Table 4-1. Standards Identified by NIST

	Standard	Application	Comments	WG
Standards and Specifications				
1	ANSI/ASHRAE 135-2008/ISO 16484-5 BACnet - A Data Communication Protocol for Building Automation and Control Networks http://www.techstreet.com/cgi-bin/basket?action=add&item_id=4427156 IKB Standards Information Form: http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_BACnet.pdf	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.	Open, mature standard with conformance testing developed and maintained by an SDO. BACnet is adopted internationally as EN ISO 16484-5 and used in more than 30 countries. This standard serves as a customer-side communication protocol at the facility interface and is relevant to the Price, DR/DER, and Energy Usage PAPs. (PAP03: Develop Common Specification for Price and Product Definition, PAP09: Standard DR and DER Signals, and PAP10: Standard Energy Usage Information).	B2G
2	ANSI C12 Suite : ANSI C12.1 http-p://webstore.ansi.org/R	Performance- and safety-type tests for revenue meters.	Open, mostly mature standards developed and maintained by an SDO. It is recognized that ANSI C12.19 is an extremely flexible revenue metering model that allows such a wide range of options that	PAPs 5, 6, B2G, H2G

	ecordDetail.aspx?sku=ANSI+C12.1-2008 ANSI C12.18/IEEE P1701/MC1218 http://webstore.ansi.org/FindStandards.aspx?SearchString=c12.18&SearchOption=0&PageNum=0&SearchTermsArray=null|c12.18|null ANSI C12.19/MC1219 http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI+C12.19-2008 ANSI C12.20 http://webstore.ansi.org/FindStandards.aspx?SearchString=c12.20&SearchOption=0&PageNum=0&SearchTermsArray=null|c12.20|null	Protocol and optical interface for measurement devices. Revenue metering End Device Tables. Revenue metering accuracy specification and type tests. Transport of measurement device data over telephone networks.	requests for actionable information from a meter, such as usage in kilowatt hours, requires complex programming to secure this information. ANSI C12.19 2008 has a mechanism by which table choices can be described, termed Exchange Data Language (EDL), that can be used to constrain oft-utilized information into a well-known form. PAP05 has been set up to establish common data tables for meter information that will greatly reduce the time for utilities and others requiring meter data to implement Smart Grid functions, such as demand response and real-time usage information (PAP05: Standard Meter Data Profiles). The task was undertaken by the Association of Edison Illuminating Companies (AEIC). AEIC completed a new guideline on November 19, 2010, "SmartGrid/AEIC AMI Interoperability Standard Guidelines for ANSI C12.19 / IEEE 1377 / MC12.19 End Device Communications and Supporting Enterprise Devices, Networks and Related Accessories, Version 2.0." The guideline is also included in this table. It is recognized that C12.22 is an important standard relevant to the transport of C12.19 tables and many comments on the draft framework document recommending it were received. However, it is not included here, but rather in Table 4.2 for further review, because it is not clear that sufficient consensus exists	

	ANSI C12.21/IEEE P1702/MC1221 http://webstore.ansi.org/FindStandards.aspx?SearchString=c12.21&SearchOption=0&PageNum=0&SearchTermsArray=null|c12.21|null IKB Standard Information Template: C12.1: C12.18 - http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_ANSIC12_18.pdf C12.19 - http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_AN		for it. Several issues were raised in other comments received, including concerns about layering, security, and the need for better alignment with Internet Protocol and harmonization with the IEC 62056(Device Language Message Specification (DLMS)/Companion Specification for Energy Metering (COSEM)) standard (see #21 in Table 4.2). This further review may require a PAP to be established by the SGIP.	

	SIC12_19.pdf C12.20 - http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_ANSIC12_19.pdf C12.21 - http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_ANSIC12_21.pdf			
3	ANSI/CEA 709 and CEA 852.1 LON Protocol Suite: ANSI/CEA 709.1-B-2002 Control Network Protocol Specification http://www.ce.org/Standards/browseByCommittee_2543.asp	This is a general purpose local area networking protocol in use for various applications including electric meters, street lighting, home automation, and building automation.	Widely used, mature standards, supported by the LonMark International users group. Proposed for international adoption as part of ISO/IEC 14908, Parts 1, 2, 3, and 4. These standards serve on the customer side of the facility interface and are relevant to the Price, DR/DER, and Energy Usage PAPs (PAP03: Develop Common Specification for Price and Product Definition, PAP09: Standard	B2G

	ANSI/CEA 709.2-A R-2006 Control Network Power Line (PL) Channel Specification http://www.ce.org/Standards/browseByCommittee_2545.asp	This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.	DR and DER Signals, and PAP10: Standard Energy Usage Information).	
	ANSI/CEA 709.3 R-2004 Free-Topology Twisted-Pair Channel Specification http://www.ce.org/Standards/browseByCommittee_2544.asp	This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.		
	ANSI/CEA-709.4:1999 Fiber-Optic Channel Specification http//www.ce.org/Standards/browseByCommittee_2759.asp	This is a specific physical layer protocol designed for use with ANSI/CEA 709.1-B-2002.		
	CEA-852.1:2009 Enhanced Tunneling Device Area Network Protocols Over Internet Protocol Channels http://www.ce.org/Stan	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		

	dards/browseByCommittee_6483.asp	create larger internetworks.		
4	IEEE 1815 (DNP3) IEEE Xplore - IEEE Std 1815-2010	This standard is used for substation and feeder device automation, as well as for communications between control centers and substations.	An open, mature, widely implemented specification initially developed and supported by a group of vendors, utilities, and other users, and now maintained by an SDO. IEEE has adopted it as an IEEE standard, IEEE Std 1815-2010, excluding the cybersecurity part which is being updated by IEEE Substation Committee WG C12. A Priority Action Plan (PAP12) was established to support transport of Smart Grid data and management functions between networks implementing IEEE 1815 and IEC 61850. PAP12 has coordinated actions on the development of mapping between IEC 61850 and IEEE 1815 (DNP3) objects that will allow presently-communicated SCADA information to be used in new ways, while also providing the ability to create new applications using the existing DNP3 infrastructure. A draft IEEE 1815.1 mapping standard has been developed, and a new working group C14 under IEEE substation committee has been established to adopt it as a formal IEEE standard.It is also anticipated to be adopted later by IEC as a dual-logo IEEE/IEC standard. (PAP12: Mapping IEEE 1815 (DNP3) to IEC 61850 Objects).	T&D, PAP12
5	IEC 60870-6 / TASE.2 http://webstore.iec.ch/webstore/webstore.nsf/artnum/034	This standard defines the messages sent between control centers of different utilities.	Open, mature standard developed and maintained by an SDO. It is widely	T&D

	806 IKB Standards Information Form: http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_IEC60870_6.pdf		implemented with compliance testing. This is part of the IEC 60870 Suite of standards. It is used in almost every utility for inter-control center communications between SCADA and/or EMS systems. It is supported by most vendors of SCADA and EMS systems.	
6	IEC 61850 Suite http://webstore.iec.ch/webstore/webstore.nsf/artnum/033549!opendocument IKB Standards Information Form: http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_IEC61850.pdf	This standard defines communications within transmission and distribution substations for automation and protection. It is being extended to cover communications beyond the substation to integration of distributed resources and between substations.	Open standard with conformance testing that is developed and maintained by an SDO. It has been widely adopted world-wide and is starting to be adopted in North America. Developed initially for field device communications within substations, this set of standards is now being extended to communications between substations, between substations and control centers, and including hydroelectric plants, DER, and synchrophasors. It is also adapted for use in wind turbines (IEC 61400-25) and switchgears (IEC 62271-3). Several PAPs (PAP8, PAP12, and PAP13) are dedicated to further development work in various areas. PAP12 has been working on the mapping of IEEE 1815 (DNP3) to IEC 61850 objects, and it has resulted in a draft IEEE standard P1815.1 being completed in early 2011 for adoption by IEEE around mid-2011. (PAP12: Mapping IEEE 1815 (DNP3) to IEC 61850 Objects)	T&D, PAP7, PAP8, PAP11, PAP12, PAP13, R&S

			PAP13 is established to assist and accelerate the integration of standards (IEEE C37.118 and IEC 61850) that impact phasor measurement systems and applications that use synchrophasor data, as well as implementation profiles for IEEE Std 1588 for precision time synchronization. (PAP13: Harmonization of IEEE C37.118 with IEC 61850 and Precision Time Synchronization) IEEE will split current IEEE C37.118-2005 into two parts in its new revision to facilitate the harmonization with IEC standards: C37.118.1 "*Standard for synchrophasor measurements for power systems*" aimed to become an IEEE/IEC dual-logo standard, and C37.118.2, "*Standard for synchrophasor data transfer for power systems*" to be harmonized with / transitioned to IEC 61850-90-5, which is currently under development. PAP8 is working on harmonizing this family of standards, the IEC 61970 family of standards (CIM), and Multispeak for distribution grid management (PAP08: CIM/61850 for Distribution Grid Management).	
7	IEC 61968/61970 Suites	These families of standards define information exchanged among control center systems using	Open standards that are starting to become more widely implemented, developed and maintained by an SDO with support from a	T&D

	http://webstore.iec.ch/webstore/webstore.nsf/artnum/031109!opendocument http://webstore.iec.ch/webstore/webstore.nsf/artnum/035316!opendocument IKB Standards Information Form: http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_IEC61968.pdf	common information models. They define application-level energy management system interfaces and messaging for distribution grid management in the utility space.	users group. They are part of PAP08 activities relating to integration with IEC 61850 and Multispeak (PAP08: CIM/61850 for Distribution Grid Management).	
8	IEEE C37.118-2005 (To be published as IEEE C37.118.1 and IEEE C37.118.2 in its new revision) https://sbwsweb.ieee.org/ecustomercme_enu/start.swe?SWECmd=GotoView&SWEView=Catalog+View+(eSales)_St	This standard defines phasor measurement unit (PMU) performance specifications and communications for synchrophasor data.	Open standard, widely implemented, developed and maintained by an SDO. Standard includes some requirements for communications and measurement and is currently being updated by IEEE Power System Relaying Committee (PSRC) Relaying Communications Subcommittee Working Group H11 and H19. Some items not covered in C37.118-2005 include communication service modes, remote device configuration, dynamic measurement	T&D

	andards_IEEE&mem_type=Customer&SWEHo=sbwsweb.ieee.org&SWETS=1192713657 IKB Standards Information Form: http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_IEC61970.pdf		performance, and security. IEEE will split current IEEE C37.118-2005 into two parts in its new revision to facilitate the harmonization with IEC standards: C37.118.1 "*Standard for synchrophasor measurements for power systems*" by IEEE PSRC WG H11 to become an IEEE/IEC dual-logo standard, and C37.118.2, "*Standard for synchrophasor data transfer for power systems*" by IEEE PSRC WG H19 to be harmonized with / transitioned to IEC 61850-90-5, which is currently under development. IEEE PSRC WG C5 is developing a "Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU) applied in Power System Protection and Control" based on the C37.118 standards and previous publications by North American Synchro-Phasor Initiative (NASPI) in these areas. They are part of PAP13 relating to harmonization of IEC 61850 and IEEE C37.118 standards (PAP13: Harmonization of IEEE C37.118 with IEC 61850 and Precision Time Synchronization).	
9	IEEE 1547 Suite https://sbwsweb.ieee.org/ecustomercme_enu/st	This family of standards defines physical and electrical interconnections between utility	Open standards developed and maintained by an SDO with significant implementation for the parts covering physical/electrical	PAP7, R&S

	art.swe?SWECmd=GotoView&SWEView=Catalog+View+(eSales)_Standards_IEEE&mem_type=Customer&SWEHo=sbwsweb.ieee.org&SWETS=1192713657	and distributed generation (DG) and storage.	connections. The parts of this suite of standards that describe messages are not as widely deployed as the parts that specify the physical interconnections. Many utilities and regulators require their use in systems. Revising and extending the IEEE 1547 family is a focus of PAP07, covering energy storage interconnections (PAP07: Energy Storage Interconnection Guidelines**Error! Hyperlink reference not valid.**). When applied to utility-interactive equipment, UL 1741, "Standard for Safety Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources," should be used in conjunction with 1547 and 1547.1 standards to supplement them. The products covered by these requirements are intended to be installed in accordance with the National Electrical Code, NFPA 70.	
10	IEEE 1588 http://ieee1588.nist.gov/ IEEE PC37.238 http://standards.ieee.org/develop/project/C37.238.html	Standard for time management and clock synchronization across the Smart Grid for equipment needing consistent time management.	Open standard. Version 2 is not widely implemented for power applications. Developed and maintained by an SDO. IEEE PSRC Subcommittee Working Group H7 is developing a new standard PC37.238 (IEEE Standard Profile for use of IEEE Std. 1588 Precision Time Protocol in Power System Applications).	T&D, PAP13

			The new standard is part of PAP13, which covers incorporating precision time synchronization with harmonization of IEEE and IEC standards for communications of phasor data (PAP13: Harmonization of IEEE C37.118 with IEC 61850 and Precision Time Synchronization).	
11	Internet Protocol Suite including, but not limited to: IETF RFC 2460 (IPv6) http://www.ietf.org/rfc/rfc2460.txt IETF RFC 791 (IPv4) http://www.ietf.org/rfc/rfc791.txt Internet Protocols for the Smart Grid RFC http://tools.ietf.org/html/draft-baker-ietf-core-11	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. Internet Protocols for the Smart Grid.	A set of open, mature standards produced by IETF for Internet technologies. As part of the tasks for PAP01 (PAP01: Role of IP in the Smart Grid), a core set of IP protocols has been identified for Smart Grid. After review by PAP01, CSWG, and SGAC, it has been recommended to and approved by the SGIP GB for recommendation for inclusion in the SGIP Catalog of Standards. The Internet Protocols for the Smart Grid RFC identifies the key protocols of the Internet Protocol Suite for use in the Smart Grid. The target audience is those people seeking guidance on how to construct an appropriate Internet Protocol Suite profile for the Smart Grid.	PAP1, SGAC
12	Multispeak http://www.multispeak.org/About/specifications.htm IKB Standards Information Form:	A specification for application software integration within the utility operations domain; a candidate for use in an Enterprise Service Bus.	An open, mature specification, developed and maintained by a consortium of electric utilities and industry vendors, with an interoperability testing program. It is part of PAP08's task for harmonization of IEC 61850/CIM and Multispeak (PAP08: CIM/61850 for Distribution Grid Management).	T&D, PAP8

	http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_MultiSpeakV4.pdf			
13	NAESB WEQ19, REQ18, Energy Usage Information	The standards specify two-way flows of energy usage information based on a standardized information model.	Open standards, developed and maintained by an SDO. These are new standards to be adopted and deployed. It will be a basis of additional standards and recommendations including those from PAP17; also used as input for Energy Interoperation. The standards have been reviewed by PAP10 (PAP10: Standard Energy Usage Information) and SGAC. It has been recommended to and approved by the SGIP GB for inclusion in the Catalog of Standards.	PAP10, PAP17
14	OpenADR http://openadr.lbl.gov/pdf/cec-500-2009-063.pdf IKB Standards Information Form: http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_OpenADR.pdf	The specification defines messages exchanged between utilities and commercial/industrial customers for price-responsive and direct load control.	Developed by Lawrence Berkeley National Laboratory, used primarily in California. It is part of PAP09 to develop standard demand response signals OpenADR 2.0 is a profile (subset) of Energy Interoperation. (PAP09: Standard DR and DER Signals).	PAP9
15	OPC-UA Industrial	A platform-independent specification for a secure, reliable,	Widely supported open standard, with	T&D,

	http://www.opcfoundation.org/Downloads.aspx?CM=1&CN=KEY&CI=283 IKB Standards Information Form: http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_OPCUA.pdf	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.	compliance testing program.	B2G?
16	Open Geospatial Consortium Geography Markup Language (GML) http://www.opengeospatial.org/standards/gml IKB Standards Information Form: http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_OpenGIS.pdf	A standard for exchange of location-based information addressing geographic data requirements for many Smart Grid applications.	An open standard, GML encoding is in compliance with ISO 19118 for the transport and storage of geographic information modeled according to the conceptual modeling framework used in the ISO 19100 series of International Standards and is in wide use with supporting open source software. Also used in Emergency Management, building, facility, and equipment location information bases (http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32554).	T&D

17	ZigBee/HomePlug Smart Energy Profile 2.0 http://www.zigbee.org/Products/TechnicalDocumentsDownload/tabid/237/Default.aspx	Home Area Network (HAN) Device Communications and Information Model.	A profile under development, but anticipated to be technology-independent and useful for many Smart Grid applications.	H2G, HAN TF
Requirements and Guidelines				
18	OpenHAN http://osgug.ucaiug.org/utilityami/openhan/HAN%20Requirements/Forms/AllItems.aspx	A specification for home area network (HAN) to connect to the utility advanced metering system including device communication, measurement, and control.	A specification developed by a users group, UCAIug, that contains a "checklist" of requirements that enables utilities to compare the many available HANs.	H2G, HAN TF
19	AEIC Guidelines v2.0 http://www.aeic.org/meter_service/AEICSmartGridStandardv2-11-19-10.pdf	A guideline comprising framework and testing criteria for vendors and utilities who desire to implement standards-based AMI (StandardAMI) as the choice for Advanced Metering Infrastructure (AMI) solutions.	The guidelines in this document were created in order to assist utilities in specifying implementations of ANSI C12.19 typical metering and AMI devices. Intended to constrain the possible options chosen when implementing the ANSI C12 standards and therefore improve interoperability.	PAP5
20	SAE J1772: SAE Electric Vehicle and Plug in Hybrid Electric Vehicle Conductive Charge Coupler http://standards.sae.org/j1772_201001/	A recommended practice covering the general physical, electrical, functional, and performance requirements to facilitate conductive charging of EV/PHEV vehicles in North America.	This recommended practice responds to a need for a coupling device identified very early on in the EV industry and meets new interoperability and communications requirements. After review by PAP11 (PAP11: Common Object Models for Electric Transportation), CSWG, and SGAC, it has been recommended	V2G, PAP11

			to and approved by the SGIP GB for inclusion in the SGIP Catalog of Standards.	
21	SAE J2836/1: Use Cases for Communication Between Plug-in Vehicles and the Utility Grid http://standards.sae.org/j2836/1_201004	This document establishes use cases for communication between plug-in electric vehicles and the electric power grid, for energy transfer and other applications.	This document responds to a need by system designers for documentation of use cases as inputs to creation of end-to-end system solutions between EVs and utilities. After review by PAP11 (PAP11: Common Object Models for Electric Transportation), CSWG and SGAC, it has been recommended to and approved by the SGIP GB for inclusion in the SGIP Catalog of Standards.	V2G, PAP11
22	IPRM - SGTCC http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGTCCIPRM/SGTCC_IPRM_Version_1.0_Updated.pdf	The Interoperability Process Reference Manual (IPRM) developed by SGIP SGTCC outlines the conformance, interoperability, and cybersecurity testing and certification requirements for SGIP-recommended Smart Grid standards.	A guide developed and maintained by the SGTCC of SGIP. IPRM has been designed to capture testing and certification processes and best practices needed to verify product interoperability amongst two or more products using the same standards-based communications technology. These processes and best practices are intended for use by an Interoperability Testing and Certification Authority (ITCA) in the design and management of a testing and certification program.	TCC

23	ISP-based Broadband-PLC coexistence mechanism: (Portion of) IEEE 1901-2010 https://sbwsweb.ieee.org/ecustomercme_enu/start.swe?SWECmd=GotoView&src=0&Join=n&SWEView=Catalog+View+%28eSales%29_Main_JournalMags_IEEE&mem_type=Customer&HideNew=N&SWEHo=sbwsweb.ieee.org&SWETS=1298228970 and ITU-T G.9972 (06/2010) http://www.itu.int/rec/T-REC-G.9972-201006-P/en	Both IEEE 1901-2010, "IEEE Standard for Broadband over Power Line Networks: Medium Access Control and Physical Layer Specifications," and ITU-T G.9972 (06/2010), "Coexistence mechanism for wireline home networking transceivers," specify Inter-System Protocol (ISP) based Broadband (> 1.8 MHz) PLC (BB-PLC) coexistence mechanisms to enable the coexistence of different BB-PLC protocols for home networking.	Both IEEE 1901 and ITU-T G.9972 are developed and maintained by SDOs. Through coordination by PAP15 (PAP15: Harmonize Power Line Carrier Standards for Appliance Communications in the Home), the potential divergence between the two standards has been resolved before they are ratified. IEEE 1901--compliant devices implementing either one of the two IEEE 1901 PHY/MACs can coexist with each other. Likewise, ITU-T G.9960/9961 devices that implement ITU-T G.9972 can coexist with IEEE 1901-compliant devices implementing either one of the two IEEE 1901 PHY/MACs.	PAP15, H2G

Cybersecurity				WG
24	*Security Profile for*	This document	The Advanced Metering Infrastructure Security (AMI-SEC) Task	CSWG

	Advanced Metering Infrastructure, v 1.0, Advanced Security Acceleration Project – Smart Grid, December 10, 2009 http://osgug.ucaiug.org/utilisec/amisec/Shared%20Documents/AMI%20Security%20Profile%20(ASAP-SG)/AMI%20Security%20Profile%20-%20v1_0.pdf.	provides guidance and security controls to organizations developing or implementing AMI solutions. This includes the meter data management system (MDMS) up to and including the HAN interface of the smart meter.	Force was established under the Utility Communications Architecture International Users Group (UCAIug) to develop consistent security guidelines for AMI.	
25	Department of Homeland Security, National Cyber Security Division. 2009, September. Catalog of Control Systems Security: Recommendations for Standards Developers. http://www.us-cert.gov/control_systems/pdf/FINAL-Catalog_of_Recommendations_Rev4_101309.pdf	The catalog presents a compilation of practices that various industry bodies have recommended to increase the security of control systems from both physical and cyber attacks.	This is a source document for the NIST Interagency Report NISTIR 7628, *Guidelines for Smart Grid Cyber Security* (http://csrc.nist.gov/publications/nistir/ir7628/introduction-to-nistir-7628.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-7628_vol1.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-7628_vol2.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-7628_vol3.pdf).	CSWG
26	DHS Cyber	The National	This is a source document for the NIST Interagency Report NISTIR	CSWG

	Security Procurement Language for Control Systems http://www.us-cert.gov/control_systems/pdf/FINAL-Procurement_Language_Rev4_100809.pdf	Cyber Security Division of the Department of Homeland Security (DHS) developed this document to provide guidance to procuring cybersecurity technologies for control systems products and services.It is not intended as policy or standard. Because it speaks to control systems, its methodology can be used with those aspects of Smart Grid systems.	7628, *Guidelines for Smart Grid Cyber Security* (http://csrc.nist.gov/publications/nistir/ir7628/introduction-to-nistir-7628.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-7628_vol1.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-7628_vol2.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-7628_vol3.pdf).	
27	IEC 62351 Parts 1-8 http://webstore.iec.ch/webstore/webstore.nsf/artnum/037996!opendocument IKB Standards	This family of standards defines information security for power system control operations.	Open standard, developed and maintained by an SDO. Defines security requirements for power system management and information exchange, including communications network and system security issues, TCP/IP and MMS profiles, and security for ICCP and Sub-station automation and protection. It is for use in conjunction with related IEC standards, but has not been widely adopted yet.	CSWG

	Information Form : http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate_IEC62351.pdf			
28	IEEE 1686-2007 https://sbwsweb.ieee.org/ecustomercme_enu/start.swe?SWECmd=GotoView&SWEView=Catalog+View+(eSales)_Standards_IEEE&mem_type=Customer&SWEHo=sbwsweb.ieee.org&SWETS=1192713657	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.	Open standard, developed and maintained by an SDO. Not widely implemented yet.	CSWG

29	NERC CIP 002-009 http://www.nerc.com/page.php?cid=2|20	These standards cover organizational, processes, physical, and cybersecurity standards for the bulk power system.	Mandatory standards for the bulk electric system. Currently being revised by NERC.	CSWG
30	NIST Special Publication (SP) 800-53, NIST SP 800-82 http://csrc.nist.gov/publications/drafts/800-82/draft_sp800-82-fpd.pdf; http://csrc.nist.gov/publications/nistpubs/800-53-Rev3/sp800-53-rev3-final-errata.pdf.	These standards cover cybersecurity standards and guidelines for federal information systems, including those for the bulk power system.	Open standards developed by NIST. SP800-53 defines security measures required for all U.S. government computers. SP800-82 is in draft form. It defines security specifically for industrial control systems, including the power grid.	CSWG
31	IEC 61851			CSWG
32	NISTIR 7628 http://csrc.nist.gov/publications/nistir/ir7628/introduction-to-nistir-7628.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-	A guideline that is • An overview of the cybersecurity strategy used by the CSWG to develop the high-level cyber security	A guideline published by NIST in 2010. It was developed through a participatory public process that, starting in March 2009, included several workshops as well as weekly teleconferences, all of which were open to all interested parties. There were two public reviews of drafts of the report, both announced through notices in the *Federal Register*. The guidelines are not prescriptive, nor mandatory. Rather they are advisory, intended to facilitate each organization's efforts to develop a cybersecurity strategy effectively focused on prevention, detection, response, and recovery.	CSWG

	7628_vol1.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-7628_vol2.pdf http://csrc.nist.gov/publications/nistir/ir7628/nistir-7628_vol3.pdf	Smart Grid requirements; • A tool for organizations that are researching, designing, developing, implementing, and integrating Smart Grid technologies—established and emerging; • An evaluative framework for assessing risks to Smart Grid components and systems during design, implementation, operation, and maintenance; and • A guide to assist organizations as they craft a		

		Smart Grid cybersecurity strategy that includes requirements to mitigate risks and privacy issues pertaining to Smart Grid customers and uses of their data.		