For interoperable networks it is important to study the suitability of Internet networking technologies for Smart Grid applications. PAP01's work area investigates the capabilities of protocols and technologies in the Internet Protocol Suite by working with key SSO committees to determine the characteristics of each protocol for Smart Grid application areas and types. **Output:** This PAP's work culminated in publication of a Request for Comment (RFC) cataloguing a core Internet Protocol Suite for IP-based Smart Grid and its acceptance by the SGIPGB in December 2010 as a Smart Grid standard. **Date:** Completed 2010.
2	Wireless technologies can be used in field environments across the Smart Grid, including generation plants, transmission systems, substations, distribution systems, and customer premises communications. The choice of wireless, type of wireless, or non-wireless must be made with full knowledge of the appropriate use of the technology. This plan will investigate the use of wireless communications for different Smart Grid applications by assessing the strengths, weaknesses, capabilities, and constraints of existing and emerging standards-based technologies for wireless communications. The approach is to work with key SDO committees to determine the characteristics of each technology for Smart Grid application areas and types. Results will be used in evaluations of the appropriateness of wireless communications technologies for Smart Grid applications. NIST expects the initial guidelines, based on the existing Smart Grid requirements, to be completed by mid-year 2010.	**Wireless Communications for the Smart Grid** **Scope:** This PAP's work area investigates and evaluates existing and emerging standards-based physical media for wireless communications. The approach is to work with the appropriate SDOs to determine the communication requirements of Smart Grid applications and how well they can be supported by wireless technologies. Results are used to assess the appropriateness of wireless communications technologies for meeting Smart Grid applications. **Output:** PAP02 compiled Smart Grid communication requirements and a catalog for wireless standards and their characterizations. The PAP developed an evaluation methodology published in "Guidelines for Assessing Wireless Communications for Smart Grid Applications, Version 1.0" in July 2011. **Date:** 2011.

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3	Actions under this plan will result in a common specification for price and product definition. This specification will be used in demand response applications, market transactions, distributed energy resource integration, meter communications, and many other inter-domain communications. Businesses, homes, electric vehicles, and the power grid will benefit from automated and timely communication of energy prices, characteristics, quantities, and related information. Price is a number associated with product characteristics, including delivery schedule, quality (reliability, power quality, source, etc.), and environmental and regulatory characteristics. Price also is a common abstraction for abundance, scarcity, and other market conditions. A common price model will define how to exchange data on energy characteristics, availability, and schedules to support efficient communication of information in any market.	**Common Price Communication Model** **Scope:** Coordination of energy supply and demand requires a common understanding of supply and demand. A simple quotation of price, quantity, and characteristics in a consistent way across markets enables new markets and integration of distributed energy resources. Price and product definition are key to transparent market accounting. Better communication of actionable energy prices facilitates effective dynamic pricing and is necessary for net-zero-energy buildings, supply-demand integration, and other efficiency and sustainability initiatives. Common, up-to-the-moment pricing information is also an enabler of local generation and storage of energy, such as electric-charging and thermal-storage technologies for homes and buildings. PAP03 builds on existing work in financial energy markets and existing demand response programs to integrate with schedule and interval specifications under development. This PAP overlaps with others that include price and product information (4, 6, 8, 9, 10, and 11). **Expected Outputs:** OASIS Energy Market Information Exchange standard version 1.0, Zigbee Smart Energy 2.0. **Date:** 2011.

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4	Already important, coordination of supply and demand in the grid will be critical as distributed energy resources increase and as renewable energy resources account for a growing share of electric power. Beyond electromechanical devices and equipment, it is necessary to coordinate enterprise activities, home operations and family schedules, and market operations. Thus, a common schedule specification is required for the Smart Grid and the many sectors that interact with the grid. Under this plan, NIST and collaborators are surveying existing calendaring specifications. They will develop a standard for how schedule and event information is passed between and within services. The output will be a micro-specification that can then be incorporated into price, demand-response, and other specifications. Easy integration of the specification will facilitate a common scheduling operation across different domains and diverse contracts. A draft is scheduled for completion by the end of April 2010 so that it can be included in the Common Specification for Price and Product Definition plan.	**Common Schedule Communication Mechanism** **Scope:** Under this plan, NIST and collaborators will develop a standard for how schedule and event information is passed between and within services. The output will be a specification that can then be incorporated into price, demand-response, and other specifications. This Project Plan was developed in conjunction with PAP03 (Develop Common Specification for Price and Product Definition). Participants include, but are not limited to, International Electrotechnical Commission (IEC), North American Energy Standards Board (NAESB), other OASIS Technical Committees, and ZigBee Smart Energy Profile. **Expected Outputs:** A common standard for transmitting calendaring information will enable the coordination necessary to improve energy efficiency and overall performance. The Calendar Consortium will complete its current work in 2011 on eXtensible Markup Language (XML) serialization of iCalendar into a Web-service component (OASIS Web Services-(WS)-Calendar). **Date:** 2011.

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5	This action plan will define meter data in standard profiles. The common profiles will benefit not only the utility company, but also customers and the devices they use to manage their energy consumption, such as thermostats and building automation systems. Other potential clients exist inside and outside of the customer premises. Action plan tasks include completion of AEIC Guidelines v2.0, mapping utility requirements expressed via AEIC Guidelines v2.0 to ANSI C12.19 device classes by March 2010, and expressing AEIC Guidelines v2.0 in terms of one or more additional ANSI C12.19 device classes by May 2010. Other tasks include socializing the existence of additional tables within ANSI C12.21-2006 and C12.22-2008 and socializing the existence and application of existing default sets, and the definition of new default sets, device classes, and profiles via Web conferences, all by fourth quarter 2010.	**Standard Meter Data Profiles** **Scope:** The Smart Grid recognizes that several clients may require local access to meter data, and these data may be on the same order of complexity as the meter itself. Such potential clients might range from thermostats to building automation systems. Other potential clients will exist inside and outside of the customers' premises. Meter interface will reach across various domains including Operations (e.g., Metering System), Customer (e.g., Customer Energy Management System (EMS) and Submeter), and Distribution (e.g., Workforce Tool and Field Devices). The ANSI C12.19 standard contains an extensive set of end device (e.g., meter) data tables. This large set of tables makes it time-consuming for utilities (and other service providers) to understand the standard and specify the proper tables for specific applications. The objective of this Priority Action Plan is to develop a smaller set of data tables that will meet the needs of most utilities and simplify the meter procurement process. **Expected Outputs:** Minimize variation and maximize interoperability of application services and behaviors within ANSI C12.18-2006, ANSI C12.19-2008, ANSI C12.21-2006, and ANSI C12.22-2008. **Date:** 2011.

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6	なし	**Common Semantic Model for Meter Data Tables** **Scope:** There are currently several "meter models" in standard existence. These include ANSI C12.19, Device Language Message Specification (DLMS)/ Companion Specification for Energy Metering (COSEM)/IEC 62056, IEC 61968 CIM, and IEC 61850. As the Smart Grid requires interoperation between meters and many other applications and services, the existence of unique forms of data representation pertinent to a single actor is problematic, requiring complex gateways to translate this representation into alternate formats for information sharing. PAP06 works with industry stakeholders to translate the ANSI C12.19 End Device (meter) data model to and from a common form that will allow the semantics of this and End Device models in other standards to be more readily harmonized. The objective is to allow the lossless translation from the common form to the various syntactic representations prevalent in each domain. Details will include the representation of the Decade/Table/Element model. PAP06 develops an exact and reusable representation of the ANSI C12.19 data model in the presentation form of Unified Markup Language (UML). **Expected Outputs:** A side-by-side comparison of the ANSI C12.19 UML model and the IEC 61968-9 UML model to illustrate gaps and overlaps. **Date:** 2011.

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7	Energy storage is required to accommodate the increasing penetration of intermittent renewable energy resources and to improve Electric Power System (EPS) performance. Consistent, uniformly applied interconnection and information model standards, supported by implementation guidelines, are required for energy storage devices (ES), power electronics interconnection of distributed energy resources (DER), hybrid generation-storage systems (ES-DER), and plug-in electric vehicles (PEV) used as storage. A broad set of stakeholders and SDOs have been enlisted to address this need. Significant progress has been made in meeting the objectives of the Energy Storage PAP. The first draft of a Scoping Document defining interconnection requirements across a broad range of anticipated ES-DER scenarios (including islanding) has been completed and posted on the NIST Smart Grid Collaboration Site. The Scoping Document describes EPS applications of dispatchable ES-DER, multifunctional operational interface capabilities of mechanical generators (rotating machines) and electronic generators (power electronics-based inverters), business and regulatory issues influencing the deployment of ES-DER devices, and emerging storage and power electronics technologies that will influence the timeline for introduction of ES-DER devices. A process has also been initiated to identify and develop ES-DER use cases (UCs), and to prioritize and roadmap the standards development required to meet urgent near-term deployments while ensuring consistency of standards for the broad spectrum of future ES- DER applications. The Scoping Document and the prioritized timeline for ES-DER applications will expedite the formation of new standards projects for Smart Grid dispatchable ES-DER extensions of the IEEE 1547 series of standards, which define the physical and electrical interconnection of DERs with the grid. The Scoping Document and UCs will also be used by a similar fast-tracking effort focused on defining ES-DER object models in the IEC 61850-7-420 standards to accommodate Smart Grid requirements. Collaborations with UL, SAE, NEC-NFPA70, and CSA also have been initiated to focus on specifications for safe and reliable implementation.	**Energy Storage Interconnection Guidelines** **Scope:** Energy storage is expected to play an increasingly important role in the evolution of the power grid, particularly to accommodate increasing penetration of intermittent renewable energy resources and to improve electrical power system (EPS) performance. Coordinated, consistent, electrical interconnection standards; communication standards; and implementation guidelines are required for energy storage devices (ES), power-electronics-connected distributed energy resources (DER), hybrid generation-storage systems (ES-DER), and the ES-DER aspects of plug-in electric vehicles (PEV). A broad set of stakeholders and SDOs are needed to address this coordination and evolution in order to update or augment the IEEE 1547 electrical interconnection standards series as appropriate to accommodate Smart Grid requirements and to extend the ES-DER object models in IEC 61850-7-420 as needed. Coordination with Underwriters Laboratories (UL), Society for Automotive Engineers (SAE), National Electrical Code-(NEC-) National Fire Protection Association (NFPA)70, and Canadian Standards Association (CSA) will be required to ensure safe and reliable implementation. This effort will need to address residential, commercial, and industrial applications at the grid distribution level and utility/Regional Transmission Operator (RTO) applications at the grid transmission level. **Expected Outputs:** IEEE 1547.8, IEC 61850-7-420. **Date:** 2012.

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8	This action plan intends to ensure that new Smart Grid equipment for distribution grid operations, currently deploying in many different grid environments, can readily communicate with new and legacy equipment and act on the information exchanged. To ensure the interoperability of new equipment, the strategy calls for defining the key distribution applications that will enable Smart Grid functions for substation automation, integration of distributed energy resources, equipment condition monitoring, and geospatial location; evaluating existing standards; and coordinating the necessary standards development work. This work will enable the integration of data and information from equipment in the distribution grid with information used for enterprise back-office systems. Efforts are focusing on three standards used in North American distribution systems. The standards differ in the type of data models they use. Their integration will enable many new Smart Grid applications and will lower technical barriers to the implementation of these applications. Currently, none of these standards has a complete data model for distributed energy resources, equipment condition monitoring data, geospatial location, and other information that will underpin Smart Grid technologies and applications. It is critical to act quickly on the initial tasks defined in this action plan since deployments, particularly those funded by the Department of Energy Smart Grid grants and demonstration projects, are under way.	**CIM for Distribution Grid Management** **Scope:** Standards are urgently needed to enable the rapid integration of wind, solar, and other renewable resources, and to achieve greater reliability and immunity to grid instabilities resulting from their wide-scale deployment, which is radically changing how the power system must operate. The use of standardized object models, such as the CIM and 61850, will support the interoperability of information exchanges that is critically needed to ensure a more reliable and efficient grid. PAP08 will coordinate with: PAPs 3, 4, 9, or 10 on any use cases involving Demand Response (DR), pricing signals, and other customer interactions; PAP07 on any use cases involving energy storage and Distributed Energy Resources (DER); PAP11 on any use cases involving PEVs; PAP14 on any use cases involving "CIM wires models" or transmission-related interactions; and CSWG on security efforts. **Expected Outputs:** IEC 61968, IEC 61970, and IEC 61850. **Date:** 2011.
9	While the value of DR is generally well understood, the interaction patterns, semantics, and information conveyed vary. Price (often with the time that the price is effective), grid integrity signals (e.g., event levels of low, medium, high), and possibly environmental signals (e.g., air quality) are components of DR communications. Defining consistent signal semantics for DR will make the information conveyed more consistent across Smart Grid domains. The swift deployment of smart meters and the integration of distributed energy resources (DER) into the grid require DR standards. As represented in this plan, the focus of the DR standards effort is to integrate the standards work in OpenADR, OpenSG, IEC TC57, and NAESB efforts, along with the input of other stakeholders to deliver a draft DR specification in January 2010. The initial emphasis is on meeting utility DR requirements, while developing an extensible signaling framework that allows continued development of DER semantics.	**Standard DR and DER Signals** **Scope:** Demand Response communications cover interactions between wholesale markets and retail utilities and aggregators, as well as between these entities and the end-load customers who reduce demand in response to grid reliability or price signals. While the value of DR is generally well understood, the interaction patterns, semantics, and information conveyed vary. Defining consistent signal semantics for DR will make the information conveyed more consistent across Smart Grid domains. **Expected Outputs:** OASIS Energy Interoperation standard version 1.0, Zigbee Smart Energy 2.0. **Date:** 2011.

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10	This action plan will lead to data standards to exchange fine-grained and timely information about energy usage. The first goal is agreement on a core information set to enable integration of usage information throughout facility decision processes. Customers and customer-authorized third-party service providers will use these standards to access energy usage information from the Smart Grid and meter, enabling them to make better decisions about energy use and conservation. Consumers and premises-based systems will use these standards to provide real-time feedback on present and projected performance. Using the Smart Grid infrastructure, this information will be shared with the facility: a home, building, or industrial installation. Two-way flows of usage information will improve collaboration and thereby energy efficiency. The data standards will enable immediate and widespread benefit. They will support access to monthly usage information, which may already be available, as well as near-real-time information as smart meters and other devices are deployed. The standards will enable innovation by third-party service and software providers in providing novel ways to help consumers and operations manage their energy usage. In the absence of these standards, software developers and utilities would have to negotiate pair-wise interfaces, an impractical situation. The standards will also promote more responsive facilities. Devices that deliver and understand common usage information can be deployed more quickly. These standards must be developed on an aggressive timetable. States such as California and Texas have mandated that consumers have electronic access to such data in 2010. This action plan will result in both an initial specification of narrower information to satisfy regulatory mandates by February 2010 and a requirements-based definition for standard energy usage within the facility as well as to and from the Smart Grid by mid-2010.	**Standard Energy Usage Information** **Scope:** This action plan led to data standards to exchange detailed information about energy usage in a timely manner. The first goal was agreement on the core information set to enable integration of usage information throughout facility decision processes. Customers and customer-authorized third-party service providers will use these standards to access energy usage information from the Smart Grid and meter, enabling them to make better decisions about energy use and conservation. Consumers and premises-based systems will use these standards to provide real-time feedback on present and projected performance. Using the Smart Grid infrastructure, this information will be shared with the facility: a home, building, or industrial installation. Two-way flows of usage information will improve collaboration and energy efficiency. **Outputs:** Implementation of a plan to expedite harmonized standards development and adoption: OASIS, IEC61970/61968, IEC61850, ANSI C12.19/22, PAP17/ American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) SPC201, and ZigBee Smart Energy Profile (SEP) 2.0. **Date:** Completed 2011.

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11	This action plan will define data standards to enable the charging of plug-in electric vehicles (PEVs). The specifications will cover charging at home or away from home using a special rate schedule, discharging of PEV energy storage for demand response purposes, and administration and monitoring. The standards will allow the charging flexibility necessary for PEVs to meet customer needs. They also will encourage the adoption of electric vehicles for general-purpose transportation. This anticipated trend would favorably affect the nation's energy portfolio. The standards developed under this action plan will benefit electric utilities by supporting charging during off-peak, low-demand periods and enabling energy stored in PEVs to be returned to the grid during high-demand periods. The objectives described below are expected to be completed by December 2010.	**Common Object Models for Electric Transportation** **Scope:** PAP11 ensures that the grid can support the massive charging of cars and help to popularize the adoption of PEVs. Standards will optimize charging capabilities and vendor innovation, allowing for more creative engineering and automobile amenities. This PAP also supports energy storage integration with the distribution grid as addressed by PAP07. **Expected Outputs:** SAE J1772, SAE J2836/1, and SAE J2847/1. SAE J1772 and SAE J2836/1 standards have been completed and approved, and they are included in the Catalog of Standards. SAE J2847/1 will be submitted for approval later in 2011. **Date:** 2011.
12	There is an urgent need for distribution and transmission communication networks currently using the legacy DNP3 protocol to support the exchanges of larger volumes of data (with low latency/time delays) necessary to achieve new Smart Grid capabilities. This action plan focuses on developing the means to enable transport of select Smart Grid data and related services over legacy DNP3 networks. This will be accomplished, in part, by defining a method to map the exchange of certain data types and services between DNP3 and the newer IEC 61850 Standard for Communication Networks and Systems in Substations. IEC 61850 is considered to be a standard better suited to support Smart Grid functions. IEC 61850 is a comprehensive standard for substation automation that supports monitoring and control of grid equipment (relays, circuit breakers, transformers) as well as renewable energy resources. Many of the new Smart Grid deployments, including those funded under Department of Energy Smart Grid grants programs, will require rapid, high-bandwidth communications that are better supported by IEC 61850. The tasks of this action plan include performing a gap analysis to identify the extent to which DNP3 meets Smart Grid requirements. Guidelines for achieving interoperable integration of DNP3 with EC 61850 and other Smart Grid standards will be produced in 2010.	**Mapping IEEE 1815 (DNP3) to IEC 61850 Objects** **Scope:** This action plan focuses on developing the means to enable transport of select Smart Grid data and related services over legacy Distributed Network Protocol (DNP)3 networks. This will be accomplished, in part, by defining a method to map the exchange of certain data types and services between DNP3 and the newer IEC 61850 Standard for Communication Networks and Systems in Substations. This is to be published as IEC 61850-80-2, Standard for Exchanging Information between Networks Implementing IEC 61850 and IEEE Std 1815 (DNP3). DNP3 was adopted by IEEE as Standard 1815 in 2010. IEEE is now developing Standard 1815.1 which includes upgraded security. **Expected Outputs:** IEC 61850-80-2, IEEE 1815.1. **Date:** 2011.

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13	For the integration of PMU and PDC data based on IEEE C37.118 into IEC 61850, a new work item has already been issued as a joint work item for IEEE and IEC. The work has been circulated within IEC TC57. Within the IEC, a task force as part of working group 10 may be created to support that work from the IEC side. In IEEE, the Power System Relaying Committee (PSRC) H11 Working Group (WG) is responsible for C37.118. These will be the key SDOs for that part of the work. From a procedural viewpoint, the integration of PMU and PDC data into IEC 61850 cannot be considered as an independent standard. Integration will affect several parts of the existing IEC 61850 standard. Therefore, NIST recommends the development of a technical report (similar to IEC 61850-90-1) that addresses all the issues related to the problem. While the final responsibility of the work will be in the joint IEEE/IEC task force, the PAP collaborators will provide technical input to the SDO, will interact with the stakeholders like NASPI, and support demonstration activities. For time synchronization, this action plan focuses on ensuring that Smart Grid deployments use a common format and have common meaning for time data so that the applications are readily interoperable. The approach will determine detailed requirements for Smart Grid applications and in particular, for synchrophasor measurements used to monitor conditions in the transmission grid. Additionally, the plan tasks cover harmonizing the differences in time data formats used by Smart Grid standards, promoting rapid prototype development and interoperability testing, and developing guidelines on how to achieve uniform time stamping throughout the Smart Grid. Since the IEEE PSRC WG H7 work on developing a profile for accurate time synchronization for power system applications is supported by IEC TC57 WG10, no harmonization is required here. The current activities in the WG are driven on one side by the requirements of PMUs and on the other side by the requirements for accurate synchronization of instrument transformers in a substation that are transmitting sampled values as a stream of data for protection and control applications. The PAP13 WG will interact with the IEEE working group by developing the requirements for the different applications of Smart Grid, by contributing technical work and by supporting demonstration activities. In addition, several other aspects need to be considered like loss of synchronization, dealing with synchronization islands and resynchronization. Calendar models are required. Also, other mechanisms for time synchronization using the global positioning system (GPS) or inter-range instrumentation group (IRIG-B) approaches need to be discussed.	**Harmonization of IEEE C37.118 with IEC 61850 and Precision Time Synchronization** **Scope:** The current primary standard for the communication of phasor measurement unit (PMU) and phasor data concentrator (PDC) data and information is the IEEE Standard C37.118, which was published in 2005. This standard also includes requirements for the measurement and determination of phasor values. IEC 61850 is seen as a key standard for all substation and field equipment operating under both real-time and non-real time applications. The use of IEC 61850 for wide-area communication is already discussed in IEC 61850-90-1 (Draft Technical Report) in the context of communication between substations. It appears possible to use a similar approach for the transmission of PMU and PDC data, but the capability needs to be formally defined in IEC 61850. This action plan seeks to assist and accelerate the integration of standards that can impact phasor measurement and applications depending on PMU- and PDC-based data and information. **Expected Outputs:** IEEE C37.118.2 (updated version), IEC 61850-90-5, and IEEE C37.238. **Date:** 2011.

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14	This plan will define strategies for integrating standards across different utility environments to support various real-time grid operations (relay, circuit breaker, transformer operations) and back-office applications for customer services, meter data and billing, and other business operations. The work must be completed on an aggressive schedule to enable ready nteroperability of ongoing Smart Grid deployments funded by federal and industry investments. Modeling of the electric power system, multifunctional Intelligent Electronic Devices (IEDs), and definition of standard methods for reporting events and exchanging relay settings will enable improving the efficiency of many protection, control, engineering, commissioning, and analysis tasks. Tasks include identifying issues that stand in the way of harmonizing potentially conflicting standards and identifying information requirements for relay settings in the Smart Grid. Some of the tasks identified for this action plan overlap with those in PAP 08 "Develop Common Information Model (CIM) for Distribution Grid Management," and are covered by it as noted in the objectives given below.	**Transmission and Distribution Power Systems Model Mapping** **Scope:** PAP14's work defines strategies for integrating standards across different environments to support different real-time and back-office applications. Strategies call for defining key applications and evaluating the available standards for meeting the requirements of such applications. Modeling of the electric power system, multifunctional Intelligent Electronic Devices (IEDs), and definition of standard methods for reporting events and exchanging relay settings will meet the requirements for improvements of the efficiency of many protection, control, engineering, commissioning, and analysis tasks. Field equipment can supply the raw data for objects and measured parameters used across the enterprise based on the standard models and file formats defined. **Expected Outputs:** updates to IEC 61850, IEC 61970, IEC 61968, IEEE C37.239, IEEE C37.237, and MultiSpeak v1-v4. **Date:** 2011.
15	Several power line-based communications technologies are being considered for appliances, meters, and PEV communications in and across the customer premises. Relevant standards include ITU G.Hn (HomeGrid), IEEE P1901 (HomePlug™), and ANSI/CEA 709.2 (Lonworks™). However, these technologies are currently not interoperable and may not coexist successfully, and their operation in proximity may cause harmful mutual interference. Given the cost, complexity, and physical constraints of the medium, it is imperative that coexistence and some interoperability be achieved. The purpose of this PAP is to achieve that resolution.	**Harmonize Power Line Carrier Standards for Appliance Communications in the Home** **Scope:** The goal of this PAP is to enable the development of an interoperable profile containing common features for home appliance applications where the resulting implementation of this profile leads to interoperable products. **Expected Outputs**: Updates to relevant standards including ITU G.Hn (G.9960, G.9961, G.9972), IEEE P1901 (HomePlug ™, High Definition Power Line Communication (HD-PLC™), and Inter-System Protocol (ISP)), and ANSI/ Consumer Electronics Association (CEA) 709.2 (Lonworks™). **Date:** 2011.
16	なし	**Wind Plant Communications** **Scope:** The goal of PAP16 is development of a wind power plant communications standard. **Expected Output:** IEC 61400-25, Wind Plant Communications, based on IEC 61850. **Date**: 2011.

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17	なし	**Facility Smart Grid Information Standard** **Scope:** This priority action plan will lead to development of a data model standard to enable energy-consuming devices and control systems in the customer premises to manage electrical loads and generation sources in response to communication with the Smart Grid. It will be possible to communicate information about those electrical loads to utilities, other electrical service providers, and market operators. This PAP will leverage the parallel PAP10 effort and other related activities and models, such as IEC CIM, SEP 2.0, IEC 61850.7-420, and PAPs 3, 4, and 9. **Expected Output:** Development of an ANSI-approved Facility Smart Grid Information Standard that is independent of the communication protocol used to implement it. **Date:** 2011.
18	なし	**SEP 1.x to SEP 2 Transition and Coexistence** **Scope:** This action plan focuses on developing specific requirements to allow the coexistence of SEP 1.x and 2.0 and to support the migration of 1.x implementations to 2.0. Because it is a deployment-specific issue, the PAP will not address whether new deployments should be 1.x or 2.0. The effort assumes 1.x in the field as the starting point and assumes that the meters themselves are capable of running SEP 1.x or 2.0 via remote firmware upgrade. **Expected Output:** The PAP has produced a white paper summarizing the key issues with migration and making specific recommendations and a requirements document to be submitted to the ZigBee Alliance for consideration in developing the technology-specific recommendations, solutions, and any required changes to the SEP 2.0 specifications themselves. **Date:** 2011.

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