# INFORMATION, COMMUNICATION & CYBER SECURITY NEWSLETTER

Dear EPRI ICCS Members and Stakeholders,

Happy Groundhog Day! According to Punxsutawney Phil, we will have an early Spring. ICCS is moving along just as quickly as the changing of the seasons – and 2016 is off to an incredibly busy start. The first month of the year has been packed with incredible opportunities for learning and engaging, which leads me to believe this will be an inspiring year for the electric utility industry.

The first big learning opportunity this year is the publishing of the 2015 Cyber Security (183) Annual Review and the Information & Communication Technology (161) Annual Review. Each of these Annual Reviews highlights last year's deliverables, with key takeaways on how to apply the results. In addition, each project set has a brief success story on how EPRI research is being applied as well as references to our technical team and all past reports. I highly encourage you to share these reports with your teams as a key measure of the success of our research --- and the ability of utilities to apply the results.
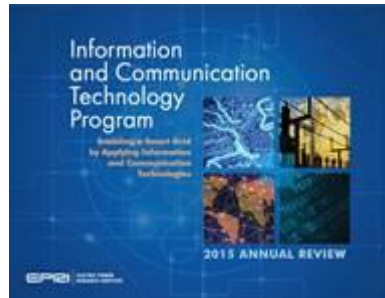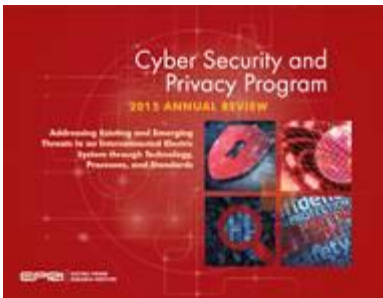
The pace doesn't slowdown in February. EPRI is participating in the DistribuTECH conference in Orlando (February 9-11) – yes, that's next week. We will have a very strong presence with a number of papers and panel session participants as well as our expert staff in the EPRI booth **(#2061)** displaying some of the important research areas across PDU. Please stop by and see us.

And a quick reminder for our upcoming advisors and sector council meetings in Austin, Texas (Feb 22-25) – If you haven't registered and would like to attend follow this link.

Coming up in April is the EPRI European Engagement Summit, which will be in Dublin, Ireland. Follow this link for more details and to register for the summit.

One last reminder about another upcoming event - the **Call for Contributions** for the EPRI/Southern Company *2016 EPRI Smart Distribution and Power Quality Conference and Exhibition*, "*Embracing the Grid of the Future*" (June 28-30) has been released. Utilities, industry reps, and consumers are invited

to participate by sharing their unique perspectives on the importance of the focus areas. For more details and guidelines follow this link.

And an entertainment nugget, the behind the scenes story of the electric industry has hit Hollywood. Coming to a theater near you in October 2016 is "Life in the Line". Here's a sneak peek at the trailer https://youtu.be/zbmqO_XEhko. (We hear PG&E helped in making this movie.)

Keep reading to see what's been accomplished since our December newsletter.

I look forward to seeing many of you in Orlando and/or Austin in February.

Sincerely,

Matt Wakefield
Director, Information, Communication and Cyber Security Research

Information and Communication Technology (ICT) (161)

ICT Team Industry Contributions and Collaborations

Brian Seal is featured in an EPRI Journal article _DERMS: Software and Communications for Grid Integration_ where the discussion is that _Researchers Envision App Managing Millions of Distributed Energy Resources_.

ICT / IntelliGrid (161) & Related Demonstration Deliverables

Top Ten Indicators of Enterprise Architecture (EA) Maturity

Indicators of Enterprise Architecture Maturity _is a survey instrument developed by the EPRI Enterprise Architecture Interest Group to provide a means to do a "back of the envelope" maturity assessment of enterprise architecture practices. When the survey design was completed, fifteen utilities participated in a survey using this instrument. Each utility could then compare its results to the aggregated results of all participants. Each participating utility received a chart that reflected the range of responses (0 through 5, indicating the level of maturity for a given indicator), average score, and the distance from the mean (either positive or negative) for each indicator in the survey. The output of this survey will be used to collaboratively develop materials to address weaknesses that were reflected in the results of the survey in an effort to help utility enterprise architecture teams improve their practices._

[Evaluation of TV White Space for Utility Communications Networks](#)

Television (TV) White Space consists of unoccupied channels in the very high frequency (VHF) and ultra high frequency (UHF) bands. Federal Communications Commission (FCC) regulations have made this spectrum available to unlicensed radio devices operating under specific rules. Commercial products operating in this spectrum have recently become available. This report presents the results of testing TV White Space for utility communications network applications.

[Electric Utility Guidebook on Using IEC Standards for Asset Health Data Management: Harmonizing Common Information Model (CIM) and IEC 61850 Asset Health Data Models](#)

This report examines each standard's perspective on grid resources and the measurements associated with the grid resources, explores each standard's data modeling approach, and reviews each standard's supporting data models. Harmonizing the touchpoints between standards is crucial to realizing the field-to-enterprise data sharing vision. The report overviews the ongoing work of the IEC Common Information Model (CIM)/61850 Harmonization Task Force and the CIM users group (CIMug) Asset Health Focus Community. These two organizations are focused on effectively bridging the distance between standards. The report examines in detail several areas of their work that are providing critical support to the use of field data for asset analytics.

[Guidebook for Advanced Metering Infrastructure Prognostics and Health Management, Second Edition](#)

This document is a guidebook for utilities that details a recommended practice for AMI system prognostics and health management (PHM). The procedures outlined herein are intended to guide utility test procedures that provide insight into the remaining useful service life of AMI systems.

[Utility Cloud Integration Guidebook: A Guide for Enterprise Architects](#)

As cloud technologies continue to mature, they have become an important consideration in the overall architecture of utilities. The fact is that these technological solutions have matured to the point at which they warrant new attention. The challenge then becomes to make sure that utility decision-makers are armed with a basic understanding of cloud technology and how it impacts architecture decisions, along with an understanding of how to best manage the financial aspects of migrating to or investing in cloud-based solutions. Additionally, as with any fundamental change in architecture, the appropriate governance and change-management challenges need to be addressed. There are many available resources that address cloud topics, but there are few (if any) that address cloud technology in a utility-based context which reflects an understanding of utilities' specific constraints and typical operating environments.

This research synthesized numerous sources of information pertaining to cloud-based computing solutions into a singular resource that provides guidance on all of the factors that should be considered when evaluating a utility's application portfolio. This guidebook does not tell each utility practitioner what their decisions should be; rather, it creates a comprehensive framework to provide assistance when evaluating solutions.

[Telecommunications Solutions for a Distribution Network: A Hydro-Québec Case Study](#)

This case study includes results of technology tests, cost-benefit analyses, and a pilot project, as well lessons learned in the process of selecting and deploying a cellular system.

[Utility Needs and Wants Gap Analysis for Innovators Forum](#)

This first-year forum report is based on the extensive research—including a survey—performed for the purpose of developing the 2015 Information, Communication, and Cyber Security (ICCS) Roadmap. Gaps that were identified to exist between current capabilities and the future states are characterized, and the survey rankings of the gaps that fall into the top and bottom quartiles are identified.

[Opportunities and Hesitations Associated with Open Advanced Metering Infrastructure](#)

Many utilities are interested in interoperability for AMI systems that would allow them to buy meters and other system components from any source and blend them into a cohesive system. At the same time, utilities have recognized that moving to open systems of this sort will bring certain new challenges from both the business and technical perspective. Although such open AMI systems have clear advantages, new challenges may cause some to hesitate as they consider emerging opportunities.

This technical update report examines some of the opportunities and hesitations for a utility to examine when considering implementing an open AMI system, including such issues as responsibility for integration of the system components, which entities provide the required maintenance expertise, and some potential economic effects on the industry.

[Reference Implementation of Open AMI Endpoints Based on IEEE 802.15.4g and Wi-SUN](#)

This document describes a reference implementation of the IEEE 802.15.4g / Wi-SUN communication standard. EPRI developed this reference software during 2015 to provide the market with a vendor-neutral implementation and utilities with a baseline against which vendor products can be evaluated. EPRI is participating in Wi-SUN interoperability events with this software and intends to have it certified going forward.

Upcoming Meetings/Webcasts

GIS Interest Group – Automated Damage Assessment using Overhead Imagery	25-Feb 2016 11 a.m., Eastern

With support from Department of Homeland Security, Pacific Northwest National Laboratory (PNNL) is developing algorithms for automated damage assessment, and a framework for delivering geospatial situational intelligence to electrical utilities. The objective of the project is to provide actionable damage information to utilities within 24 hours of a weather event.

The webcast will describe the process and algorithms for collecting imagery, automated analysis, and delivery of damage information useful to utilities.

Meeting/Webcast Materials Available

[Information and Communication Technology Emerging Technologies and Technology Transfer – Project Set P161A](#)

[Information and Communications Technology for Smart Transmission Systems Webcast – Project Set P161B](#)

[Information and Communications Technology for Distribution Webcast – Project Set P161C](#)

[Information and Communications Technology for Distributed Energy Resources and Demand Response Webcast – Project Set P161D](#)

[Information and Communications Technology for Enterprise Architecture and Systems Integration Webcast – Project Set P161E](#)

[Information and Communications Technology for Advanced Metering Systems Webcast – Project Set P161F](#)

Cyber Security and Privacy Program (183)

Cyber Security Team Industry Contributions and Collaborations

[From E&ETV](#): *On January 6, 2016, on **OnPoint**, Annabelle Lee, an appointed member and the only American on the European Commission's cybersecurity panel, discusses the unique cybersecurity challenges facing Europe as it works to advance its electric power grid.*

Cyber Security (183) Program Demonstration Deliverables

[Cyber Security and Privacy Newsletter, January 2016](#)

EPRI's tracking and outreach efforts reflect its continued commitment to support the power industry in the identification of cyber security and privacy issues and efforts for the electric sector. In support of these efforts EPRI works diligently to stay abreast of the present state of standards and guideline developments as well as regulatory governance. This newsletter provides highlights and status of ongoing efforts by numerous working groups, as well as insights into future activities.

[Guidelines for Integrating Substation and Field Domain Events into an Integrated Security Operations Center](#)

This report describes strategies and guidelines for utilities to integrate additional security events into an Integrated Security Operations Center (ISOC). It builds upon previous EPRI ISOC efforts and focuses on the substation and field domain devices and system utilized within the electric transmission and distribution environments. These include operations technology (OT) assets such as intelligent electronic devices (IED), communication systems and devices, network and cyber security devices, and physical access control and monitoring systems.

[Configuration Management and North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) v5](#)

This guidance document examines CIP v5 and outlines strategies for utilities to expand their current traditional configuration management capabilities to include CIP concepts. Leveraging configuration management best practices from the nuclear sector and other external resources, this document outlines the entire configuration management process throughout the lifecycle of any given system. As an ongoing research effort, this project also include criteria for assessing configuration management tools to be used by EPRI and utilities in the future.

[Deployment Options and Considerations for Substation Security Gateways: P183A Working Group White Paper](#)

This white paper describes the key topics discussed in 2015 by the P183A working group focused on deployment options and considerations for substation security gateways. These topics include the network architecture and placement of these gateways, relevant enterprise account management and authentication systems, and other significant issues related to process or cultural impacts of gateway deployment. Each topic is introduced in order to

allow individual utilities to make fully informed decisions concerning how to confidently deploy and use substation security gateways.

Cyber Security Architecture Methodology for the Electric Sector

This report includes a methodology for developing a security architecture that leverages existing architecture methodologies. This includes prioritizing the systems, performing a cyber security risk assessment, and determining the impacts of a cyber security compromise.

Cyber Security Risk Management Database Overview: Security, Cyber, Risk Assessment Methodology Database (SCRAM) Version 1.0

Currently, the nation's power system consists of both legacy and next-generation technologies. The federal government has responded to changes in technology and the threat environment by developing and updating cyber security guidance. Currently, utilities are assessing this guidance for applicability and implementation. In addition, utilities are trying to analyze the impact of this guidance because it contains varying levels of specificity and focus.

To support the use of this guidance, EPRI developed several documents to provide a framework and mapping of existing guidance to assist cyber security practitioners in addressing cyber security for both legacy and next-generation technologies. To better correlate the information in these documents, EPRI has developed this database, which includes information from the various documents. The format and capabilities of the database will allow utilities to perform searches as they determine how to apply the various guidance documents.

Creating Security Metrics for the Electric Sector

To better protect the nation's power grid, many utilities are investigating methods of communicating their security posture across the organization, as well as to outside parties. This has led to several discussions regarding measuring security in a consistent way. Building on previous efforts, the electricity industry leverages various security metrics and is constantly maturing in this relatively new field.

This report provides guidance to utilities on developing and implementing a security metrics program, leveraging existing best practices. The guidance is intended to complement existing security and compliance programs.

Distribution and Transmission Modernization on Data Analytics

DMD/TMD Team Industry Contributions and Collaborations

Electric Energy Online posted a commentary by Doug Dorr and Jared Green, From Research to Action | Utility Data Analytics Project Makes Molehills out of Mountains, which discusses how EPRI's Distribution Modernization Demonstration (DMD) initiative may identify what can be done with existing data, gain insights from the data that were previously unknown or perhaps not yet conceptualized, and assist utilities as they become more versatile with big data analytics and associated activities.

Upcoming Meetings/Webcasts

Transmission Modernization Demonstration (TMD) Member Webcast	09-Feb-2016
The purpose of these webcasts is to inform the advisory team on progress and developments in each respective research area and to obtain input and direction on the activities associated with the research being addressed in the TMD initiative.	
EPRI Distribution Modernization Demonstration and Transmission Modernization Demonstration Spring Advisory Meeting 2016, EPB, Chattanooga, TN	11&12-May 2016

Smart Grid and Related Demonstration Deliverables

Demand Response Standards and Interoperability: Kansas City Power & Light Smart Grid Demonstration

This case study describes Kansas City Power & Light's (KCP&L) use of demand response (DR) messaging standards within its SmartGrid Demonstration Project. By leveraging DR interoperability standards, KCP&L tested and demonstrated residential DR event management using its demand response/distributed energy resource management system (DERMS), distribution management system (DMS), customer-oriented home energy management portal, meter data management system, advanced metering infrastructure (AMI), and home area network devices. Results, lessons learned, and recommendations to the industry for future implementation of interoperability standards are included.

Sacramento Municipal Utility District Smart Grid Host Site Report, Final Update

This is the final report on the Sacramento Municipal Utility District (SMUD) Smart Grid Demonstration Project. This project was part of the Electric Power Research Institute's (EPRI's) seven-year Smart Grid Demonstration Initiative. The project focused on integrating large-scale distributed energy resources (DER)—including demand response, storage, distributed generation, and distributed renewable generation—into a "virtual power plant" to advance widespread, efficient, and cost-effective deployment of utility and customer-side technologies in distribution and overall power system operations. A second focus for SMUD was to add technology and information systems to better enable SMUD to operate its distribution system resources more efficiently and cost effectively.

Southern Company Smart Grid Host Site Progress Report

This report provides a progress update for the Southern Company Smart Grid Demonstration Host Site Project, which is part of the Electric Power Research Institute's (EPRI's) multi-year Smart Grid Demonstration Initiative. The EPRI initiative included core smart grid research and a number of large-scale smart grid projects conducted with 23 funding utility members. The Southern Company Demonstration Project was focused on integrating large-scale distributed energy resources (DER), including demand response, energy storage, distributed generation, and distributed renewable generation, via an integrated distribution management system. The project also sought to improve the efficiency of the distribution grid, test an electronic-based distribution transformer, and investigate the use and grid impact of electric vehicles.

Duke Energy Smart Grid Host Site Progress Report: Final Edition

This report summarizes a series of progress updates from the 2011-2015 time period for the Duke Energy Smart Grid Demonstration Host Site Project, which is a part of the Electric Power Research Institute's (EPRI's) multi-year Smart Grid Demonstration Initiative. The Duke Energy Demonstration Project focused on the integration of higher levels of distributed energy resources, such as energy storage, photovoltaic generation, demand response, and plug-in electric vehicles. In addition, Duke Energy developed and refined a communications architecture throughout the project using an open-standards communications node to transmit, aggregate, and manage data from Smart Grid devices on the grid and beyond the customer's meter. In order to effectively and reliably manage the available resources, Duke Energy developed a distributed energy resource management system and demonstrated its capabilities within its smart grid test bed in Charlotte, North Carolina, called Envision Energy.

 [Grid Strategy: Operating the Grid with a High Penetration of Distributed Energy Resources](#)

Operating the distribution grid with an increasing amount of distributed energy resources (DER) is an area of focus for the electric utility industry and especially for the utilities within the Electric Power Research Institute's (EPRI's) multi-year Smart Grid Demonstration Initiative. This report provides a summary of the challenges and methods to overcome these challenges in planning for and operating the grid as the amount of DER increases and changes over time.

 [Utility-Scale, Single-Customer Microgrid at Duke Energy: EPRI Smart Grid Demonstration Initiative](#)

The Duke Energy McAlpine Microgrid technology demonstration project is a 24 kV utility-scale microgrid that serves a city fire station located adjacent to the McAlpine Creek Substation in Charlotte, North Carolina. Duke Energy developed this microgrid to test the ability of disparate equipment and distributed energy resources to provide a seamless transition to and from connection with the grid and to create a utility-owned microgrid using standard-use, "off-the shelf" equipment.

This case study documents the phases of development of the McAlpine Microgrid and includes lessons learned in the process.

OpenADR and Related Demonstration Deliverables

 [Automated Demand Response and Ancillary Services Demonstration Project Newsletter, December 2015](#)

This newsletter provides information about EPRI's Automated Demand Response and Ancillary Services Demonstration project. Articles feature forthcoming changes in OpenADR Alliance specification and implementation documents for OpenADR 2.0b, along with descriptions of OpenADR-related activities planned for the upcoming DistribuTECH 2016 conference.

Upcoming Events		Dates
	Orlando, FL **Look for EPRI in booth #2061**	Feb. 9-11, 2016

EPRI Power Delivery and Utilization Sector Council and Advisory Meetings, Austin, TX	Feb. 22-25, 2016
GridEd 2016: Unbalanced Power Systems Analysis, JW Marriott Austin, Austin, TX, 12 PDUs	Feb. 25-26, 2016
EPRI European ICCS Engagement Summit, Dublin, Ireland	April 19-20, 2016
EPRI Distribution Modernization Demonstration and Transmission Modernization Demonstration (DMD/TMD) Spring Advisory Meeting 2016, EPB, Chattanooga, TN	May 11-12, 2016
EPRI Smart Distribution and Power 2016 Quality Conference and Exhibition, Atlanta, GA	June 28-30, 2016
Save the Date: EPRI Power Delivery and Utilization Advisory Meetings, Hollywood, FL	Sept. 19-22, 2016

Together...Shaping the Future of Electricity