Grid-Interop™

Proceedings

Implementing Interoperability

Advancing Smart Grid Standards, Architecture and Community

U.S. DEPARTMENT OF ENERGY

NIST

GRIDWISE Architecture Council

SGiP SMART GRID INTEROPERABILITY PANEL

Phoenix, AZ
December 5-8, 2011

CLASMA Events worth attending

Welcome to Grid-Interop 2011

On behalf of the GridWise® Architecture Council, I am excited to have your participation in this fifth annual Grid-Interop forum. We want to thank you for taking the time to attend this important meeting and, most especially, to thank the planning and program committees and the presenters for the time and energy they have put into preparing for the event.

Since last year's forum, the community has been very busy working within the Smart Grid Interoperability Panel (SGIP) to tackle a number of important problems. At the same time, the GridWise Architecture Council (GWAC) has been busy considering how to work with the business, policy and regulatory dimensions of interoperability as framed within the upper levels of the GWAC Stack. To that end, the council completed an update to its Decision Maker's Checklist last year and recently completed an update to the GridWise Interoperability Constitution by expanding the regulatory principles section and adding policy principles. At this meeting, the council's work to develop an Interoperability Maturity Model is featured in the foundational session. We hope this work will help the community and organizations gauge maturity and progress in interoperability practices.

As an attendee of the meeting you will interact with other leaders in smart grid interoperability though the four tracks of oral presentations and the Face Time at the Interoperability Fair on Tuesday evening. This year we have four tracks, covering Business and Policy, Cross-Cutting Elements, Information Interoperability and Architecture. An exciting new element of the forum is the "Plug-In." Participants in the Plug-In will be demonstrating real-world applications of smart grid interoperability with simulated end-to-end utility systems.

The meeting would not be possible without the support of our sponsors. These organizations recognize the importance of interoperability in revitalizing our electric power systems and are demonstrating this through their support of this event. Please take a few moments to thank them and to visit their displays.

Members of the GridWise Architecture Council will be available throughout the meeting to answer your questions and discuss your involvement in the ongoing work. Your continued participation in these activities is critical to the success of this national effort. Thank you for attending Grid-Interop and joining us in this work.

Sincerely,

Erich Gunther, Chair, GridWise Architecture Council

Thank You From the Team

January 10, 2012

Grid-Interop Participants and Interested Colleagues:

On behalf of the GridWise® Architecture Council and the National Institute of Standards and Technology (NIST), we would like to thank those who attended, participated in, or sponsored the very successful 2011 Grid-Interop Forum. We are pleased to offer a record of the forum in the following proceedings material. The proceedings contain the compendium of papers produced for the event, as well as the panel session abstracts, links to the presentation slides, and a wrap-up of the SGIP meetings.

To reiterate what Erich highlighted in his welcome letter, the community has been hard at work this past year to make progress on the smart grid interoperability goals of NIST, the SGIP, and GWAC to implement an effective smart grid. This year's forum highlighted the progress we are making through the foundational session and a track session focusing on the newly released GWAC Smart Grid Interoperability Maturity Model (IMM); the addition of the Plug-In, which showed the value of interoperability through real-world implementations of interoperability standards; and talks, panels, and demonstrations of the Green Button initiative.

Your continued participation in these activities is critical to the success of this national effort! We would like to thank you for taking the time to attend this important meeting and most especially to thank the planning and program committees and the presenters for the time and energy they have put into preparing the event.

This meeting would not have been possible without the support of our sponsors. These organizations recognized the importance of interoperability in revitalizing our electric power systems and demonstrated this through their support of this event.

 George Arnold

National Coordinator for Smart Grid Interoperability, NIST

 Erich Gunther

GWAC Chair

 Ron Melton

GWAC® Administrator

GridWise® Architecture Council

Erich Gunther
(May 2004 – Dec 2011)
Chief Technology Officer, EnerNex Corporation

Ron Ambrosio
(May 2004 – Dec 2011)
Global Research Leader, IBM Energy and Utilities Industry, IBM Thomas J. Watson Research Center

Robert Burke
(Mar 2009 – Dec 2012)
Principal Analyst, ISO New England

Tony Giroti
(Jan 2011-Dec 2012)
Chairman & CEO, Bridge Energy Group, Inc.

Rik Drummond
(May 2004 – Dec 2011)
CEO and Chief Scientist, Drummond Group Inc

Ward Camp
(Jan 2011-Dec 2012)
Vice President, Landis +Gyr

Amr Ibrahim
(Feb 2010 – Dec 2011)
Senior Regulatory Analyst, Office of the Ohio Consumers' Counsel

Alexander Levinson
(Jan 2008 – Dec 2011)
Information Systems Architect, Lockheed Martin

Wayne Longcore
(Jan 2010 – Dec 2011)
Director, Enterprise Architecture & Standards, Consumers Energy

Tracy Markie
(Mar 2009 – Dec 2012)
President, Engenuity Systems

Bob Saint
(Mar 2009 – Dec 2012)
Principal Distribution Engineer, National Rural Electric Cooperative Association (NRECA)

Thomas Sloan
(Jan 2010 – Dec 2011)
State Representative, State of Kansas

Kenneth Wacks
(Jan 2007 – Dec 2011)
Consultant, Sensus Metering

Ron Melton
Pacific Northwest National Laboratory
(PNNL Administrator, GridWise® Architecture Council)

The GridWise Vision

GridWise® is a vision of how advanced communications, information and controls technology can transform the nation's energy system—from customer loads through central generation—into a collaborative network whose participants exchange decision-making information as driven by market opportunities. The GridWise Architecture Council gathers a team of experts with diverse, relevant industry backgrounds to articulate the guiding principles that constitute the architecture of a future intelligent, transactive, energy system and see that GridWise evolutionary directions remain true to these principles. This team is assembled by the Department of Energy Office of Electricity Delivery and Energy Reliability in cooperation with key stakeholders in the GridWise vision.

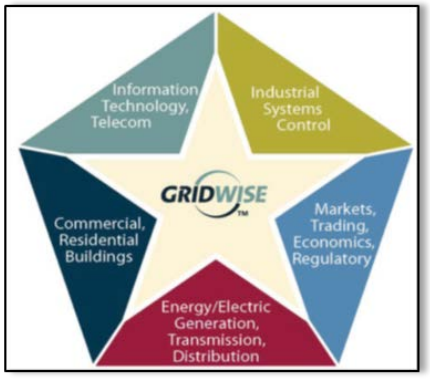
Council Mission

The mission of the Architecture Council is to establish broad industry consensus in support of the technical principles that enable the vast scale of interoperability necessary to transform electric power operations into a system that integrates markets and technology to enhance our socioeconomic well-being and security.

The scope of the GridWise Architecture Council spans intelligent interactions across the component elements of the electric system, embracing distributed energy resources (end-use systems, distributed generation, and storage) with distribution, transmission, and bulk power generation.

Council Composition

The Architecture Council comprises recognized and respected practitioners and leaders with broad-based knowledge and expertise in power systems, information technology, telecommunications, markets and financial systems, buildings, industrial controls, and additional related sectors. Any group or organization may recommend candidates to the Architecture Council.



2011 Committees

Planning

Erich Gunther
Chairman and Chief Technology Officer
EnerNex Corporation

Tracy Markie
President & CEO
Engenuity Systems

Bob Saint
Principal Distribution Engineer
National Rural Electric Cooperative Association

Gerald FitzPatrick
Leader, Applied Electrical Metrology Group
National Institute of Standards and Technology

Stuart McCafferty
Vice President
EnerNex Corporation

Dave Mollerstuen
Founder
Alcatraz Energy

Ward Camp
VP, Regulatory & Environmental Policy
Landis + Gyr

Ron Melton
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Todd Halter
Senior Scientist
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Anto Budiardjo
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Clasma Events, Inc.

Paul Boynton
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Program

Bob Saint
Principal Distribution Engineer
NRECA

Amr Ibrahim
Sr. Regulatory Analyst
Ohio Consumers' Counsel

Ward Camp
VP, Regulatory & Environmental Policy
Landis + Gyr

Tony Giroti
Former Chairman & CEO
BRIDGE Energy Group, Inc.

Stephan Amsbary
Director of Utility Enterprise Architecture
EnerNex Corporation

Tracy Markie
President & CEO
Engenuity Systems, Inc.

Robert Burke
Principal Analyst
ISO New England

James Mater
Co-Founder & Director
Quality Logic, Inc.

David Hardin
Senior Director
EnerNOC, Inc.

Ken Wacks
President
Home & Utility Systems

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Plug-In

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Stuart McCafferty
Vice President
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Todd Halter
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President & CEO
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Founder
Alcatraz Energy

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An Introduction to the Grid-Interop Forum

Held in partnership with the GridWise® Architecture Council and NIST, this fifth Grid-Interop event brought together a broad audience from both the government and the technical community, including key players from the energy utilities, software, cable, semiconductor, telecommunications and electricity consumer sectors. As the birthplace of the Smart Grid Interoperability Panel, Grid-Interop continues to focus on smart grid interoperability standards and technologies—defining the interoperability framework necessary for smart grid to flourish.

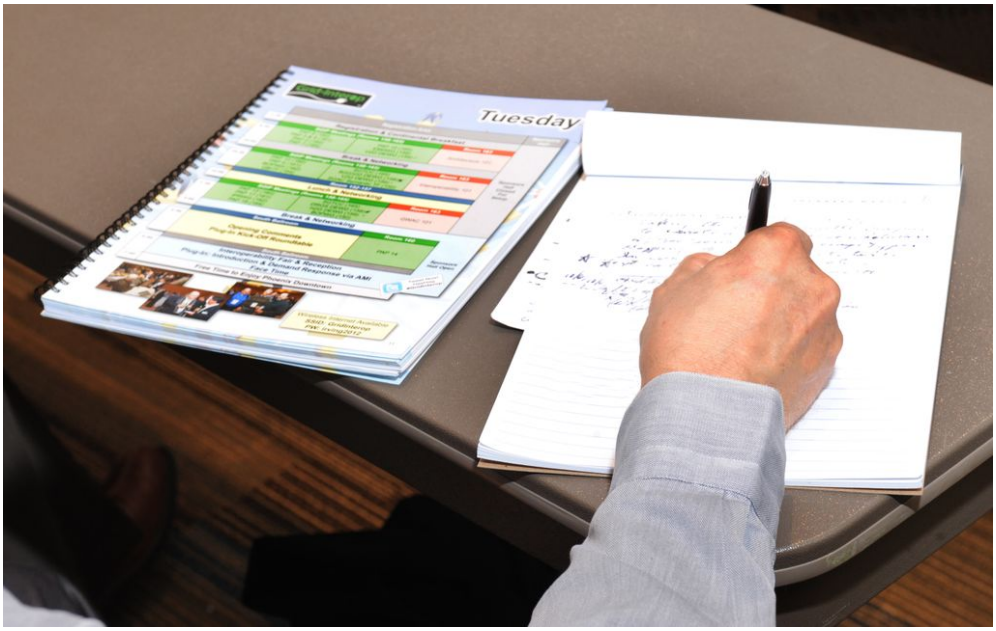
With the guiding principle of implementing interoperability through collaboration, Grid-Interop brings together a true cross-section of industry stakeholders to ensure rapid development and implementation of smart grid interoperability standards.

In 2011, our focus was on implementation progress to date – with a particular focus on demonstrating successes and progress.

Grid-Interop creates dialogue among the key stakeholders shaping and driving the progress of standards development, including:

- standards development organizations
- businesses that use and implement these standards
- regulators that oversee the implementation of standards-based technologies
- product designers, system integrators, and consultants who put the standards to work in real-life applications.

In addition to providing a clear snapshot of industry developments around interoperability standards to date, Grid-Interop provides a unique opportunity and forum to have your voice heard at this most critical time.



Utility & Power Companies

- define the interoperability framework necessary for smart grid to flourish
- cover the architectural framework and tools currently in deployment by vendors, system integrators, and utility companies across the U.S. and internationally
- highlight success stories from early utility implementers in all areas of smart grid, including customer-facing advanced metering infrastructure (AMI) deployments, building-to-grid technologies, and even electric vehicles
- determine best approaches for achieving interoperability – from substations to customer devices
- highlight the consumer side of interoperability, from smart grid consumer data management, to privacy and reliability, to long-term customer interoperability challenges and solutions
- dive deeply into the most technical aspects of information modeling for interoperability.

Standards Development Organizations

- define the interoperability framework necessary for smart grid to flourish
- cover the architectural framework and tools currently in deployment by vendors, system integrators, and utility companies
- highlight success stories from early utility implementers in all areas of smart grid, including customer-facing AMI deployments, building-to-grid technologies, and even electric vehicles
- determine best approaches for achieving interoperability – from substations to customer devices
- dive deeply into the most technical aspects of information modeling for interoperability.

Businesses and Vendors

- define the interoperability framework necessary for smart grid to flourish
- discuss how to manage and uncover business opportunities from customer data, while balancing the need for privacy and reliability
- offer a critical venue for discovering direction and business opportunities within this tremendous smart grid opportunity
- provide an overview of current framework and tools being deployed by other vendors, system integrators, and utilities
- cover success stories from early utility implementers
- create networking opportunities from key players among utilities, software, cable, telecomm, electricity consumers and government and providing the only technical conference with this breadth.

Regulatory & Policy Community

- dives deeply into the consumer side of interoperability, from smart grid consumer data management, to privacy and reliability, to long-term customer interoperability challenges and solutions
- provides an overview of innovations in rate structures, regulatory policies, and tariffs to support a demand-responsive grid
- highlights success stories from early utility implementers in all areas of smart grid, including customer-facing AMI deployments, electric vehicle pilots, and more
- discusses cyber security, privacy, and information assurance and how those can be achieved through interoperable systems that are both flexible and secure
- defines the interoperability framework necessary for smart grid to flourish.

Product Designers, System Integrators & Consultants

- cover the architectural framework and tools currently in deployment by vendors, system integrators, and utility companies across the U.S. and internationally
- highlight success stories from early utility implementers in all areas of smart grid, including customer-facing AMI deployments, building-to-grid technologies, and even electric vehicles
- determine best approaches for achieving interoperability – from substations to customer devices
- dive deeply into the most technical aspects of information modeling for interoperability
- provide a critical venue for discovering direction within the tremendous smart grid opportunity.

Grid-Interop continues to offer an opportunity to discuss new and innovative ways to improve smart grid interactions and to participate in actions that shape the future of interoperability and to advance the Smart Grid Interoperability Roadmap from concept to reality.

Highlights of Grid-Interop 2011

In December 2011, several hundred smart grid leaders gathered in Phoenix, Arizona, to discuss implementations of interoperability and witness the first annual Plug-In, a literal show-and-tell of interoperability in action.

A Focus on "Green Button"

U.S. Chief Technology Officer (CTO) Aneesh Chopra launched an initiative at GridWeek in September, 2011 encouraging industry leaders to provide standardized information to energy consumers. In an effort to drive innovation, Chopra's challenge has already sparked preliminary applications—all created in less than two weeks. See the live application demo from the Green Button round table on Dec. 7: http://www.grid-interop.com/2011/#videos.

The Plug-In

This year's Plug-In showcased interoperability in six scenarios, including transmission & distribution, demand response, cyber security, and a testing corner. Visit http://www.grid-interop.com/2011/#plug for details, and read coverage on Plug-In from:

- Smart Grid Today - 'Interoperability takes center stage'
- Smart Grid Today - 'End-to-end interoperability'
- GreenTechGrid - 'Grid-Interop 2011: ZigBee, HomePlug and Wi-Fi'

Utility Buy-In

Grid-Interop closed with a utility-rich panel focused on implementation. Speakers from Consumers Energy, Duke, Florida Power & Light, and Southern California Edison agreed about the success of Plug-In and Green Button efforts at the conference, committing to driving interoperability within their respective organizations. They also advised the vendor community to take them seriously about supporting the standards lest they be left behind at procurement time.

Get the Download

More than 100 speakers participated in 30+ panel discussions and dozens of SGIP Working Group and Priority Action Plan (PAP) meetings. You can now download all presentations from www.Grid-Interop.com. Just visit the agenda page or speaker list to navigate to the content you want.

See It, Hear It

Videos and images from the event are available at: http://www.grid-interop.com/2011/#videos.

Smart Grid Interoperability Panel at Grid-Interop 2012 Recap

Nearly 700 attendees, both in person and remote, participated in the Winter Face-to-Face at Grid-Interop 2012. Held in partnership with Clasma, the GridWise® Architecture Council and the U.S. Department of Energy, more than 100 industry-leading speakers in 30 sessions covered critical areas of progress and opportunity related to information interoperability, architecture, business, policy, and cross-cutting issues like cyber security.

Thanks to the amazing Plug-In participants, attendees viewed implementation and interoperability at work. Each day, the agenda highlighted real-life implementation of SGIP work. One of the most popular sessions was Green Button. The session included a presentation of the three-legged stool components with regard to Energy Services Provider Interface (ESPI)/Green Button – North American Energy Standards Board (NAESB) Standards, Utilities Communication Architecture International Users Group (UCAIug) testing and certification, and OpenESPI running code. The group discussed the critical monitoring points as independent organizations start rolling out Green Button, perhaps in a Domain Expert Working Group (DEWG) or in a new PAP.

Due to the volume of ongoing work and discussion, the SGIP Governing Board convened for a two-day event (to view these presentations, click here). At the Closing Plenary session, Plenary Chair Steve Widergren announced the much-anticipated Governing Board election results (click here) and Secretary David Mollerstuen provided highlights from the week (see below).

U.S., Europe Working Together on Smart Grid Standards Development

The SGIP and the European Union's (EU's) Smart Grid Coordination Group (SG-CG), on December 5, 2011, signed a Letter of Intent to cooperate on smart grid efforts. The new collaboration is meant to ensure that smart grid standards on both continents have as much in common as possible, so that devices and systems that interact with the smart grid can be designed in similar fashion.

The Letter of Intent describes the areas and methods to enhance coordination and it outlines specific focus areas for short-, medium- and long-term activities.

Areas highlighted as short-term activities include:

- establishment of a harmonized conceptual model
- use cases and application descriptions
- cyber security requirements

Areas highlighted as medium- to long-term activities include:

- smart grid interoperability architecture
- testing and certification of smart grid interoperability standards compliance

In addition to these specific areas of collaboration, the two organizations will cooperate in facilitating the timely development of international specifications to remedy identified gaps in smart grid standards. The methods of cooperation will include information sharing and joint workshops.

Both the SGIP and the SG-CG have mandates to coordinate the development of a standards framework for smart grid, which can unlock innovation in the electrical sector. The SG-CG represents three private-sector standards organizations: the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunications Standards Institute (ETSI). The SGIP is a public/private partnership established by the National Institute of Standards and Technology, an agency of the U.S. Department of Commerce.

The Letter of Intent, signed by SG-CG's Ralph Sporer and SGIP's John McDonald at Grid-Interop 2011, results from a September 2011 joint white paper authored by NIST and the SG-CG that laid out the principles for cooperation.

"We want this letter to be more than just a piece of paper," said Ralph Sporer, Chairman of SG-CG. "I am confident that we will be able to fill it with life. Already, we have begun collaborations and discussions between our two organizations, and this letter will enable us to do this in a more systematic way."

"Encouraging the development and adoption of international Smart Grid standards is one of our highest priorities," said John McDonald, Chair of the SGIP Governing Board. "In support of our growing engagement in international outreach, the Governing Board recently created an International Task Force to oversee our expanding efforts. Our collaboration with the EU's SG-CG is a very important step forward on that path."

To read the full article, please visit: http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/Dec2011LOIArticle.

Session Round Up

Priority Action Plans

- PAP 3 – Common Specification for Price and Product: Energy Market Information Exchange (EMIX) recommend for inclusion in Catalog of Standards (CoS), now with Governing Board. Work complete, closing soon.
- PAP 6 – Common Semantic Model for Meter Data Tables: Model, white paper expected by end of year. Expect PAP completion by end of the first quarter (Q1) of 2012.
- PAP 7 – Electric Storage Interconnection Guidelines: IEC 61850-90-7 has been submitted to the International Electrotechnical Commission (IEC), with expected Q1 2012 release as a technical report standard. Discussed the Institute of Electrical and Electronics Engineers (IEEE) 1547.8 Distributed Energy Resources (DER) Standard communications requirements effort.
- PAP 9 – Standard Demand Response (DR) and DER Signals: Monitoring Energy Interoperation progress; expected to finish Q1 2012. Robust discussion on application space for consumer domain.
- PAP 12 – Mapping IEEE 1815 Distributed Network Protocol(DNP3) to IEC 61850: IEEE Std 1815-2010 (DNP3) is ready for CoS vote. IEEE P1815-2012 (new release) is nearing completion with a new security section (Version 5).
- PAP 13 – Harmonization of IEEE C37.118/IEC 61850: Pending Smart Grid Architecture Committee (SGAC) review, IEC 61850-90-5 is ready to begin CoS process.
- PAP 14 – T & D Power Systems Model Mapping: Documents reviewed to move the IEEE C37.239 Common Format for Event Data Exchange (COMFEDE) Standard into the CoS. Identified plans to develop a guideline for implementation of the COMFEDE standard including specific use cases. Reviewed IEEE Power System Relay Committee Working Group H5

document and plans to publish "Common Format for Intelliget Electronic Device IED Configuration Data" as a Technical Report early in 2012.

- PAP 16 – Wind Plant Communications: The IEC maintenance team for 61850 and 61400-25-2 has begun looking into the weather data collected at substations and wind farms for better forecasting. Implementation of the revised 61400-25-2 needs to be broadcast to the independent system operators (ISOs) and others making wind farm reports (asked Implementation Working Group for assistance).
- PAP 17 – Facility Smart Grid Information Standard: Presented in depth the systems engineering approach pursued by ASHRAE/NEMA Standard Project Committee (SPC) 201P. Reviewed incorporated standards reuse methodology and identified two new use cases.
- PAP 18 – SEP 1.x to SEP 2 Transition and Coexistence: PAP's closeout session covered history, Project Management Office (PMO) discussion and next steps.
- Electric Vehicle (EV) Fast Charge Priority Action Plan (to be proposed): Key consensus reached on Direct Current (DC) Fast Charge proposal with relevant stakeholders. The SGIP Administrator and Governing Board will review for the January meeting.

Standing Committees and Domain Expert Working Groups

- Building-to-Grid (B2G)/Industry-to-Grid (I2G) DEWGs: Working toward the Electric Power Research Institute (EPRI) Common Information Model (CIM) extension project to align with Weather Information Exchange Model (WXXM) weather standard to promote better interoperability with Facility Smart Grid Information Model and international standards. Facility Energy Services Interface White Paper V8.1 is posted on the TWiki, bringing together the different perspectives on the facility interface to the grid service providers. IEC PC118 Smart Grid Interface has been established. Scope conflict with other IEC standards and SGIP standards. First meeting in China Feb 8-10. Need to build a US Technical Activities Group (TAG) to develop the US position on coordinating standards work.
- Transmission and Distribution (TnD) DEWG: Reviewed the latest draft of the Transmission Bus Load Model as well as Framework comments.
- Vehicle-to-Grid (V2G) DEWG: Invited to collaborate with Governing Board Vision, Mission & Roadmap Group at January EV Workshop. Agreed on "Crossing the Chasm" timeline (draft) for V2G infrastructure.
- Cyber Security Working Group(CSWG): Announced a set of privacy awareness and training slides for utilities and a future set for public utility commissions (PUCs). Final review of the assessment guide for the NIST Interagency Report NISTIR 7628. Completed 8 cyber security standards for Q3 and Q4. Announced the Cyber-Physical call for abstracts for upcoming workshop.
- SGAC: Approved first four versions of IEC 61850 Standard for the SGIP Catalog of Standards. Reviewed the Work of the European Communities (CEN, CENELEC and ETSI) to integrate the work of the SGAC Conceptual Model into their framework for Smart Grid Architecture Models.
- Smart Grid Testing and Certification Committee (SGTCC): Review of Interoperability Process Reference Manual (IPRM) v2 final draft; agreement reached on a few final changes. SGTCC will hold its final vote for approval during the second half of December. The End-to-End Testing work group revised its charter to focus on collecting and sharing existing nonproprietary test cases contributed by utilities and consolidating for broad acceptance and usage.

Other Key Groups

- Bylaws and Operating Procedures Working Group (BOPWG): Agreed to review and document the Governing Board (GB) Candidate Evaluation Committee process and determine whether

bylaw and/or organization and procedures (O&P) changes are needed. Agreed to look into GB positions and limits on the number of members from a Participating Member organization, the relationship of at-large positions to positions voted upon by specific stakeholder categories, and the potential for flooding categories with candidates to impact board makeup.

- Communications, Marketing, and Education Working Group (CMEWG): Moving forward with the first survey of SGIP membership to implement in mid-January 2012. Develop value propositions for each stakeholder community with the assistance of the stakeholder-specific GB members.
- International Task Force: Spirited discussion on four topics: NIST's International Priorities, Responsibilities of International Coordination Teams, Marketing/Value Statement of the SGIP and the Template for SGIP letters of intent (LOIs).

Session materials can be found here on the TWiki: http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/WinterF2F2011

Plug-In Kick-Off Roundtable

Vint Cerf - Moderator
VP & Chief Internet Evangelist
Google, Inc.

John Simmins
Senior Project Manager
Electric Power Research Institute

George Arnold
National Coordinator for Smart Grid Interoperability
National Institute of Standards and Technology

Jonathan Booe
Deputy Director
North American Energy Standard Board

Zahra Makoui
Lead
Pacific Gas and Electric Company

Rolf Bienert
Technical Director
OpenADR Alliance

Brent Hodges
General Manager
Tendril Networks

Opening Keynote

Lauren Azar
Senior Advisor
U.S. Department of Energy

Green Button – Prerecorded Video Address

Aneesh Chopra
Chief Technology Officer
United States of America

Green Button Roundtable

Anto Budiardjo - Moderator
President & CEO
Clasma Events, Inc.

Nick Sinai
Senior Advisor
Office of Science and Technology Policy

Erich Gunther
Chief Technology Officer
EnerNex Corporation

Zahra Makoui
Lead
Pacific Gas and Electric Company

Wayne Longcore
Chief Energy Solutions Expert
SAP

Tariq Samad
Corporate Fellow
Honeywell

Donny Helm
Director
Oncor Electricity Delivery

Cameron Brooks
Vice President
Tendril

The Value of Interoperability to Utilities and Their Customers Panel

Bob Saint - Moderator
Principal Analyst
ISO New England

Doug Kim
Director, Advanced Technology
Southern California Edison

George Bjelovuk
Managing Director
American Electric Power

Terry Oliver
Chief Technology Innovation Officer
Bonneville Power Administration

Dinner Speaker

Marc Spitzer
Commissioner
Federal Energy Regulatory Commission

Lunch Speaker

Patrick Miller
President and CEO
EnergySec

Utility Implementation Roundtable

Erich Gunther
Chief Technology Officer
EnerNex Corporation

Matt Gillmore
Director of Enterprise Architecture & Standards
Consumers Energy

Philip Slack
Senior Manager, Enterprise Architecture
Florida Power & Light

Percy Haralson
Manager, Field Technologies Engineering Advancement
Southern California Edison

Gary Stuebing
Strategic Planning Manager
Duke Energy

Closing Comments and Recognitions

Ron Melton
GridWise® Architecture Council Administrator
Pacific Northwest National Laboratory

Steve Widergren
Principal Engineer
Pacific Northwest National Laboratory

David Mollerstuen
Standards Development Architect
Tendril

Foundational Session

Interoperability Maturity and the GWAC IMM

Steve Widergren
Principal Engineer
Pacific Northwest National Laboratory

Greg Armstead
AMI Project Manager
Eugene Water & Electric Board

Ron Melton
Pacific Northwest Smart Grid Demonstration Project Manager
Battelle

Mark Knight
Director
KEMA

James Mater
Co-Founder & Director
Quality Logic, Inc.

Tony Giroti
Former Chairman & CEO
BRIDGE Energy Group, Inc.

Stephen Amsbary
Director of Utility Enterprise Architecture
EnerNex Corporation

Philip Slack
Senior Manager, Enterprise Architecture
Florida Power & Light

The development of a smart grid interoperability community has come a long way since the GridWise® Constitutional Convention was held six years ago in Philadelphia. With the establishment of the Smart Grid Interoperability Panel two years ago, an organization approaching 2000 members is now taking shape to advance interoperability at the community level and enable a smart grid ecosystem of connected devices and systems.

With healthy levels of awareness and stakeholder engagement now in place, we are preparing to embark on a new phase of progress—to nurture a culture of interoperability. Given the changing nature of technology and energy directions, the way forward is to consider the application of a process improvement approach. The GWAC's Smart Grid Interoperability Maturity Model (SGIMM) initiative proposes to develop methods and tools that encourage well-specified agreements between smart grid components. The model targets communities advancing the integration of smart grid technology to assess the strengths and shortcomings of the present state so that well-managed interface agreements based on supported standards and tests can evolve in the future.

Plug-In

This year's Grid Interop conference in Phoenix was host to a first-of-its-kind event called the "Plug-In" that demonstrated how the implementation of Smart Grid standards is paying off by accelerating the availability of interoperable products and systems. The Plug-In featured participation and products from over a dozen organizations, connected over a network infrastructure and communicating to demonstrate a broad range of capabilities including three demand response scenarios, a distribution automation scenario based on IEC 61850, test and monitoring tools and security capabilities. Attendees at the event had the opportunity to see an electric vehicle and charging stations interoperating with network equipment, and a "Green Button" demonstration providing detailed energy information for consumers—a realization less than three months after the call to action made in September at Grid Week by the White House. The Plug-In was extremely well received by attendees and participants alike and plans are already taking shape for bigger and better future events to keep pace with the rapid adoption of Smart Grid standards and the technologies emerging based upon those standards.

Boot Camps & Workshops

SGIP 101

 **Moderator:** Paul Molitor, National Electrical Manufacturers Association (NEMA)

This breakout will introduce the Smart Grid Interoperability Panel. The SGIP is an organization that fills the gap between well-focused standards development and broad-scope applications of the Smart Grid requiring interoperation between many such standards. The structure of the SGIP is presented along with rationale for its composition, its tools, and its process and procedures. We will present the chartered deliverables of the organization and how it functions.

SGIP 101 – SGIP Mission, Structure, Membership and Groups

Presentation

Regulators' Workshops

 **Moderator:** Robert Burke, ISO New England

The GWAC has developed several tools that regulators can use in assessing Smart Grid projects. This toolkit is not a conceptual construct, but rather it is a set of real tools that can be used to ensure that Smart Grid projects deliver the intended benefits without significant customization and additional time and cost to deploy. In this session, participants will work in cross-cutting functional teams to explore applications of the toolkit and processes to evaluate proposed Smart Grid implementations. Using case studies, the workshop participants will compare business-as-usual scenarios versus scenarios using the toolkit and discuss the perspectives of regulators, utilities, vendors, markets and consumers.

Regulatory Workshop

Presentation

Title	Presenter	Affiliation
Panelist	 Ward Camp	Landis+Gyr
Introduction to GWAC and The Available Tools **Presentation**	 Kenneth Wacks	Home & Utility Systems

Architecture 101

 **Moderator:** Stephan Amsbary, EnerNex

This session will provide an overview on what Architecture for a Smart Grid is: what the key concepts of architecture are, what the primary artifacts are and how it is used in an organization to guide implementation. This session is an entry-level session for non-architects. It is presented in two parts: an overview of the discipline of enterprise architecture itself followed by specific examples of the application of that discipline in the real world.

Smart Grid (Enterprise) Architcture 101

Presentation

Title	Presenter	Affiliation
Applying Architectal Practices: Best Practice/Real-Life Examples	 Doug Houseman	EnerNex

Interoperability 101

 **Moderator:** Ron Ambrosio, IBM T.J. Watson Research Center

Everyone agrees that interoperability is a central issue in the development of smart grids, but what exactly is it? This session will define interoperability and explain its many dimensions, from basic communication interoperability through policy/regulatory interoperability. The GridWise Architecture Council's Interoperability Framework (the GWAC Stack), along with the SGIP's Smart Grid Conceptual Model, will be used to explain how to analyze key interoperability interface points in a complex smart grid system environment, and to frame examples for discussion.

Interoperability 101
ISO/IEC 18012-2 Implementation Example

Presentation

Title	Presenter	Affiliation
Interoperability 101 - Introduction and Overview **Presentation**	 Ron Melton	Pacific Northwest National Laboratory/Battelle

GWAC 101

 **Moderator:** Dave Elve, PayGo

This session will provide an update and overview on the GWAC: what the GWAC is, what is does, how it is relevant and how it supports and provides tremendous value to the smart grid industry. The session will also have utility representatives providing updates on SGIP and on the UCAIug (CIM, OpenSG and IEC 61850). For utilities looking for actionable information and support for their Smart Grid programs, this is a perfect session to attend. Session presenters are truly experts in their fields and will actively field questions from the audience. Network with your industry colleagues.

Gridwise® Architecture Council (GWAC) 101

Presentation

Title	Presenter	Affiliation
Panelist	 Ward Payles	Southern Company
Panelist	 Wayne Longcore	SAP
Panelist	 Darren Highfill	Utilisec

Grid-Interop Forum Tracks

Implementing Interoperable Smart Grid Solutions

This year there were over 80 papers submitted for the forum. The paper presentations in the tracks address the Call for Papers.

Business and Policy

Track Leader: Robert Burke, ISO New England, GridWise® Architecture Council

The Business and Policy track examines issues involving the aspects of the business processes, regulatory issues and customer interactions at the highest level of the GWAC interoperability stack. Interoperability considerations relative to utility incentives, mobile loads, innovative rate structures and demand response programs all may fall within the business and policy area. Developing and using a technology roadmap is a key aspect of planning for smart grid implementations; progress can be accelerated or retarded depending on whether the appropriate and timely policies are put in place or not. Individual utilities, regional combinations of utilities, ISOs/Regional Transmission Organizations (RTOs) and state-level policy roadmaps can guide policymakers in terms of what policies are needed; when they are needed; the consequences of implementing them and the politics of achieving consensus to do so.

Transactive Energy

Moderator: Chris Irwin, U.S. Department of Energy

Under the regulated retail energy paradigm, once the energy leaves the bulk power system, the economic model for energy delivered to the end-use customer generally changes from time-varying to fixed prices or limited variation in prices. This economic model has evolved as local electric service providers consolidated to achieve economies of scale in delivering electricity with higher reliability. Local service providers generally operate as natural monopolies with oversight to avoid abuse of this role. Another approach extends the variable pricing model throughout the system—from generation through transmission and distribution to consumption. This model could extend the interplay between economic activity (transactions) and the technical operation of an electric power system from end-to-end. Thus the term “transactive energy.” This session will explore various aspects of transactive energy.

Title	Presenter	Affiliation
Transactive Methods for Integrating DR/DER for Balancing Variable Energy Resources **Presentation**	 Ali Ipakchi	OATI – Open Access Technologies, Inc.
Transactive Energy : Smart Grid Applications **Presentation**	 Ed Cazalet	TeMIX Inc.
Where does Transactive Energy Fit In Wholesale Energy Markets? **Presentation**	 Robert Burke	ISO New England Inc.
Grid Operations, Bilateral Markets, And Transactive Energy: Possibilities & Pitfalls **Presentation**	 Don Watkins	Bonneville Power Administration
Transactive Control of DER **Presentation**	 Ron Melton	Battelle, Pacific Northwest National Laboratory

Market Participation

 **Moderator:** Terry Oliver, Bonneville Power Administration

Utilities have long been faced with the challenge of balancing electric generation with consumers' demand. Increasing amounts of variable renewable generation supplied to the grid have made cost-effective balancing activities very important. This session will examine various consumer demands that might participate in some aspects of the wholesale energy market.

Title	Presenter	Affiliation
How Can Mobile Load Participate In New England Wholesale Markets? **Presentation**	 Robert Burke	ISO New England
Integration of Financial Processes between Utilities and Renewable Energy Suppliers **Presentation**	 Jian Zhang	GridX, Inc.
Energy Micromarkets and Microgrids **Presentation**	 William Cox	Cox Software Architects LLC
Grid-Interactive Electric Thermal Storage Provides Economic and Environmental Benefit **Presentation**	 Paul Steffes	Steffes Corporation

Policy Roadmap

 **Moderator:** Robert Burke, ISO New England

Residential dynamic pricing can be seen as one of the key utility tools for reducing peak load. By adjusting the price of electricity based on the time of day and the cost of generation and providing appropriate tools to obtain this information, consumers have a tangible incentive to reduce consumption. This session will discuss the smart grid maturity model, the technical and logistical challenges of offering dynamic pricing programs and how demand response can play a part in the equation.

Title	Presenter	Affiliation
Smart Grid Maturity Model (SGMM) **Presentation**	 Raja Iyengar	Ebiz Labs Inc.
Unlocking the Power of Dynamic Pricing	 Arthur “Bud” Vos	Comverge
Regulatory Changes to Support the Smart Grid **Presentation**	 Ben Boyd	EnerNex Corporation

Regulatory

 **Moderator:** Ward Camp, Landis + Gyr

This session will assess the role for state and federal legislation in getting energy management and conservation into the consumer and business mainstream. These actions impact the role of the utility and the regulator. The session will address how we align the interests of the utility and the regulator through changes in the regulatory model.

Title	Presenter	Affiliation
Smart Grid Regulatory Models - Why Change Anything? **Presentation**	 Chris Chen	Sempra Energy
Innovative Retail Strategies in Smart Grid Solutions **Presentation**	 Jiyuan Fan	General Electric (GE) Energy, Digital Energy
The Role for State and Federal Regulation **Presentation**	 Frank Lacey	Comverge, Inc.
Smart Grid Creates an Over-the-Counter Market for Energy Sales **Presentation**	 Terry Mohn	General MicroGrids
Smart Grid Rate Design: Incentive Solutions from EVs to Intermittent Wind	 Chris King	eMeter

Customer Responsiveness

 **Moderator:** Phil Davis, Schneider Electric

If the smart grid is to succeed, end-use customers must want to participate in the process. The session will look at results of various pilot projects.

Title	Presenter	Affiliation
Consumer Engagement—a Dynamic Interaction Process **Presentation**	 Gale Horst	EPRI
Price Normalization to Facilitate Demand Response (DR)—Algorithms and Issues **Presentation**	 Chellury (Ram) Sastry	Battelle
Smart Grid Interoperability—What's Different This Time? **Presentation**	 Erik Gilbert	Navigant Consulting
Steps Toward a "Normal" Technology Adoption Market for Distributed Energy **Presentation**	 Toby Considine	TC9

Information Interoperability

 **Track Leader:** Tracie Markie, Engenuity Systems

It has been said for many years and in many industries that information is the key. Nowhere is that more true than for smart grid. Smart grid implementations will depend on the accurate and timely flow of information among systems of all kinds in a highly-scalable system of systems. Dynamic prices and demand response signals may flow from wholesale market operators (ISOs/RTOs) to suppliers, and will flow from energy suppliers and aggregators to customers. Meter data will flow to utilities and customers. Market transactions will flow from customers to markets to operators and back. Values, statuses and control information will flow from devices produced by different companies and embedded throughout the grid to operators and customers. This information will change over time and yet must not be misinterpreted. It should enable different vendors to develop systems that work together and interoperate effectively as integrated solutions.

Interoperability

 **Moderator:** Barry Haaser, Lakeview Group

Smart grid has been described as a system of systems or a multitude of devices networked together in what might be described as “an Internet of Things.” An important aspect is the process of networking multiple systems and having those systems truly work together. Architecture and functionality of the integrated system must mesh without complicated one-time software to allow systems to interoperate.

Title	Presenter	Affiliation
The Smart Grid as a Semantically Enabled Internet of Things **Presentation**	 Andrew Crapo	GE Global Research
Interoperable Taxonomies For Broad-Based Grid Benefits **Presentation**	 Andy Abendshein	Power Tagging
Communicating Resource Semantics within Control Protocols **Presentation**	 Jim Butler	Cimetrics Inc.

Demonstration Projects, Lessons Learnt

 **Moderator:** Barry Haaser, Lakeview Group

Interoperability is a word, but what does it really mean when projects are put in place? This session will examine interoperability issues encountered during actual projects.

Title	Presenter	Affiliation
Smart Grid Standards and Systems Interoperability through OpenADR Conformance **Presentation**	 Rish Ghatikar	Lawrence Berkeley National Laboratory
Automated Empowerment **Presentation**	 Arthur "Bud" Vos	Comverge
Sustainable Residential Energy Management: A Blend of Behavioral Science and Automation **Presentation**	 Scott Hublou	EcoFactor
Interoperability Lessons from Ongoing Residential Smart Grid Deployments **Presentation**	 Erik Gilbert	Navigant Consulting

Standards

 **Moderator:** Tracy Markie, Engenuity Systems

Standard development is an integral part of smart grid. Standards must lay out the definitions, roles and functions of various data. Without standards, it is difficult, if not impossible, to obtain interoperability between existing and new equipment. This session describes the evolution of several smart grid standards for specific areas (i.e. electric vehicles, customer energy management systems, etc.).

Title	Presenter	Affiliation
Electric Vehicle Supply Equipment (EVSE) Information Model for Interacting with a Grid-Enabled Customer Energy Management System (CEMS) in Small Residential to Large Commercial and Industrial Premises **Presentation**	 Nick McLellan	Johnson Controls

Title	Presenter	Affiliation
Moving DR Signals from Energy Interoperation to Smart Energy Profile 2 (SEP2) **Presentation**	 David Holmberg	NIST
IEC CIM Architecture for Smart Grid to Achieve Tnteroperability **Presentation**	 Ron Ambrosio	IBM T.J Watson Research Center
Standard Profiles—Key to High Interoperability **Presentation**	 Heiko Englert	Siemens AG
The Energy Services Interface **Presentation**	 Dave Hardin	EnerNOC, Inc

Demonstrating Interoperability

 **Moderator:** Tracy Markie, Engenuity Systems

Building systems, especially those related to life safety and security, have been integrated for years. Newer advanced technology approaches are needed for system integration and interoperability of systems within the buildings (related to energy management) and must address issues very similar to those with the electric grid standardization including sequences of operation, database management, dashboards, and security. Presentations in this session will encompass interactions between home and commercial resources and the needs of the power systems (demand response).

Title	Author	Affiliation
Using Interoperability and Advanced Architecture to Maintain Power Quality with Renewables **Presentation**	 Phil Davis	Schneider Electric
Applying the Lessons of Building System Integration and Interoperability to the Smart Grid **Presentation**	 Jim Sinopoli	Smart Buildings LLC
Automating and Optimizing Demand Response to Solve the Peak Load Management Problem **Presentation**	 Dave Olson	BuildingIQ
Aggregated Demand Response Resources and the Role of Standard DR Signals **Presentation**	 Ed Koch	Akuacom

Certification & Testing

 **Moderator:** Tracy Markie, Engenuity Systems

Obstacles to standards-based interoperability are many, but the need to ensure interoperability of products from multiple vendors for smart grid will become significant. Standards typically define protocol and content requirements in great detail but may be light on implementation concerns. One of the questions yet to be answered is how this work translates into actual adoption of standards-based products within vendor and utility systems. There needs to be a certification and testing regimen to validate interoperability based on the standard.

Title	Author	Affiliation
Standardizing Common Information Model (CIM) Implementations, a Test-Based Approach **Presentation**	 John Simmins	EPRI
Moving From Standards Development to Field Implementation: A Case Study of a Regional Demonstration Project **Presentation**	 James Mater	Quality Logic, Inc.
The Smart Grid Interop Lab **Presentation**	 Harry Stephey	KEMA Powertest, LLC
Localization of Common Information Models: Incorporating Information Interoperability in the Indian Power System for Load Shedding Mechanisms	 V S K Murthy Balijepalli	Indian Institute of Technology Bombay
Advancing Certification Testing: Beyond Conformity, Moving to Interoperability **Presentation**	 Clinton Powell	Southern California Edison/Powell Wireless Consulting, LLC

Architecture

Track Leader: Tony Giroti, BRIDGE Energy Group, Inc.

The Architecture track will cover five areas:

− Innovative Architectural Models: As interoperability efforts advance, the architectural vision for the future grid has not yet fully come into focus. New products, services, and standards are coming to market, each typically with implicit architectural assumptions. This session will cover a few innovative architectural models.

− System Evolution and Legacy Integration: The power grid is currently being operated and managed with many legacy systems that are proprietary as they have been either custom developed or have been highly customized versions of commercial applications. This track will discuss integration with legacy systems.

− Data Integration and Deluge: Smart Grid is not about procuring and installing products, but doing that for the purpose of achieving business objectives. This session will discuss the need for data integration and how to manage the data deluge.

− You've Got Data, Now What! : Data is king as some would say. However, it's value is realized only if it's used. This session provides ideas around operationalizing the data and how some utilities are using the data.

− Cost Benefit Analysis & Risk Mitigation: Utilities are at various stages in their Smart Grid execution plan. On one extreme, there are some who are in a holding pattern and are waiting, while on the other hand there are some who are two to three years into their journey. And then there is the great majority who are in-between. Many of these are considering developing cost/benefit analyses to understand the value of such investments. This session is for decision makers, executives and information technology (IT) managers considering launching integration initiatives using service oriented architecture (SOA) and enterprise service bus (ESB) technologies.

Innovative Architectural Models

Moderator: Brad Rogers, Navigant Consulting

As interoperability efforts advance, the architectural vision for the future grid has not yet fully come into focus. New products, services, and standards are coming to market, each with explicit or implicit architectural assumptions. Important questions remain:

• Can the existing patchwork of grid architectures ever converge?
• Is there a place for a unified vision for grid architecture?
• Should the approach to grid architecture be more specified or more general?
• What decisions can utilities make today in spite of architectural uncertainty?

This session advances the GridWise Architecture Council's goal to "identify the concepts and architectures needed to make interoperability possible" by offering unique perspectives on the future of grid architecture.

A Smart Grid Reference Architecture Drives Information Management at SCE will describe a unique tool that helps utilities navigate the world of grid architecture and interoperability to make decisions today.

Identifying Architectural Modularity in the Smart Grid asks whether the organization of grid architectures can be improved and offers a tool to help organize grid systems more optimally.

Utilizing Telecom Operations Frameworks in Energy Utilities will show us how utilities are similar to telecoms and will offer architectural insights from the telecom companies around the world.

Open Source and the Smart Grid asks what role "open source" can play in bringing about interoperability and ultimately delivering on the promises of a smarter grid.

This session reminds us not to get caught up in existing paradigms, but to continue looking at the issues of the day with a fresh set of eyes

Innovative Architecture Models
Architecture Track

Presentation

Title	Author	Affiliation
Utilizing Telecom Operations Frameworks in Energy Utilities - Case Studies **Presentation**	 Eric Nelson	Synaptitude
A Smart Grid Reference Architecture Drives Information Management at SCE **Presentation**	 Jeff Gooding	Southern California Edison (SCE)
Open Source and the Smart Grid **Presentation**	 John Teeter	People Power

System Evolution & Legacy Integration

 **Moderator:** Brian Lenane, SRA International

The power grid is currently being operated and managed with many legacy systems that are proprietary as they have been either custom developed or have been highly customized versions of commercial applications. Many of these are fragmented, isolated and are reaching end of life. More importantly, they may not scale to support the needs of smart grid. Utilities are therefore consolidating these overlapping applications and systems by procuring off-the-shelf applications and products. However, there are far too many applications and systems in a utility and replacing or upgrading these systems is a journey. Every utility therefore needs to develop a system evolution and legacy integration approach to ensure that new systems will work with the legacy systems and infrastructure. This session will provide insight into four areas:

•Interoperability and integration with communication systems
•How new systems can integrate with older legacy systems to achieve resource savings
•Integrating AMI/Automatic Meter Reading (AMR) and cloud technologies with the legacy systems
•An energy service provider interface that enables legacy integration

Title	Author	Affiliation
Managing Smart Grid Communications Network Interoperability **Presentation**	 Ray Bariso	Telcordia Technologies
Merging Legacy Systems with the Smart Grid **Presentation**	 David Mayne	Digi International
An Architectural Template for Standardized Consumer Access to Energy Use **Presentation**	 David Mollerstuen	Tendril

Data Integration & Deluge

 **Moderator:** Doug Houseman, Enernex

Smart grid is not about procuring and installing products, but doing that for the purpose of achieving business objectives such as delivering better quality of customer service, improving proactive outage management, increasing internal operational efficiencies, etc. The key ingredient in achieving these objectives is the need to integrate the new interval data from the smart meters and the integration of such data with legacy systems. Utilities will be inundated with this data. To start with, the data deluge will be a challenge in itself—how to handle it, how to validate it and how to store it. On top of that, there is a need for operationalizing this data. These are challenges that every utility faces. This session will provide an insight into such challenges and how the data integration and deluge challenge can be managed.

Title	Author	Affiliation
Understanding Wireless Topologies for Smart Grid applications	 Joaquin Silva	On-Ramp Wireless
Enabling Users With CIM Data **Presentation**	 John Gillerman	Grid Cloud System, Inc
Distributed data collection and storage **Presentation**	 Heart Akerson	Heart Transverter
Communications and Analytics Architectures for Distributed Smart Grid Sensors **Presentation**	Greg Nulty	Tollgrade Communications

You've Got Data, Now What!

 **Moderator:** Tony Giroti, BRIDGE Energy Group, Inc.

Data is king, as some would say. However, its value is realized only if it's used. Many utilities are embarking on smart grid initiatives and deploying AMI infrastructure, which will result in a data deluge. The key is to operationalize the data—which means using the data actively. New systems and applications will need to leverage this data to deliver efficiencies and improve business processes such as proactive outage management, load curtailment, market operation, better customer service, etc. This session will discuss how such data can be operationalized.

You've Got Data, Now What

Presentation

Title	Author	Affiliation
Transactive Methods for Integrating DR/DER for Balancing Variable Energy Resources **Presentation**	 Ali Ipakchi	OATI – Open Access Technologies, Inc.
Smart Grid Operations and Control Center Design: Vision vs. Reality **Presentation**	 Derrick Mealiffe	Telcordia Technologies Inc.
A Utility Perspective **Presentation**	 Greg Armstead	Eugene Water & Electric Board

American Recovery and Reinvestment Act (ARRA) SmartGrid Investment Grant Projects Data **Presentation**	 Scott Crowder	(National Renewable Energy Laboratory (NREL)

Return on Investment and Risk Mitigation

 **Moderator:** Kerri Martinek, BRIDGE Energy Group, Inc.

Utilities are in various stages when it comes to smart grid. On one extreme, there are some who are in a holding pattern and are waiting, while on the other hand there are some who are two to three years into their journey. And then there is the great majority who are in-between. Many of these are considering developing cost/benefit analyses or trying to understand the return on investment to understand the value of such investments, while many others are considering how such investments can be managed to reduce risk. This session will provide a Return on Investment (ROI) model for Service Oriented Architecture (SOA) cost benefit and how organizations can manage their technical and business risk.

Title	Author	Affiliation
Cost Benefit Analysis of Pursuing a Phased Approached to an Evolving Smart Grid **Presentation**	 Tony Giroti	BRIDGE Energy Group, Inc.
Interoperating Smart Grid Cyber Security Systems: Adaptive Risk Management across Unified Operation Technology (OT) and IT Domains **Presentation**	 Christopher Reed	Albeado
Managing Smart Grid Communications Network Interoperability **Presentation**	 Derrick Mealiffe	Telcordia Technologies Inc.

Cross-Cutting

 **Track Leader:** James Mater, Quality Logic, Inc.

There are numerous issues that cut across multiple smart grid domains and topics—that is, they are important and relevant to almost every aspect of interoperability standards and smart grid systems and applications. Many of these issues are identified in the GWAC Context-Setting Framework (the GWAC Stack) but issues also include others such as conformance and interoperability testing, risk management, safety and system reliability. We are fortunate to have four sessions focused on three of the critical cross-cutting issues. The Smart Grid Interoperability Maturity Model (SGIMM) and GWAC session looks at the practical application of the GWAC Stack and the developing SGIMM (also the subject of the Foundational Session in the opening Plenary). Two sessions focus on cyber security, one of the most critical of the cross-cutting issues. Finally, the issue of achieving interoperability from one end of the communications network to another end through a series of smart grid domains and standards is addressed in the End-to-End Interoperability Session**.**

Smart Grid Interoperability Model & GWAC

 **Moderator:** Steve Widergren, Pacific Northwest National Laboratory

This session will show the complexity and many dimensions that go into achieving interoperability among smart grid participants in a community required to interoperate at multiple levels in regional or local electricity markets, balancing authorities, or generation regions, or other technical and business requirements that bring multiple participants together. Papers will discuss the use of the GWAC Stack and principles of the SGIMM in practical applications and the emerging SGIMM model being developed by GWAC.

Title	Presenter	Affiliation
A Utility Application Implementation Strategy Using the EPRI IntelliGrid$_{(sm)}$ Methodology and the GWAC Stack as a Model **Presentation**	 John Simmins	EPRI
The SGIMM and Integrated Development, Test and Certification Presentation	 James Mater	Quality Logic, Inc.
SGMM and SGIMM	 Austin Montgomery	Software Engineering Institute, Carnegie Mellon

Using the IntelliGrid Methodology and GWAC Stack in IT Smart Grid Project Management **Presentation**	 Mark Knight	KEMA

Cyber Security Solutions & Practices

 **Moderator:** Patrick Miller, National Electric Sector Cybersecurity Organization (NESCO)

Practical implementations that address cyber security requirements are addressed in this session. In the real world, organizations take risks every time they agree to have a technology interface with a customer, a business partner, a vendor or even internal organizations. Risks can be related to business (failure of an interface to transmit correct, timely information); security (opening a possible intrusion portal to your own systems); privacy (inadvertent theft of consumer information); quality (deterioration of service if a partner's system is slow to respond and drops key data), etc. In this session, papers address security and risk issues ranging from the semantics of security to the need and requirements of cyber security in smart grid applications to cyber security testing.

Title	Presenter	Affiliation
A Semantic Model for Cyber Security **Presentation**	 Bruce Barnett	GE
The Growing Need for Cyber Security in Smart Grid Networks **Presentation**	 Russell Silva	Telcordia Technologies, Inc.
Smart Grid Cyber Security in the Trenches **Presentation**	 Efrain Gonzalez	Southern California Edison
The Need For Security Testing and Conformance Standards **Presentation**	 Mike Ahmadi	Granitekey LLC
Information Security Program Fundamentals **Presentation**	 Sandy Bacik	EnerNex

End-to-End Interoperability

 **Moderator:** Bob Saint, NRECA

Achieving end-to-end interoperability in smart grid applications requires the availability of standards: the selection of appropriate standards for a specific architecture platform or application and then getting the various products and technologies to work together on an end-to-end basis. Papers in this session address the selection of standards and standards-based products, highlight progress in key standards and look at interoperability for systems that include components in differing smart grid domains and/or incorporate components based on multiple standards, either in one product or across the system. Finally, the issue of achieving actual conformance to standards is considered as a key building block in the achievement of end-to-end interoperability.

Title	Presenter	Affiliation
Grid Communications Protocol Interoperability on Converged Virtual Internet Protocol (IP) Networks **Presentation**	Eruch Kapadia	Cisco Systems Inc.
IEEE Smart Grid Series of Standards IEEE 2030TM (Interoperability) and IEEE 1547TM (Interconnection) Status **Presentation**	Thomas Basso	NREL
Modeling of Distributed Premises-Based Renewable Energy Grid Integration using HOMER **Presentation**	Tim Schoechle	International Center for Standards Research

Cyber Security

 **Moderator:** Darren Highfill, Utilisec

This session starts looking at how interoperability standards can be “cyber secured” during design and development rather than have security added to an inherently insecure standard design. The biggest challenge in the smart grid domain is the achievement of end-to-end interoperable systems with adequate attention paid to security and how to incorporate security at the standards and systems development level.

Title	Presenter	Affiliation
Next Generation Automation: Effective Platform Design and Practical Implementations **Presentation**	 John Camilleri	Green Energy Corp
Visibility into Smart Grid Security **Presentation**	 Chris Blask	ICS Cybersecurity, Inc.
Being Compliant Does Not Mean You Are Secure	 Sandy Bacik	EnerNex
Security Fabric: An Implementation of the DOE Proposed Tailored Trustworthy Space **Presentation**	 Charles (Chuck) Speicher	McAfee

Securing Industrial Automation Control Systems

 **Moderator:** Mike Ahmadi, GraniteKey, LLC

Today's modern industrial automation and control systems (IACS) used in the power sector are frequently deployed using many of the same technologies used in corporate IT systems. At a minimum, these systems require the same IT management rigor as the corporate IT systems. However, IACS has different IT priorities with respect to the classic CIA Triad (Confidentiality, Integrity, and Availability). In most cases an IT system will place a higher priority on confidentiality, while a control system will place a higher priority on availability or integrity. In order to address the challenges associated with IACS, an international standards committee is developing a series of standards for IACS, which are designated as IEC-62443. In addition to this series of standards, there are sets of compliance-testing specifications that are being written to assess the conformance to the requirements in the standard series.

This session will give an overview of the IEC-62443 series of standards, including the intended content of each document in the series and the intended audience for each of the standards. Following the overview of the standards, this session will introduce the audience to the ISASecure certification program for industrial automation and control system devices and a system level certification, and the APC vendor security practices certification program (both in existence and practiced today).

Securing Industrial Automation Control Systems

Presentation

Title	Presenter	Affiliation
	 Kevin Staggs	Honeywell ACS Advanced Technology Lab
Industrial Automation & Control Systems Security Presentation	 James Gilsinn	NIST

Appendix A. Agenda

Monday, December 5, 2011

SGIP Governing Board Meeting (SGIP GB begins on Sunday 12/4)		Lunch & SGIP Plenary	TnD DEWG CSWG Green Button PAP 16 EV Fast Charge CMEWG	Description of SGIP Meetings and Terms
	SGIP 101		Regulators Workshop	

Tuesday, December 6, 2011

PAP 8	PAP 12	Lunch	PAP 13	Opening Comments Plug-In Kick-Off Roundtable	Interoperability Fair/Face Time
PAP 3 & 9	PAP 6		PAP 17		
PAP 2	BOPWG		BOPWG		
PAP 7	GBITF		PAP 18		
PAP 15	SGTCC Session 1		SGTCC Session 2		
Electromagnetic Interoperability Issues WG	B2G/I2G DEWG		DRGS DEWG		
V2G DEWG	V2G DEWG		Home-to-Grid DEWG		
Architecture 101	Interoperability 101		GWAC 101	PAP 14 SGAC Semantic TF	Plug-In and Expo open

Wednesday, December 7, 2011

Opening Keynote Video Address Green Button Roundtable	Foundational Session - Interoperability Maturity	Lunch	SGTCC Session 3	SGTCC Session 4	Plug-In	Reception & Dinner
			SGAC	SGAC		
			Transactive Energy	Market Participation		
			Interoperability	Demonstration Projects, Lessons Learned		
			Innovative Architectural Models	System Evolution & Legacy Integration		
			SGIMM & GWAC	Cyber Security Solutions & Practices		
Plug-In and Expo open						

Thursday, December 8, 2011

			Business and Policy DEWG	Utility Implementation Roundtable Closing Comments	End of Grid-Interop 2011 Plan for Grid-Interop 2012 December 3-6, 2012
Policy Roadmap	Regulatory	Lunch	Customer Responsiveness		
Standards	Demonstrating Interoperability		Certification & Testing		
Data Integration & Deluge	You've Got Data, Now What!		Return on Investment and Risk Mitigation		
End-to-End Interoperability	Cyber Security		Securing Industrial Automation Control Systems		
Plug-In and Expo open					

Appendix B: Forum Participants

Ali Ipakchi, OATI

Dr. Ipakchi has over 30 years of experience in the application of information technology to power systems and electric utility operations. As the VP of Smart Grid and Green Power at OATI, he is responsible for growth of the business in these emerging areas. Prior to OATI, he was Vice President of Integration Services at KEMA, assisting utility clients with roadmaps, specifications, business and implementation strategies for automation and technology projects. Prior to KEMA, Dr. Ipakchi held various senior management positions at leading vendors supporting power application development and system solutions delivery to the power industry. He has led new business-line and organizational development initiatives, and has managed product development and delivery teams. His areas of experience include Smart Grid, utility automation, power systems operations, enterprise and operational IT systems, systems for ISOs/energy markets, utility control centers, trading floors, power generation, distribution operations, and advanced metering. He holds a PhD from University of California at Berkeley, and is co-holder of three US patents on power systems applications and instrument diagnostics.

Andrew Crapo, GE Global Research

Dr. Crapo has been a part of the GE Global Research staff for 30 years. While developing performance and diagnostic models of mechanical, chemical, and electrical systems he developed a particular interest in human-computer interfaces, decision support systems, machine reasoning and learning, and semantic representation and modeling. His work has included a graphical expert system language (GEN-X), a graphical environment for procedural programming (Fuselet Development Environment), and a model-driven user-interface for decision support systems (ACUITy). Most recently Andy has been active in developing the Semantic Application Design Language (SADL), enabling GE to leverage world-wide advances and emerging standards in semantic technology and bring them to bear on diverse problems from engineering and maintenance to information security.

Andy Abendshein, Power Tagging

Andy Abendschein brings over 20 years of software engineering experience to his current role as Software Architect at Power Tagging where he is currently responsible for developing a platform to support distributed grid-aware applications.

Prior to joining Power Tagging, Andy's background developing distributed systems was nurtured in such wide ranging industries as automotive test and measurement, telecommunications, hosted CRM, storage area network management, and most recently interactive cable television. He has been an advocate of the use of interoperable standards such as the DMTF's Common Information Model (CIM) in storage, and participated in Open Cable Applications Platform (OCAP) standards work and interoperability labs at CableLabs.

Andy holds two Bachelor's degrees, including a BSEE from Colorado State University, as well as post-graduate studies in Software Engineering.

Aneesh Chopra, United States of America

Aneesh Chopra is the United States Chief Technology Officer and in this role serves as an Assistant to the President and Associate Director for Technology within the Office of Science & Technology Policy. He works to advance the President's technology agenda by fostering new ideas and encouraging government-wide coordination to help the country meet its goals from job creation, to reducing health care costs, to protecting the homeland. He was sworn in on May 22nd, 2009. Prior to his appointment, he served as Secretary of Technology for the Commonwealth of Virginia from January 2006 until April 2009. He previously served as Managing Director with the Advisory Board Company, a publicly-traded healthcare think tank. Chopra was named to Government Technology magazine's Top 25 in their Doers, Dreamers, and Drivers issue in 2008. Aneesh Chopra received his B.A. from The Johns Hopkins University and his M.P.P. from Harvard's Kennedy School. He and his wife Rohini have two young children.

Anto Budiardjo, Clasma Events

Anto Budiardjo is a seasoned marketing and product development professional specializing in the energy, connectivity and IT disciplines. Mr. Budiardjo has more than three decades experience within these industries and has fashioned his expertise into an energetic, visionary, and dynamic approach to business.

Mr. Budiardjo has held executive-level marketing and product development positions with various controls companies where he was responsible for product development, management and marketing communications. His rare combination of marketing and technology practices has enabled him to fine tune and soften the challenging task of transitioning the product development process from an engineering-centric focus to a market-centric focus.

Mr. Budiardjo's entrepreneurial and creative spirit has won him international business opportunities throughout Europe, Americas, and Asia/Pacific further enabling his global perspective on our market.

As a founder of Clasma Events Inc. Mr. Budiardjo is responsible for organizing key conferences and events for the emerging intersection of energy and IT, including GridWeek and ConnectivityWeek. These and other events specifically focus on Smart Grid and the role of smart connected devices in the future clean and renewable energy economy.

Mr. Budiardjo is a frequent speaker at industry events and is a contributing editor of AutomatedBuildings.com. He lives in the Dallas Fort Worth area in Texas and was the recipient of the Frost & Sullivan 2005 Building Technologies CEO of the Year award.

Arthur "Bud" Vos, Comverge

Mr. Vos joined Comverge in April 2003 as Vice President of Development for our 6DiNET Group after the acquisition of Sixth

Dimension, Inc. Mr. Vos was named Vice President, Marketing, Products and Strategy in 2004. As co-founder and Vice President of Sixth Dimension from 1997 to April 2003, Mr. Vos has been extensively involved in the electric utility industry for over 13 years, including the development of Demand Response offerings based on real-time monitoring and control technology, strategic sales to electric utilities, alliances and joint product and development offerings with partner companies. Mr. Vos obtained B.S. and M.S. degrees from Colorado State University with an emphasis in artificial intelligence, distributed control systems, manufacturing systems, and embedded system design.

Austin Montgomery, Software Engineering Institute

Austin Montgomery is smart grid program lead for the Software Engineering Institute (SEI) at Carnegie Mellon University. SEI collaborates with government and industry to address security, architecture, interoperability, process improvement and other software and systems engineering challenges of grid modernization. Montgomery spent the first part of his career as M&A attorney, investment banker and management consultant. Prior to joining the SEI he was a founder and senior executive of several start-up companies developing innovative software and wireless communication technologies. He received a BA in Economics from Harvard University, JD from the University of California, Hastings College of the Law, and MBA from the Simon School of the University of Rochester and the Erasmus University in the Netherlands.

Barry Haaser, Lakeview Group

Barry Haaser has over 25 years of experience in high technology and energy industries. Barry is the President of the Lakeview Group, a company providing marketing and association management services to energy related trade associations. Haaser has extensive experience creating and managing industry alliances and trade associations, including, the Digital Home Alliance, EIS Alliance, Home Lighting Control Alliance, LonMark International, OpenADR Alliance, SunSpec Alliance and the USNAP Alliance. Prior to starting his own company, Barry spent 15 years with Echelon Corporation (ELON) where he held a number of marketing and business development positions in the U.S. and Europe. Mr. Haaser was previously Vice President of Marketing at Alacritech, a data storage company, and Director of Marketing at Saratoga Systems, an enterprise CRM company. Haaser holds a Bachelor of Science degree in Business Administration from San Jose State University.

Ben Boyd, EnerNex Corporation

Ben Boyd joined EnerNex as the Vice President of Regulatory/ Policy and manages the Smart Grid Engineering Regulatory/Policy Group. Ben is a multi-state and international electric industry hands-on take charge regulatory professional. He has fluent knowledge in broad business management functions including strategy, budgeting and resource allocation, with consulting engineering experience, as well as experience in interacting on regulatory and legislative filings and working with state and federal commissions and agencies. Ben specializes in organizing processes for written or oral products, and motivating assets necessary to achieving EnerNex objectives crisply, directly, timely and with resource efficiency. He is an analytical, decisive, objectively critical extrovert with expertise in relationship building, product presentation, industry intelligence gathering, public speaking, and regulatory process management.

At EnerNex, Ben is responsible for regulatory business development, personnel, projects, clients, and related business activities. He oversees and conducts studies based upon regulatory work in the Smart Grid arena conducts workshops for road maps with clients in accordance with regulatory compliance in the Smart Grid assists clients (utilities, etc.) with rate cases, as well as critiques when necessary and works closely with industry-related trade groups and organizations to support the EnerNex brand, technologies and services. Ben is responsible for the technical management of the EnerNex Regulatory Team and is accountable for their work. He works with the EnerNex Program Manager to manage overall project scheduling and deliverable management, and effectively manages multiple priorities in a fast paced environment, consistently meeting deadlines. Ben also represents EnerNex by publishing papers, articles and as a lecturer on Smart Grid related topics and technologies.

Bob Saint, NRECA

Bob has been with NRECA for over 10 years. His primary role is technical advisor for the T&D Engineering System Planning Subcommittee. He is also the Program Manager for the MultiSpeak® Software Integration Initiative.

Bob graduated from Wichita State University in Wichita, Kansas, with a BS degree in Electrical Engineering.

He has worked for rural electric co-ops, primarily distribution cooperatives for over 20 years in Colorado before coming to NRECA.

He is a Professional Engineer in Texas and Virginia and a senior member of IEEE. He is chairman of the IEEE P1547.7 (Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection) Working Group and IEEE PES Distributed Resources Integration Working Group. He is active in other IEEE working groups in the Power and Energy Society (PES) and SCC21, including P2030 – Task Force 2. Bob is a member of the GridWise Architecture Council (GWAC). He is also on the Governing Board of the Smart Grid Interoperability Panel (SGIP) and active in several other SGIP groups.

Brad Rogers, Navigant Consulting

Brad Rogers, MS, MBA, is a Managing Consultant in Navigant's Energy practice. He has most recently focused on smart grid economic assessment and interoperability issues. He has contributed to numerous efficiency and demand response program evaluation efforts by providing statistics expertise, conducting technical interviews, and managing evaluation tasks.

Mr. Rogers has quantitative expertise in the fields of optimization, Monte Carlo simulation, system dynamics, risk analysis, and decision analysis. He has applied these skills to the economic and technical assessment of energy technologies, to the improvement of product development

processes, and to project management practices in the energy and aerospace industries. He has a working knowledge of renewable energy sources, nuclear technology, transmission, distribution, and issues pertaining to smart grid.
Mr. Rogers earned an MBA and an MS in Engineering Systems concentrated in Energy and Sustainability at the Massachusetts Institute of Technology.
Mr. Rogers works out of the Boulder, Colorado office.

Brent Hodges, Tendril Networks

Brent Hodges joined Tendril, a leading energy management technology provider, as General Manager, Australia. Based in Melbourne, Hodges is responsible for leading Tendril's sales, marketing, business development and strategy in Australia and the Asia-Pacific region.

Brian Lenane, SRA International

Brian Lenane has more than 25 years of experience in all aspects of software development, SaaS solutions, data center consolidation, information security managed services and information systems management, with a proven track record of building and leading highly motivated, results-driven teams. His background includes executive-level information services at leading software firms known for driving innovation and delivering both top-line growth and bottom-line performance.
As a Senior Principal at SRA he has played the following leadership roles.
- Strategic Initiatives: Responsible for the development of methodologies, business plans, client accounts and business development for Green IT, Smart Grid Cyber Security and Energy/Resource Information management offerings for the federal government. He has worked with several agencies in developing energy savings strategies.
- Senior Advisor, EPA Business Intelligence project to help the team resolve client, budget and technical issues in the delivery of services. The BI product was to provide to EPA to make reporting simpler and more accurate for the Energy Star building program.
- Senior Advisor, OPM Led a Green IT assessments of data centers at OPM, VA and DOE to determine efficiencies and energy savings.
Brian is a serial entrepreneur and was one of the early member of the leadership team at Aclara (meter data management software products), which was acquired by ESCO Technologies in 2005. Aclara provides smart grid solutions to utilities including AMI (STAR & TWACS), meter data management system, load forecasting, settlement systems, outage management, demand response, revenue protection, and several software applications including hosted customer portals, meter asset management, customer care, rate analysis, carbon footprint calculator, and complex billing systems. He has worked directly with more than 80 of the largest utility companies in North America. He has also worked with ESCO's, energy service providers and other energy companies.
Prior to Aclara, he worked closely with executives, chief information officers and chief security officers of Fortune 1000 firms in a senior level customer relationship management capacity, championing a wide array of strategic initiatives, from developing enterprise wide IT strategies including hosted solutions, data center operations and strategic development and implementation of all aspects of IT infrastructure management. As an executive leader, he has driven financial planning, operational performance, including efficiency of IT infrastructure. His experience includes providing technical services to the health care, information technology and education markets.
Mr. Lenane has received an MBA from the Wharton Graduate School of Business, a BA in Biology from Franklin & Marshall College, and earned a CAGS from Harvard University.

Bruce Barnett, General Electric

Bruce Barnett graduated with a BS is Mathematics of Computation from RPI in 1973. Bruce was the primary Software Engineer and for 12 years developed and maintained the major product line of the Factron division of Schlumberger. In 1988, Bruce then joined GE's Global Research Center in Niskayuna, NY. Bruce developed working prototypes and published 21 papers on secure wireless sensor protocols (2005), complexity-based intrusion detection system (2002-2009) , secure data provenance (2009), security vulnerability (2000) and expert-system-based fault analysis programs (1995).
He is currently developing tools to analyze system security of smart grid systems using semantic web technology and SADL.

Cameron Brooks, Tendril

Cameron Brooks serves as Vice President of Policy for Tendril, where he leads the company's regulatory engagement and policy strategy. Cameron has over 20 years' experience in executive positions focused on energy policy and environmental advocacy. Prior to joining Tendril, Cameron served as the Vice President of Resource Development at Renewable Choice Energy (RCE), a full-service provider of renewable energy credits and carbon offsets. Previously, Cameron led multi-state public investment initiatives at the Clean Energy States Alliance, with a focus on community wind development, fuel cell deployment and partnerships with institutional investors. Cameron's early career included entrepreneurial ventures in energy efficiency, environmental campaigns and production of Mountainfilm, the premier festival of mountaineering and environmental films in Telluride, Colorado. Cameron graduated magna cum laude from Yale University with a degree in Cultural Ecology and Ecologic Design and received his MBA from Cornell University.

Charles (Chuck) Speicher, McAfee

Mr. Speicher was the founder of several successful wireless companies. His first wireless company Cellular 2001 of New England was an INC 500 listed company in 1995. He also has the distinction of launching several wireless firsts to the market. GlobaLAN, a company he founded in 1996, was the first wireless ISP in a hotel environment to provide high speed internet access to mobile executives.
Mr. Speicher helped to invent and launch nationally another product called Telguard/ Celguard, which utilized technologies from three companies and was the first centrally monitored wireless alarm system in the US.

CelGuard provided a backup system to the wired infrastructure to maintain alarm device continuity wirelessly with the central station, successfully raising centrally monitored system reliability when thieves compromised power and telephone lines.

Chuck Speicher has been recognized by his peers for his contributions to the New England Wireless Industry. He was a finalist for the Ernst & Young New England Entrepreneur of the Year award in 1995.

Mr. Speicher was CEO of NeoGate a private company that introduced technology that helps launch the BankBoston electronic banking service one of the first in the country. NeoGate assisted GE Power's launch of a new multilayered intranet architecture that lead to GE's Jack Welch companywide program launched in Atlanta called "Destroy your own business" an ecommerce initiative for GE Mangers.

Recently, he was hire by McAfee to lead new business development at McAfee focused on critical infrastructure with in the Energy Vertical. He is the founder of the Security Fabric Alliance(SFA) at McAfee, a consortium of OEMs utility vendors, System Integrators, security technology companies and utilities dedicated to the design, commercial development and implementation of an integrated interoperable end to end embedded security reference architecture for critical infrastructure now known as the "security fabric".

Chellury (Ram) Sastry, Battelle

Dr. Chellury Ram Sastry is currently a senior program manager and smart grid director with the Energy, Environment, and Material Sciences division at Battelle Memorial Institute, Columbus, OH (BCO). Prior to joining BCO, he was a senior engineer with the electricity infrastructure group in the energy and environment directorate at Pacific Northwest National Laboratory (PNNL), Richland, WA and prior to that he was a project manager and senior research scientist with Siemens Corporate Research, Princeton, NJ.

His current focus includes providing R&D, business development, and technical marketing leadership to enhance BCO's grid system's portfolio in transmission/distribution modeling & simulation, smart grid data analytics, and advanced demand management to provide value-add services to residential and small commercial building customers. And particular areas of emphasis in this regard are the use of load for power system ancillary services including frequency regulation, and use of home energy management (HEM) to facilitate the penetration of distributed generation including PV. In the area of transmission modeling & simulation, he is leading BCO's efforts in the development of novel grid management tools based on load-flow approaches that yield accurate and reliable estimates of electrical state to thereby facilitate enhanced decision-making even when the power grid is operating under stressed conditions.

Chris Blask, ICS Cyber Security, Inc.

Chris Blask has been involved in the industrial control system and information security industries for more than 20 years.

Mr. Blask's career covers the breadth of the ICS cybersecurity space. In 1990 he worked at General Electric Power Systems as a control systems engineer where he conceived, designed and implemented a facility-wide mobile video conferencing capability to integrate with GE's new global video conferencing network. He joined Sea Change Corporation in 1991 where he invented one of the first commercial firewall products, the BorderWare Firewall Server. In 1998, he joined Cisco System where he led the company's firewall business to a position of global leadership which continues to this day. With several Cisco colleagues Mr. Blask started Protego Networks, an early SIEM vendor later acquired by Cisco. He founded Lofty Perch in 2005 to investigate the application of SIEM technologies to ICS cybersecurity and has advocated such architectures since. As Chief Evangelist for NSS Labs in 2008 he worked to develop regulatory compliance testing regimes. In 2010, Mr. Blask authored the first book on SIEM, "Security Information and Event Management Implementation", published by McGraw Hill. He created AlienVault's Industrial Control Systems Group in 2011.

Today Mr. Blask is Founder and CEO of ICS Cybersecurity, Inc. and serves in faculty and advisory roles at a variety of industry organizations. He is Chair of the LIGHTS program, Vice Chair of the UCAIug OpenSG Security Conformity Group, on the board of the Australian Wind Energy Institute, actively involved with the Department of Energy's NESCO and NESCOR programs and the Department of Homeland Security's ICSJWG and contributing to workforce development through the National Board of Information Security Examiners, City & Guilds and academic institutions including Carnegie Mellon, Rochester Institute of Technology and IIT Mumbai.

Chris Chen, San Diego Gas & Electric

Chris Chen is a Market Development Manager, working with Plug-in Electric Vehicles and Smart Grid issues, for Sempra Energy. He is also a Board director for Juice Technologies and is on the Technical Advisory board for GridX. He chairs the SAP Lighthouse Council on electric vehicles. He has two Smart Grid-related patents pending and is a frequent speaker at industry events.

He has a BA degree from the University of California, Irvine, with a major in Economics. His MBA is also from UCI, with an emphasis in Organizational Behavior. Chris was an adjunct professor of organizational behavior at California State University, Long Beach and has published four books and numerous articles on a variety of topics.

Christopher Irwin, U.S. Department of Energy

Christopher Irwin has spent over 17 years in a diverse spectrum of high technology fields from HVAC to III-V semiconductor manufacturing, and most recently in communication networks for advanced metering (AMI) and Smart Grid infrastructure. He is a member of the Department of Energy team administering the Smart Grid Investment Grants, and is responsible for standards and interoperability activities, including participation in the NIST-led Smart Grid Interoperability Framework.

Prior to joining the Department of Energy, he served as Director of Products at an AMI communications vendor, also participating in Technology Discovery and Business Development. In that role, he gained a full market perspective on the electric energy sector, as well as natural gas and water infrastructure. This experience, combined

with his semiconductor and satellite communications background, contributes to a unique perspective on the US energy business under transformation. Chris holds a B.S. in Mechanical Engineering from the University of Maryland, College Park, and an M.B.A. from the W.P. Carey School of Business at Arizona State University

Chris King, eMeter

A nationally recognized authority on energy regulation and competitive energy markets, Chris King is widely recruited by regulators and legislators to consult on technology issues in electric restructuring and grid management. He has testified before Congress and was instrumental in crafting the Energy Policy Act of 2005 that paved the way for advanced metering initiatives in the USA.

Anticipating customer choice before its time, Chris was CEO and founder of Utility.com, which provided electric, gas and telecommunications services nationwide. Chris was a principal at CellNet, where he served as Vice President-Regulatory Affairs and Vice President-Sales and Marketing. Chris has also directed various energy efficiency and time-of-use pricing programs at Pacific Gas and Electric Company, where he was director of rate design.

Chris planted the seeds of a Smart Grid vision early. Chris was an early adopter of time-of-use pricing, beginning with PG&E's residential and commercial pilots and industrial rollout, in the 1980s.

Chris holds master's degrees in science and business from Stanford, and a doctorate in law from Concord University.

Christopher Reed, Albeado

Over the last 22 years, Chris has served in senior leadership roles in service organizations at companies ranging from startups to Fortune 500 including Nokia, Borland and Intellisync. Chris has built and lead teams distributed around the globe that provided integration and development services, custom engineering and educational support.

Chris attended University of California, Santa Cruz & earned his BSEE at San Jose State University and is currently leading the Information Modeling Subgroup for IEEE P2030 standards committee. He actively participates in other industry consortiums like MultiSpeak, CIM & others. He is nearing completion of his JD degree.

Chris has built and lead teams distributed around the globe that provided integration and development services, customer engineering and educational support.

Clint Powell, Southern California Edison

Clint Powell is the owner of PWC, LLC and is currently consulting to Southern California Edison on Wireless Communications Standards, Systems, and Testing for the Smart Grid. In this role he is helping to drive and establish standards, define next generation architectures, and establish communications testing capabilities. Clint has also consulted to equipment vendors and device manufacturers. He is a Vice-Chair of IEEE 802.15 TG4g, Technical Editor for IEEE 802.15 TG4m, Chair of the ZigBee Qualification Group, Elected Member of the SGTCC and Member of the OpenSG Edge Conformity Task Group. He previously played roles in IEEE 802.15 TG4c, IEEE 802.15.4-2006, ZigBee Qualification Group, and the ZigBee Application Framework Group. Prior to forming PWC, LLC Clint was the Chief Architect & Global Platform Systems & Architecture Mgr. for the Wireless Connectivity Operations at Freescale. During his 20 years at Motorola/ Freescale he held a number of Systems & Architecture management positions where he defined next generation communications architectures for 802.15.4/ZigBee, 3G, 2.5G, 2G, Multimedia-wireless, BT, DECT, CT-2, 2-Way and 1-Way Paging and proprietary wireless systems. He was an elected member of both companies Scientific and Technical Advisory Boards. Clint has 32 issued US patents and has published a number of papers.

Darren Highfill, UtiliSec

Darren Highfill is the founder and a Managing Partner of UtiliSec, where he helps utilities, vendors, and government understand appropriate decisions and take practical actions to realize a secure and resilient electric grid. Darren is widely recognized as an industry expert on utility cyber security policy and architecture, leveraging substantial experience in regulatory and political navigation, as well as a particular talent for organizing and leading collaborative team efforts – often across multiple organizations.

Darren's current engagements include developing smart grid security architecture for Southern California Edison and serving as SCE's externally facing resource for cyber security standards and collaboration. Darren also supports the U.S. Department of Energy through Pacific Northwest National Laboratory in providing cyber security guidance to recipients of Smart Grid Investment Grants as well as supporting DOE Headquarters directly as a liaison between DOE and industry. Darren chairs the SG Security Working Group within the UCA International Users Group, leads the Advanced Security Acceleration Project for the Smart Grid (ASAP-SG), and supports several industry standards and collaboration efforts including the NIST Cyber Security Working Group and the International Electrotechnical Commission. Formerly, Darren established, built, and led the utility security practice at EnerNex Corporation.

Dave Elve, PayGo

David Elve is the Executive Vice President and Chief Marketing Officer for PayGo. His background includes numerous executive roles in the energy industry. His most recent role was as a Vice President with Sensus. He has served as Vice President and Principal Consultant with Enspiria Solutions (a Black & Veatch company), Vice President with Cellnet (now Landis+Gyr) and a Senior Vice President with Atos Origin ($6.5B global IT services firm). His utility background spans over 18 years including stints at Schlumberger and Convergent Group. Mr. Elve holds a B.S. in Business, a MBA in Finance and is a graduate of the Georgia Tech Management Institute's Executive Program. Mr. Elve has worked with numerous utilities on their Smart Grid programs and he is a frequent speaker in the industry. He has been an active Investor and advisor to several energy industry ventures. He is currently an investor and Advisor Board Member for both Verdeeco and Preparis.

Mr. Elve is a founder and Past President of the Smart Meter Manufacturers' Association of America (SMMAA). He is a Founder and the acting Executive Director of SmartGridSuccess.org. He was recently named to the Fierce Grid 15 Most Influential

people in Energy. He is a member of the SGIP – CME Working Group and is active in the GridWise Architecture Council. He is the marketing lead for the efforts of UCAIug (includes CIM, OpenSG and IEC 61850). He actively participates in committees related to Distributech, Automation, Metering Americas and Smart Energy International. In the past, he has served on the GridWise Alliance Implementation Working Group, Euro AMRA and the Gridweek Advisory Committee.

Dave Hardin, EnerNOC, Inc.

Dave has more than 25 years of experience designing, integrating and managing industrial information management and control systems. He specializes in energy systems architecture and design. Dave is holds a Bachelor of Electrical Engineering from the University of Delaware. He is a Registered Professional Engineer (DE/MD), an IEEE Certified Software Development Professional and a PMI Project Management Professional.

David Holmberg, NIST

David Holmberg serves in the NIST Building and Fire Research Laboratory. His work focuses on building integration into the Smart Grid and, more generally, communication of building-system data to outside partners. David serves as the representative for the buildings community on the NIST Smart Grid team, and leads the Building-to-Grid (B2G) domain expert working group. He is currently convener of the Smart Grid Working Group (SG-WG) of the ASHRAE BACnet (Building Automation Control network protocol) committee, with work focused on advancing the control of commercial buildings and participation in the Smart Grid. David also co-chairs the OASIS Energy Interoperation Technical Committee which is focused initially on the NIST DR and DER Priority Action Plan, and more broadly on signaling standards that enable end-node participation in maintaining grid stability.

David received his PhD from VA Tech, and joined NIST as a post-doc in 1997, studying issues related to accurate measurement of heat flux in a mixed-mode (radiation, convection, and conduction) heat transfer environment. Since joining the Mechanical Systems and Controls group, David has worked on BACnet network security, utility interaction, and communication of building data to emergency responders. Dr. Holmberg is a member of ASME and ASHRAE.

David Mayne, Digi International

David Mayne is director of business development for Smart Grid technology at Digi International. In this position, he is responsible for product development and marketing and sales strategy for entry into the smart grid/utility business segment. He oversees partnership development and has established several key relationships with industry leading application and energy device providers. He also launched six new products targeting the smart grid market, including iDigi Energy, and has sustained more than 50 percent annual growth.

Prior to his position with Digi International, Mayne was vice president and general manager of General Electric's Security division where he established a new business unit with a suite of products and services designed to enable the aging population to maintain independence, as well as introducing a broad range of interactive services to the security marketplace. Prior to GE, Mayne spend over 8 years at Itron helping to develop the early AMR solutions for the utility industry.

Mayne holds a B.A. in computer science and quantitative methods from the College of St. Thomas in St. Paul, Minn.

David Mollerstuen, Alcatraz Energy

David Mollerstuen is Standards Development Architect with Tendril, of Boulder, Colorado. Tendril provides a comprehensive Residential Energy Management System platform, with specific applications for Energy Awareness, Demand Response and Load Control, Distributed Generation, Electric Vehicle Integration, and others.

David is the Smart Grid Interoperability Panel (SGIP) Plenary Secretary. He chairs the OpenADE Task Force within the UCA International Users Group (UCAIug) Open Smart Grid subcommittee, and also co-chairs the NAESB Energy Services Provider Interface (ESPI) Task Force.

Previously, David has held product management and software development positions with Tendril, Alcatraz Engineering, Tapwave, Palm, Claris, EO, and others. David holds a B.S. in Electrical Engineering and Computer Science from the University of California, Berkeley.

Dave Olson, BuildingIQ

David Olson is V.P. Business Development for BuildingIQ. David Olson previously was Sr. Managing Director for a London AiM listed Energy Efficiency & Renewable Energy Company, Tersus Energy Plc, where he was a founder and participant in the firm's IPO. Prior to that position he was Vice-President for Business Development for The Electrical Power Research Institute (EPRI) and he was the Managing Director for Energy Services at Constellation/NewEnergy. Constellation/New Energy was the pioneer in de-regulated retail electricity markets, becoming the Nation's largest de-regulated electricity service provider during Mr. Olson's tenure.

Prior to Constellation/New Energy, Mr. Olson spent 15 years in a variety of sales, marketing, and management positions in the Automation and Control Group of Honeywell, Int'l. His most recent assignment at Honeywell was the Business Unit Director for the Federal Government Market Sector, during which time his efforts included the creation, development, and management of a vertical business unit and various energy efficiency/alternative energy offerings and programs.

Mr. Olson received a BS in Architectural Engineering and a BS in Business Administration, both from the University of Colorado at Boulder. He has also had post-graduate MBA coursework at the Univ. of San Diego and participated in Executive Education programs at the Stanford University Graduate Business School. Mr. Olson is a registered Professional Engineer and is active in numerous industry related trade associations. He is currently a board member of Three privately held companies, and has served as the Interim President/CEO of a renewable energy project development firm, and as a Managing Director of an Energy Automation software and solutions firm.

Derrick Mealiffe, Telcordia Technologies Inc.

Derrick is an ITIL certified IT management professional with over 15 years' experience in the telecommunications and utility industries, domestically, and internationally.
Derrick's experience spans strategy consulting, design, service transition, service operation and continual service improvement in both operational and management capacities. He has extensive experience working with executive and senior management (including C-level) in virtually all IT interfacing business units (Finance, Marketing, Engineering, Customer Care, Human Resources).
Derrick is a proven deliverer of industry-grade IT, mission-critical solutions, including systems and business architectures.

Don Watkins, Bonneville Power Administration

Don Watkins is the Principle Operations Reliability Engineer at Bonneville Power Administration (BPA) He has been employed BPA for 30 years, having spent over 25 years in System Operations. He has been directly involved in most of the reliability issues that have developed over the years including addressing solutions to several areas of transmission constraint, participating in solutions to many reliability issues of the Western Interconnection, developing a program regional coordination of outages, as well as participation in the investigation and analysis of the 1996 Western blackout and the 2003 NE blackout. His past duties have included managing BPA's Operations Engineering unit, serving on the GridWise Architecture Council as it developed the Constitution and the Interoperability framework, and serving as Chair of the Western Electric Coordinating Council Operating Committee. He has served 2 terms on the North American Reliability Corporation's Operating Committee (NERC) and is a member of BPA's Innovation Council and Reliability Council. Other present activities include the Pacific NW Smart Grid Demonstration Project, and chairing the NERC Geomagnetic Disturbance Task Force.

Doug Houseman, EnerNex

Doug Houseman is a 30 year veteran of the utility and consulting industries. He is a retired Naval Officer who has worked on 6 continents on issues related to electricity, water, and gas. He is recognized as an industry leader in demand management and smart energy.

Doug Kim, Southern California Edison

Doug Kim is director of Advanced Technology in the Transmission & Distribution Business Unit of Southern California Edison. Advanced Technology is SCE's research, development and demonstration organization responsible for Smart Grid development, which includes advanced grid technologies, electric transportation, energy storage, and integration of energy smart consumer products.
Before assuming his current position, Mr. Kim was responsible for the Plug-In Electric Vehicle (PEV) Readiness Program for Southern California Edison. The PEV Readiness Program was created to ensure that SCE would be prepared to support customer adoption of plug-in electric vehicles being introduced in the market by many of the major automakers.
Prior to his PEV responsibilities, Mr. Kim was General Manager of Edison Carrier Solutions, a business unit of SCE that provides large capacity fiber optics-based broadband services to all types of telecommunications companies such as wireless carriers, large and small local and long distance telephone companies, alternative telecommunications service providers, cable television companies and internet access companies.
Previously, Mr. Kim worked as a senior manager in various SCE organizations, with primary responsibilities in assessing new business opportunities and developing strategies and detailed business plans. He joined Edison International (EIX), the parent company of SCE in 1996, working on corporate strategic planning and new business development. He also provided internal consulting to many of EIX's operating units.
Mr. Kim received a bachelor of science degree in engineering from Harvey Mudd College in Claremont and a master of business administration degree from UCLA.

Ed Cazalet, TeMIX Inc.

Ed is CEO and Founder of TeMIX Inc, a transactive energy services provider, and VP and Co-founder of MegaWatt Storage Farms, Inc., a storage advisory and project development firm.
An internationally recognized electric industry expert, Dr. Cazalet is a leader in the analysis and design of markets for electricity. For his industry contributions, Public Utilities Fortnightly magazine named Dr. Cazalet "Innovator of the Year".
Dr. Cazalet has over forty years of electric power and related experience as an executive, board member, consultant, and entrepreneur.
He formerly was a Governor of the California Independent System Operator, and founder and CEO of both Automated Power Exchange, Inc. (APX) and Decision Focus, Inc. (DFI).
He has a PhD from Stanford in Engineering-Economic Systems.
Dr. Cazalet is co-chair of the OASIS Energy Market Information Exchange (eMIX) Technical Committee, and a member of the OASIS EnergyInterOp and WS-Calendar Technical Committees.

Ed Koch, Akuacom

Ed is currently Co-Founder and CTO of Akuacom, a company dedicated to automating Demand Response programs. Ed was the leader of the workgroup at LBNL that drafted the OpenADR specification and is currently the co-chair of the OpenADR Task Force within UCAIug. Ed is also actively involved in a number of Smart Grid standardization efforts including the NIST Building to Grid Domain Expert Working Group, the OASIS Energy Interoperation Technical Committee, and the NAESB Smart Grid Standards Taskforce.
Prior to Akuacom Ed was Co-Founder and CTO of Coactive Networks where he led all of Coactive's engineering efforts and established architecture and technical directions. Before that, he managed the Automotive Systems Department of Navteq, where he led development of the first Automotive Navigation Systems, which are widely deployed today. He has 25 years of industry experience and has authored numerous patents and articles in the areas of Distributed Control, Automation, Vehicle Guidance, Robotics, Artificial Intelligence

and Embedded Systems. Mr. Koch has both led and participated in standardization efforts for the Intelligent Vehicle Highway Systems, Consumer Electronics Associations, and IEEE.

Efrain Gonzalez, Southern California Edison

Efrain Gonzalez is an information security professional with over 25 years of Information Technology experience.

Efrain works for Southern California Edison. He is a member of SCE's Smart Grid Engineering team where he is the lead Cyber Security Architect for Smart Grid projects.

Efrain is a Certified Information Systems Security Professional and holds a Bachelor of Science degree in Electrical Engineering from Stanford University.

Eric Nelson, Synaptitude

Mr. Nelson has over 29 years of executive management, information technology, and systems development experience. His career includes over fourteen years at the executive level, including five years of General Management, P&L, and Business Development responsibilities. Mr. Nelson is currently Managing Principal and Chief Development Officer for Synaptitude Consulting (www.SynaptitudeConsulting.com), providing Transformational Enterprise and Operations Systems Consulting, with offices in DC, NYC, and Seoul, Korea. Mr. Nelson has extensive experience in Operations System Architecture and Implementation, Data Communications Networking, and Revenue Management (sold-to-cash, meter-to-cash) in both the Utility and Telecommunication industries.

Mr. Nelson was formerly the Managing Principal/Chief Development Officer at Alteritech, an IT Infrastructure and Managed Cloud Services firm located in the Washington DC area. Mr. Nelson is a recognized expert in the Cloud and Hosted/ Managed IT Services domain, and has provided secure Cyber/IA consulting services to various Federal and State entities.

Prior to Alteritech Mr. Nelson was SVP and CIO for next-generation communication service providers MegaPath Networks and Netifice Communications. He previously held two executive management positions with e.spire Communications, including head of ACSI NT Network Technology Solutions Division and VP of Strategic Systems.

In addition, Mr. Nelson spent four years with Bell Atlantic and MFS Communications leading divisions in their Information Systems organizations. He also has 10 years of experience working in management consulting for renowned companies such as The Management Network Group (TMNG), Cap Gemini Sogeti, and Ernst and Young.

Mr. Nelson received a BA from George Washington University and has completed several Executive Management programs at Wharton Business School and other post-graduate institutions. He speaks at several industry conferences and events during the year. He serves in advisory and consulting roles on several corporate and industry boards, including:

Board of Directors, Glen Echo Park Partnership for Arts and Culture Member, Gerson Lehrman Group The Council of Communications Advisors Member, Vista Research Advisors Member, Dematteo Moness Advisors Member, NetEconomy Service Provider Panel Member, META Group Technology Research Forum Member, Primary Global Research Technology Advisors Member, e Week Advisory Panel Nominated, Computerworld Premier 100 IT Leaders

Erich Gunther, EnerNex

Erich Gunther is the Chairman and Chief Technology Officer for EnerNex Corporation in Knoxville Tennessee where he helps EnerNex clients define their strategic direction in basic R&D, technology, and product development. Mr. Gunther has over 25 years of experience in design and development of innovative solutions to a wide array of power system problems, most notably ways to take advantage of communications networks and technology to improve the efficiency, operating practices, and security of the electric power system. Erich has a leadership role in many of the key grid modernization groups and standards organizations including the GridWise Architecture Council, IEEE PES Intelligent Grid Coordinating Committee and the Utility Communications Architecture International Users Group as the chairman of those organizations. He is presently serving as the administrator for the NIST SGIP effort and is working with several utilities developing their smart grid development roadmaps.

Erich received his Masters of Engineering degree in electric power from Rennsaelaer Polytechnic Institute in 1984. He is a registered professional engineer in Tennessee and speaks geek in multiple languages including power systems engineering, computer science, enterprise architecture, and communications technology. Presently he is applying his skills in promoting the application of systems engineering principles to smart grid development, and is actively facilitating information exchange among the many organizations and institutions working on smart grid development.

Erik Gilbert, Navigant Consulting

Erik Gilbert is an Associate Director with Navigant's Energy Practice. His focus is on smart grid and demand response program analysis and technology strategy, including cost-benefit assessment. Mr. Gilbert has over twenty years of experience in developing and managing complex products and market programs as well as performing program evaluations and assessments.

Prior to joining Navigant, Mr. Gilbert served as Director of smart-energy products for residential energy management system vendor Tendril Networks, Inc., where he defined and executed their hardware roadmap, including in-home energy displays, IP-to-HAN gateways, AMR/ERT-to-ZigBee bridges and other products.

Previously, Mr. Gilbert held various management positions at Internet infrastructure provider Cisco Systems, Inc., as well as several years of technology strategy development with Ernst & Young Management Consulting. Mr. Gilbert began his career as a design engineer. He holds BS in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology and an MBA from the University of California at Berkeley.

Eruch Kapadia, Cisco Systems Inc.

Eruch J. Kapadia is a Sr. Solutions Architect/Technical Leader with Cisco System Advanced Services. Eruch has worked in the IT and

Communications consulting industry for 20+ years across multiple industry verticals. Eruch provides Data center consulting to top enterprise and service provider accounts. Eruch's current technology focus is Smart Grid, Public and Private Cloud Architecture, and Data Center Virtualization.

Frank Lacey, Comverge, Inc.

Frank joined Comverge, Inc in June of 2011. He is charged with overseeing and managing Comverge's government and regulatory efforts across North America. Prior to joining Comverge, Frank spent 10 years forging energy policy in the competitive electricity and gas markets. Most recently, he was with Direct Energy. While there, he spent time in the regulatory group and he also led the complex transactions team for Direct Energy Business.

Prior to joining Direct Energy, Frank was the head of Strategic Energy's Government and Regulatory Affairs group, managing a team of 14 responsible for monitoring and influencing legislative and regulatory developments across 16 states, six ISOs and at the Federal Energy Regulatory Commission. Prior to that, he spent seven years consulting to companies on energy market restructuring issues. His accomplishments include the development of several independent transmission entities, the valuation of generation assets and the valuation of environmental assets and emissions credits.

Frank received his MBA with concentrations in finance and environmental management from Carnegie Mellon University in 1993. He earned his Bachelor of Science degree from the University of Maryland in 1988.

Frank is married and has three children. He is active in the community and participates in youth sports programs and charitable organizations.

Gale Horst, EPRI

At the Electric Power Research Institute Gale Horst is a Project Manager in EPRI's Smart Grid Demonstration Initiative. This is a collaborative research effort is focused on addressing prevalent challenges associated with integrating Distributed Energy Resources (DER) and fully applying them in industry demonstrations for system-wide interoperability and integration. Last year Gale authored an EPRI whitepaper titled Concepts to Enable Advancement of Distributed Energy Resources (EPRI Report 1020432) which has been referenced in recent developments in smart grid standards organizations.

In addition to the SG demonstrations, Mr. Horst directed consumer engagement research focused on the customer learning process related to consumer values, motivations, and acceptance of grid modernization technologies.

Prior to joining EPRI, Gale was an engineering lead at Whirlpool Corporation leading research in energy management where he developed an approach to smart grid enabled consumer products that respond to Real-Time Pricing, Time-of-Use, Critical Peak Pricing, and under-frequency conditions. Mr. Horst holds several patents as a result of his work in energy management.

Gary Stuebing, Duke Energy

Gary was the Director of Telecommunications at Mutual Life of Canada until 1996. In 1996 he went into private consulting. He eventually moved to Charlotte, NC and managed the Telecom group at Belk Stores Services. In 2000, he joined Duke Energy as a member of the IT Strategies and Architecture group with responsibility for IT communications and infrastructure services. During this time he was also a key member of the Mergers and Acquisitions team. He led a group which managed the integration of IT for mergers, acquisitions and divestitures. In 2004 he became a permanent member of the Power Line Communications. It was during this time where he led the efforts to build a business case for "smart" Power Distribution communications. Gary has also been the lead for Powerline Communications standards and regulatory work. In 2007 Gary joined the Smart Grid PLC and Network Design team as a Strategic Planning Manager. He is currently the Strategic Planning Manager for Technology Development. In his current capacity he has dual responsibility a technical lead in Smart Grid field Projects as well as leading standards efforts for Smart Grid implementation at Duke Energy.

Gary currently represents Duke Energy in a number of Smart Grid standardization efforts. These include GridWise, IEEE, NERC Smart Grid Task Force and the UCAIug. He also serves as the Vice-Chair on the OpenSG Technical Subcommittee and represents Duke Energy on the Boards of HomePlug and IPSO.

George Arnold, NIST

George Arnold was appointed National Coordinator for Smart Grid Interoperability at the National Institute of Standards and Technology (NIST) in April 2009. He is responsible for leading the development of standards underpinning the nation's Smart Grid and also co-chairs the White House National Science and Technology Council's Smart Grid policy subcommittee. Dr. Arnold joined NIST in September 2006 as Deputy Director, Technology Services, after a 33-year career in the telecommunications and information technology industry.

Dr. Arnold served as Chairman of the Board of the American National Standards Institute (ANSI), a private, non-profit organization that coordinates the U.S. voluntary standardization and conformity assessment system, from 2003 to 2005. He served as President of the IEEE Standards Association in 2007-2008 and Vice President-Policy for the International Organization for Standardization (ISO) in 2006-2009.

Dr. Arnold previously served as a Vice-President at Lucent Technologies Bell Laboratories where he directed the company's global standards efforts. His organization played a leading role in the development of international standards for Intelligent Networks and IP-based Next Generation Networks. In previous assignments at AT&T Bell Laboratories he had responsibilities in network planning, systems engineering, and application of information technology to automate operations and maintenance of the nationwide telecommunications network.

Dr. Arnold received a Doctor of Engineering Science degree in Electrical Engineering and Computer Science from Columbia University in 1978. He is a Senior Member of the IEEE and has delivered or authored over 100 talks and publications.

George Bjelovuk, AEP

George Bjelovuk, managing director, Enterprise Technology, is responsible for AEP's technology strategies related to application

and infrastructure standards, IT investment planning, and business analytics and optimization.

Prior to this role, Bjelovuk had been leading AEP's gridSMART initiative, a program of technology investments and customer programs directed at modernizing AEP's distribution business. He was responsible for developing and marketing programs for emerging customer offerings in AEP's utility business and for providing oversight to the company's research & development efforts.

Bjelovuk has been with AEP for 27 years, and has held a variety of leadership positions in technology and customer services functions.

Bjelovuk graduated from Youngstown State University with a bachelor's of engineering degree in electrical engineering. He has a master's of business administration from the Fisher College of Business at The Ohio State University.

Bjelovuk serves as board member for the Simon Kenton Council of the Boy Scouts of America, and has been board member and past president of the Association of Telecommunications Professionals. He is the Smart Grid Executive Committee Chair for the Electric Power Research Institute. He was elected to the governing board for the NIST Smart Grid Interoperability Panel, and serves as the Board's Secretary.

Greg Armstead

Greg is the current acting AMI project manager for Eugene Water & Electric Board.

Has worked for the Eugene Water & Electric Board for over 20 years in a variety of technology related assignments, including leading implementation of CIS, deployment of initial customer facing web applications and planning enterprise-wide GIS adoption.

Has also served as technical and enterprise architect for EWEB and participates in various business and technical planning engagements. Previously served as Data Manager overseeing enterprise data model development, data integration and data warehousing efforts.

Greg Nulty, Tollgrade Communications

Greg Nulty, Vice President, Technology Planning. Greg's unique background spans more than 25 years with both leading service providers and equipment vendors. He brings to Tollgrade a special balance of technology vision and business acumen, which is key to setting product direction. Most recently, Greg served as senior vice president of strategic planning at Tellabs. Prior to that he was vice president of Business Development at Ocular Networks. Greg has an MBA and a Bachelor of Science in Electrical Engineering from the University of Michigan, Ann Arbor

Harry Stephey, KEMA powertest, LLC

Harry Stephey has over 40 years of experience in Engineering Management, Product Development and Project Management. Most of his experience has been in the telecommunications industry, including both wireline and wireless communications, with emphasis on managing the design, development and implementation of large scale networks and systems. Mr. Stephey has held senior management positions with a number of technology development companies and has provided consulting services to both government and private sector organizations prior to joining KEMA.

Since joining KEMA, Harry has managed a number of major projects involving Advanced Metering Infrastructure, renewable energy and ARRA Stimulus Fund applications. He has also been a major contributor to several international AMI programs involving U.S. Government installations and international utilities. He is the Project Manager for implementation of KEMA's Smart Grid Interoperability Lab (SGIL) and construction of a microgrid at KEMA PowerTest facilities in Chalfont, PA.

Heart Akerson, Heart Transverter

Heart Akerson is the CEO of Heart Transverter S.A., which develops, manufactures and markets a complete Smart Grid system with integrated renewable energy and energy storage. Heart Akerson is a physicist with undergraduate degrees from Virginia Tech and graduate degrees from the University of Oregon. Inventor of US Patents #4,564,896, #4,742,441, #5,331,967, and #6,344,985 and EC Patents #EP 0 684 785 B1 and #1 340 312 with others pending. Founded Heart Interface Corp. which gave rise to a spin-off, Trace Engineering, both of whom were acquired by Xantrex which is now owned by Schneider.

Heiko Englert, Siemens AG

Heiko Englert is in charge of the standardization and regulation management of the Siemens Smart Grid Division and Energy Automation Unit. He is secretary of IEC TC57 and CENELEC TC57, member of IEC TC 57 WG 19 and DKE AK 952.0.1 "IEC 61850 Engineering." He is currently actively involved in the European smart grid mandate M490 and member of the EU Smart Grid Coordination Group. Since 2006 he is working for Siemens Infrastructure and Cities Sector. Heiko received the Dipl.-Ing. degree and Dr.-Ing. degree in electrical engineering from Saarbrücken University and Darmstadt University of Technology in 1997 and 2002, respectively. After working as research assistant at Institute of Electrical Power System at Darmstadt University of Technology he joined IDS GmbH, Ettlingen, where he was product manager for protection and substation automation systems.

James Gilsinn, NIST

Jim Gilsinn has worked as an Electronics Engineer with the Engineering Laboratory at the National Institute of Standards and Technology (NIST) for the last 20 years. During that time, he has work on a variety of projects focused on manufacturing and industrial systems. His current work focuses on developing standards, tests, metrics, and tools for industrial network reliability, specifically security and performance. He is the Managing Director and General Editor for the ISA99 committee on Industrial Automation and Control System Security and the co-PI for the NIST Factory Networks Testbed project.

James Mater, Quality Logic, Inc.

James Mater co-founded and has held several executive positions at QualityLogic from June 1994 to present. He is currently Co-Founder and Director working on QualityLogic's Smart Grid strategy, including work with GWAC, the

Pacific North West Smart Grid Demonstration Project, the SGIP Test and Certification Committee, and UCA's OpenSG Conformity Work Group, as well as giving papers and presentations on interoperability. From 2001 to October, 2008, James oversaw QualityLogic as President and CEO. From 1994 to 1999, he founded and built Revision Labs, which merged with Genoa Technologies to become QualityLogic. Prior to QualityLogic, James held Product Management roles at Tektronix, Floating Point Systems, Sidereal and Solar Division of International Harvester. Mater holds a bachelor's degree in physics from Reed College, Portland, OR and an MBA from the Wharton School, University of Pennsylvania.

Jeff Gooding, Southern California Edison

Jeff Gooding, IT General Manager of Smart Grid Engineering at Southern California Edison, is responsible for managing the architecture and engineering team that supports the Edison SmartConnect project, SCE's Advanced Metering Infrastructure (AMI) Program.

In 2005, Jeff joined the Edison SmartConnect Program in 2005, where he supported SCE's development of power procurement and nuclear software applications for the Energy Supply & Marketing (ES&M) department and San Onofre Nuclear Generating Station (SONGS).

Prior to joining SCE in 2003, Jeff was a Senior Manager at Cap Gemini Consulting where he served in the Advanced Development & Integration division of the Utilities practice. He served as an architect and technologist on projects at the California ISO, Ontario IMO, Portland General Electric and PG&E. Earlier, Jeff was President of Rapid Access Systems (RAS), a software company focused on developing decision support applications. Jeff holds M.B.A. and B.S. degrees from California State Polytechnic University, Pomona.

Jerry FitzPatrick, NIST

Jerry FitzPatrick is a member of the NIST Smart Grid Team supporting NIST efforts to fulfill its mandate given by the 2007 Energy Independence and Security Act (EISA) for the Smart Grid. He received the B.S. degree in Physics from Rutgers University in 1979, the M.S.E.E. from the New Jersey Institute of Technology in 1984, and the Ph.D. degree in Electrical Engineering from the State University of New York at Buffalo in 1988. The AEM Group he formerly led continues a legacy begun by NIST's predecessor, the National Bureau of Standards (NBS), which had supported the electric power industry from practically its inception. The Group conducts research in precision measurement of electric power and energy, maintains the national standards, and provides measurement services for standard meters. In recent years, a synchrometrology testbed was established in collaboration with the Department of Energy to develop protocols and standards for testing of phasor measurement units (PMUs). Since the passage of the 2007 EISA, the AEM Group has led the NIST efforts to meet the EISA mandate of coordinating the development of an interoperability framework for the Smart Grid. Prior to leading the AEM Group, Dr. FitzPatrick led a project in Electric Power Metrology, and conducted research in the precision measurement of high voltage impulses that supported standards development for testing of electrical insulation and power equipment. He began his career with Exxon Research and Engineering Company where from 1979 to 1984 he was part of team that conducted electro-optic studies of failure mechanisms in liquid insulators.

Jian Zhang, GridX, Inc.

Jian Zhang is the founder and CEO of GridX, Inc., a technology startup developing financial infrastructure for Smart Grid applications. In that capacity, Jian is responsible for GridX's overall strategy and execution. Prior to founding GridX, Jian had spent more than a decade developing and delivering billing and financial clearing technologies for ISPs, telecom carriers, and digital media companies. As founder and CEO of Tradescape, Jian led a team of technologists pioneering a financial clearing and settlement technology for digital media applications. Jian led the startup from inception through profitability with a combination of vision and execution. Prior to Tradescape, Jian headed the New Network Services product group at Portal Software and was responsible for a line of billing product offerings for telecom carriers and online media companies. Jian worked closely with Portal's online media and content customers to better monetize online media and content. Jian holds a Ph.D. in electrical and computer engineering from the University of Illinois at Urbana-Champaign and an MBA degree from the University of Chicago.

Jim Butler, Cimetrics Inc.

Jim Butler is CTO of Cimetrics, Inc., a company that focuses on improving the performance of commercial and industrial buildings through remote, ongoing monitoring and data analysis. Cimetrics is also a leading provider of BACnet communication products to the building controls industry.

Jim has been actively involved in the design and implementation of communication protocols for distributed control and monitoring systems. Jim has contributed to the development of the BACnet standard since 1994, and he currently leads the BACnet committee's IT working group. Jim served as the first manager of the BACnet Testing Laboratories, which coordinates the conformance testing of products that implement the BACnet standard. He is currently a member of ASHRAE SPC 201P (Facility Smart Grid Information Model).

Jim Sinopoli, Smart Buildings LLC

For over 25 years, Mr. Sinopoli has worked extensively on projects involving the configuration and optimization of technology systems and networks. Mr. Sinopoli has facilitated the design, engineering and implementation of several hundred data, video, voice, A/V and security systems. He has received the "Harry J. Pfister" award from the Building Industry Consulting Service International (BICSI). His international experience includes projects in Asia, Europe, South America and Africa.

Mr. Sinopoli's educational credits include a B.S. in Engineering from Purdue University and a M.A. in Applied Science and Management from Governor's State University. He is a licensed Professional Engineer, a Registered Communications Distribution Designer, and a registered Continuing Education Provider. He is a published author in numerous industry

publications, including his recent book "Smart Buildings."

Jiyuan Fan, GE Energy/Digital Energy

Jiyuan Fan, PhD., IEEE Senior Member, He got his BS degree from Taiyuan Univ. of Tech., Taiyuan, China in 1979, MS degree from Chinese EPRI, Beijing, China, 1982 and PhD's degree from Clarkson University, New York, USA, 1989. He worked as a Post Doctorial Research Associate at Texas A&M University, 1989-1990. Since then, he has worked in the Power System Automation area, including SCADA/ EMS/DMS/OMS with the companies of Advanced Control Systems, Inc. in Atlanta, Valmet Automation in Houston, Beijing Sifang Automation in China. He is currently with GE T&D as the Strategic Planning Leader responsible for technology and product planning.

Dr. Fan has authored/co-authored 20+ technical papers on Electric Power Automation, 10+ of them are IEEE PES transaction papers. He has an article on Advanced Distribution Management Systems in the 2009 March/April issue of IEEE Power & Energy magazine, whose theme is The Next Generation Grid.

Joaquin Silva, On-Ramp Wireless

Joaquin Silva co-founded On-Ramp Wireless in 2008 to address the large technology gap for pervasive wide-area wireless in the Smart Grid and utility automation markets. Under his leadership, On-Ramp has become an industry pioneer in the Smart Grid space, obtaining a DOE grant for below ground monitoring of distribution grid assets. Joaquin is a frequent panelist and speaker at industry events, including Greentech Media's Networked Grid 2011 and UTC Telecom 2011, discussing Smart Grid applications and the use of wireless technology. Based on Joaquin's leadership and direction, On-Ramp Wireless was also selected as a World Economic Forum 2011 Technology Pioneer, and as a 2011 Bloomberg New Energy Finance Pioneer. Prior to founding On-Ramp Wireless, Joaquin was co-founder, President and COO of Ostendo Technologies Inc., where he was instrumental in developing a unique display technology and winning several new customer and government programs. Prior to Ostendo, Joaquin was a Vice President at the investment-banking firm Montgomery & Co., where he led their wireless and semiconductor franchise for 6 years. Earlier in his career, Joaquin was a Captain in the United States Air Force. He has an MBA from University of California, Los Angeles and a BS in Management from the United States Air Force Academy.

John Camilleri, Green Energy Corp.

Mr. Camilleri is the EVP of Product Development and Chief Product Owner of GreenBus at Green Energy Corp. He has worked as a distribution and transmission engineer for PECO Energy. During his time with ALSTOM-GRID, Mr. Camilleri integrated SCADA/EMS/DMS systems to numerous utilities. Later he served in the Operations and R&D divisions providing leadership to the engineering and product development organizations as well as working closely with utility customers. For Microsoft, Mr. Camilleri managed developments of security features and operating system security architecture for several windows mobile product lines. Mr. Camilleri holds both a BS and MS in Electrical Engineering from Tennessee Technological University and is a Senior Member of IEEE.

John Gillerman, Grid Cloud Systems, Inc.

Mr. Gillerman has over 25 years' experience working on software and system integration for utilities operations and maintenance. From 1988 to 1998, Mr. Gillerman concentrated on the design and implementation of software systems for substation monitoring and control including the use of IEC 61850. From 1998 to 2011, while at SISCO, Mr. Gillerman co-led the design and architecture of the Utility Integration Bus (UIB) – an application integration framework based on the IEC 61970 and 61968 standard interfaces. More recently at Grid Cloud System, Mr. Gillerman has focused on model driven access to utility data. Mr. Gillerman has served as the Integrated Security Network Facilitator for NERC's Data Exchange Working Group, been active in EPRI's Intelligrid/Smart Grid activities, the North American Synchrophasor Initiative, the OPC Foundation Technical Architecture Committee, and is an active member of IEC TC 57 WG 13, 14, 16, and 19 committees related to the use of the IEC Common Information Model and IEC 61850 substation automaton standards.

Jonathan Booe, North American Energy Standards Board

Jonathan Booe has been an attorney for the North American Energy Standards Board (NAESB) since 2007 and is currently the lead for all NAESB Smart Grid activities. As an attorney for NAESB, Jonathan has worked with companies in the natural gas and electric wholesale and retail markets to develop business practice standards, protocols and contracts to add efficiency, transparency and clarity to market processes. Jonathan has drafted multiple filings for submission to the Federal Energy Regulatory Commission (FERC) on behalf of NAESB and has participated in the development of NAESB standards in response to FERC Order Nos. 890 and 698, among others. Virtually all of the NAESB wholesale market standards have been incorporated by reference into federal regulations and many of the retail market standards have been adopted or served as the foundation for action by state commissions.

Specific to NAESB Smart Grid efforts, Jonathan participates on the National Institute of Standards and Technology (NIST) Smart Grid Interoperability Panel as a representative of NAESB and is the acting NAESB liaison for many of the organizations involved in Smart Grid development including FERC, the Department of Energy, NIST, the National Association of Regulatory Utility Commissioners (NARUC), the North American Electric Reliability Corporation (NERC) Smart Grid Task Force and several energy trade associations. Jonathan has also been published in several industry trade publications on topics related to Smart Grid standards development.

Jonathan holds a Bachelor of Science from Texas A&M University and a JD from South Texas College of Law. He is a member of the State Bar of Texas and the Demand-Side Resources and Smart Grid Committee of the Energy Bar Association.

John Simmins, EPRI

Dr. John J. Simmins is Senior Project Manager for the Smart Grid Demonstration Projects at the Electric Power Research institute (EPRI). His current responsibilities focus on developing robust system architecture in the EPRI Smart Grid Demonstration projects and bringing thought leadership in the area of integrating diverse applications such as Advanced Meter Infrastructure, Meter Data Management Systems, Distribution Management Systems, Customer Information Systems, Geospatial Information Systems and Outage Management Systems. Dr. Simmins brings over 15 years of implementing highly integrated systems which span the latest technology to mature legacy systems. Dr. Simmins spent six years at Southern Maryland Electric Cooperative as IT Applications Manager. Prior to that, he had eight years consulting in project management, application integrations and supply chain automation. He also has six years as a manager of research in the field of magnetic materials for millimeter and microwave communication.

Dr. Simmins is a member of IEEE, the SOA Institute, the Business Process Modeling Institute and the Project Management Institute. He received his B.S. in Ceramic Science from Alfred University in 1984 and his Ph.D. in Ceramic Science from Alfred University in 1990. Dr. Simmins has nearly 80 published papers and presentations in the fields of science and technology, two books and one patent.

John Teeter, People Power Company

John Teeter brings to People Power a 40-year history in the electrical and technology industries. Most recently, he has engaged in consultations with Masdar, IBM, and CH2M-Hill in the areas of infrastructure systems. John was the founder and CEO of First Step Research, a boutique research consultancy which focused on the evolution of technology. First Step provided community internet services in the early nineties and stimulated the growth of early social networks supporting both local and globally based communities of interest. Prior to First Step Research, John was a founder and VP of Engineering at Gold Hill Computers, bringing the tools and technologies of artificial intelligence research to the commercial marketplace. His early engineering experience with Hewlett-Packard and Honeywell Information Systems focused on international standards in the areas of distributed information systems.

Kenneth Wacks, Home & Utility Systems

Dr. Wacks has been a pioneer in establishing the home systems industry and a management advisor to more than 100 clients worldwide, ranging from startups to the Fortune 500. His business focus includes home and building systems, utility customer services, and digital entertainment networks. Corporate managers depend on Dr. Wacks to identify business opportunities in emerging markets with clear and practical advice relevant for product development and market positioning.

Dr. Wacks was appointed to the United States Department of Energy 'GridWise Architecture Council' to develop a smart electric grid for reliable, cost-effective, and efficient distribution of energy. For electric and gas utilities, he has defined and demonstrated new customer services by linking utility communications with home automation to deliver demand response and value-added services.

The Consumer Electronics Association chose Dr. Wacks to chair the international committee (ISO/IEC) establishing world standards for home and building automation. In addition, he has written American National Standards in home automation. He contributed to the development of standards for networking home appliances under the auspices of the Association of Home Appliance Manufacturers (AHAM).

Dr. Wacks chairs the Editorial Advisory Board of the CABA magazine 'iHomes & Buildings' (available at www.caba.org) and is a featured contributor under the byline 'Ken Wacks Perspectives.' Dr. Wacks received his Ph.D. from MIT as a Hertz Fellow and studied at the MIT Sloan School of Management. Please visit www.kenwacks.com for additional information.

Kerri Martinek, Bridge Energy Group

Kerri Martinek leads the marketing and communication initiatives for BRIDGE Energy Group's Smart Grid Integration and Utility Solutions services. In her role, Ms. Martinek supports the organization as a technology advocate for the advancement of open standards for interoperability across Smart Grid initiatives.

Ms. Martinek has a solid track record in marketing high-tech solutions across several industries including utilities, mobile telecommunications and financial services. She has helped to build the marketing strategies for several startup companies, including the Corporate Communications Broadcast Network, now a Thomson Reuters company.

Ms. Martinek is a member of the Public Relations Group for OASIS (Organization for the Advancement of Structured Information Standards). She received a BS from the University of New Hampshire and a Masters in Business Administration from Babson College, F.W. Olin School of Business.

Kevin Staggs, Honeywell ACS Advanced Technology Lab

Kevin is a 35 year employee of Honeywell. He has 26 years of experience in the engineering of control systems as either a hardware, software or systems engineer. Kevin has recently joined the Advanced Technology Labs of Honeywell as a Cyber Security Research Engineer. In his previous assignment with Honeywell Process Solutions he was a member of the Global Architecture Team and one of his responsibilities was the security architecture of all of Honeywell Process Solutions products. He was also responsible for defining the security processes and architectural methodology so that all HPS products are designed for security. Kevin has been involved in system security since Honeywell first introduced open system platform based products. He was the lead system engineer and architect for Honeywell's HP-UX based UxS product which was introduced in the early 1990s. He defined the original high security, least privilege model which was deployed as part of Honeywell's TPS system in 1996. In addition to his day job, Kevin is also co-chair of ISA SP99 Working Group 4 which is defining technical security requirements of Industrial and Automation Control Systems and he is the Technical Chairman of the ISA Security Compliance Institute.

Lauren Azar, U.S. Department of Energy

Lauren Azar serves as a Senior Advisor to U.S. Secretary of Energy Steven Chu. Azar is working to build energy infrastructure fueled by clean and independent resources. Her work is focused on, among other things, the transmission grid and energy storage technologies.

From 2007-2011, Azar was a Commissioner of the Public Service Commission of Wisconsin (PSCW). As a Commissioner, she regulated the electricity, natural gas, telecom and water industries in Wisconsin. Aside from her duties as a Wisconsin Commissioner, Azar was a co-founder and served as the first President of the Eastern Interconnection States' Planning Council (EISPC), an organization of state representatives participating and helping to lead Eastern Interconnection-wide transmission studies.

In 2009, Azar served as President of the Organization of MISO states (OMS), a non-profit organization of representatives from each state that is included in the Midwest Independent System Operator (Midwest ISO). As president of the OMS, Azar initiated and led a regional planning and cost allocation effort for developing electric transmission over the Midwest ISO region, which includes 13 states and one Canadian province. Concurrent with those efforts, Azar chaired the Midwest ISO's taskforce on re-evaluating the cost-sharing methodology for new transmission lines within the Midwest ISO region, which resulted in a FERC-approved cost-allocation tariff.

Prior to her appointment to the PSCW, Azar worked as an attorney and practiced extensively in the area of electric and water utilities, representing both ratepayers and utilities. As a representative for ratepayers, she negotiated power purchase agreements and resolved disputes with utilities. While representing utilities, Azar helped to create the nation's first stand-alone transmission company and helped to site a 210-mile extra-high voltage line in Wisconsin and Minnesota. She has also practiced environmental law focusing on water law and contaminated properties.

Azar was named one of the Best Lawyers in America for 2007 in the area of energy law. She has authored several articles for the National Business Institute. She co-edited and co-authored the Wisconsin Environmental Law Handbook, Fourth Edition, July 2007. Azar received her Bachelor of Arts Degree from Rutgers College and a Master of Arts in Philosophy from Northwestern University. She also has a Master of Science in Water Resources Management and a law degree from the University of Wisconsin-Madison.

While Azar currently resides in Washington D.C., her home and sail boat remain in Madison, Wisconsin.

Marc Spitzer, Federal Energy Regulatory Commission

Marc Spitzer was nominated by President George W. Bush to the Federal Energy Regulatory Commission and confirmed by the U.S. Senate for a term expiring June 30, 2011.

Commissioner Spitzer believes the FERC's primary missions are to ensure that America's ratepayers have safe, economic, and reliable supplies of electricity and natural gas; and transparent, robust and competitive wholesale energy markets. Commissioner Spitzer believes that successful regulation of FERC-jurisdictional industries requires a balancing of all competing interests to ensure just and reasonable rates.

As Chairman of the Arizona Corporation Commission (ACC), he focused on policies encouraging expansion of natural gas infrastructure, specifically distribution and storage; creating a demand side management policy; enhancing the ACC's renewables standard; and advancing consumer privacy concerns in telecommunications. As Chairman, he established a legacy of balancing competing interests, while ensuring Arizonans received safe, economical and reliable utility services.

The expansion of and improvements to the bulk transmission system and the nation's natural gas pipeline system are high priorities for Commissioner Spitzer. He also believes those enhancements are essential to the dispatch of environmentally friendly resources as well as ensuring reliability and efficiency. Commissioner Spitzer also believes that the expanded enforcement authority provided by EPAct 2005 will help deter market manipulation and other anticompetitive behavior and will enhance FERC's ability to appropriately penalize those who are culpable.

Commissioner Spitzer was elected in 2000 to the ACC and in 2002 was elected Chairman by his colleagues. He received recognition for his leadership of the Arizona Commission from 2003-2005.

At the FERC, Commissioner Spitzer is building on his record in Arizona on environmental issues. Demand response, energy efficiency, and access to the grid by alternative resources were major focuses of Commissioner Spitzer in retail rate cases and policy decisions before the Arizona Commission. Commissioner Spitzer believes that EPAct 2005 supports his commitment to those issues, which are germane to both Federal and State regulators.

In 1992, after many associations with civic, philanthropic and political causes, he was elected to the Arizona State Senate for District 18. Commissioner Spitzer served in the Legislature as Chair of the Judiciary and Finance Committees and was elected by his peers to the position of Senate Majority Leader in 1996.

As an attorney since 1982, Commissioner Spitzer represented taxpayers in proceedings involving the Internal Revenue Service. He was first certified as a Specialist in tax law by the Arizona Bar in 1987.

Commissioner Spitzer was born in Pittsburgh, Pennsylvania and grew up in Philadelphia. After graduation from Dickinson College in Carlisle, Pennsylvania, he attended the University of Michigan, School of Law.

Commissioner Spitzer considers his greatest accomplishments political or otherwise, his marriage to the former Jacqueline Raub of Phoenix and his son, Bennett Alexander

Mark Knight, Logica

Mark Knight is Director of Grid Applications at KEMA. Mark's background, spanning 25 years, has included a mix of information technology work and business process work both as a consultant and as a utility employee in the UK and the US and has spanned several areas including distribution, transmission, metering, systems integration, and deregulation.

In his role at KEMA he is responsible for developing vision and requirements for Meter Data Management and other applications that can mine the data from smart meters and other intelligent devices. He is focused on the integration with and impact on utility processes and applications required to support information sharing for enterprise users' needs and to prioritize areas that will

benefit directly from this data in order to define the value propositions for the new uses of data and to enhance interoperability.
He is currently the Project Manager of the Synchrophasor Infrastructure and Data Utilization Project in the ISO New England Transmission Region.

Matt Gillmore, Consumers Energy

Matthew Gillmore is the Director of Enterprise Architecture at Consumers Energy. His responsibilities include Enterprise Information Models, Application Architecture, Network Architecture for wide area networks, AMI specific networks, home area networks, and distributed device management. He has been a panelist at numerous AMI and Smart Grid conferences and was a key contributor to the OpenHAN system requirements specification and currently chairs the SG-Network task force within the UCAiug along with the IP Suite Working Group for the SGIP. Matt has over 11 years of IT systems development and architecture experience at Consumers Energy.

Mike Ahmadi, GraniteKey LLC

Mike Ahmadi is Vice President of Operations and co-owner of GraniteKey LLC, which is a consulting firm specializing in embedded systems security, secure mobile application development, security regulatory consulting, and security business development. Mike is also serving on the NIST AMI and NIST Testing and Certification sub-groups under the NIST Cyber Security Working Groups (CSWG), as well as the Department of Homeland Security Industrial Control Systems Joint Working Group (DHS ICSJWG), and the UCAIUG OpenSG working groups. Mike is also US Expert for IEC TC65 Working Group 10, where he is currently working on the IEC 62443 project, with a focus on IEC 62443-2-4 (vendor cybersecurity practices requirements). Mike also serves on the California Office of Health Information Integrity (CalOHII) Security Committee. Mike's interest in security began over a decade ago when, as a system administrator, he noticed suspicious network activity, and discovered how creative attackers could be. Since then, Mike has been deeply involved in both understanding security issues and how the issues impact the people and organizations the issues affect, with an emphasis on understanding the business implications surrounding security related issues. Mike frequently writes on the subject of cybersecurity, and is a frequent speaker at cybersecurity conferences and events.

Nick McLellan, Johnson Controls

Nick McLellan is employed with Johnson Controls and works to support emerging technologies in the energy and sustainability space. His areas are focus is around defining open standards of communication between buildings, end devices, and the utility grid. He is currently involved in the OpenADR Alliance, an industry organization tasked to develop the next version of the OpenADR communications standard. He holds a Bachelor of Science in Mechanical Engineering from the University of Wisconsin-Milwaukee.

Nick Sinai, Office of Science and Technology Policy

Nick Sinai currently serves in the White House Office of Science and Technology Policy as the Senior Advisor to the Chief Technology Officer, where he is focused on Innovation and Entrepreneurship.
Mr. Sinai previously served as the Energy and Environment Director of the Federal Communications Commission's Omnibus Broadband Initiative. Mr. Sinai led a team exploring how broadband and advanced communications can help the nation achieve its goals of energy independence and energy efficiency.
Mr. Sinai is a former venture capitalist and strategic advisor. Most recently, he served in executive and advisory roles with two Boston area clean energy technology companies, and served as a senior advisor to the Massachusetts Clean Energy Center. Mr. Sinai played a key role in building the clean energy practice at Polaris Venture Partners, and subsequently served as a Principal of Tenaya Capital. He also has private equity experience at Madison Dearborn Partners. Earlier in his career, he was a senior management consultant with Cambridge Strategic Management Group, where he led teams working with large communications and media companies. He earned an M.B.A from the University of Chicago Booth School of Business, and an A.B. from Harvard University.

Patrick Miller, NESCO

Patrick Miller is a security executive who has dedicated his career to the protection and defense of the nation's critical energy infrastructure. He is the founder of EnergySec, and currently its President and CEO. This nonprofit information sharing organization began as a few colleagues meeting for lunch and has grown into a nationwide effort to promote sound security principles in the energy industry.
One of his strengths is the diversity of his professional experience. In Energy, he has held positions with a utility, a regulator, and a private consulting firm. He has also held key positions in the Insurance, Internet and Telecommunications sectors.Among other credentials he holds the CISA, CRISC and CISSP certifications.
Patrick is an active member of several critical infrastructure security working groups and a sought after speaker and industry expert on the subjects of critical infrastructure protection, process control system security, regulatory compliance, audit, and privacy.
Patrick can be found at https://twitter.com/#!/PatrickCMiller
http://www.linkedin.com/in/millerpatrickc

Paul Molitor, National Electrical Manufacturers Association (NEMA)

Paul Molitor is the Assistant Vice President of Strategic Initiatives for the National Electrical Manufacturers Association in Rosslyn, VA. On behalf of the member companies of NEMA, he is responsible for monitoring the national Smart Grid effort and interfacing with electric utilities, manufacturers, federal agencies, and the U.S. Congress on Smart Grid issues. He also provides information, direction, and support to the NEMA Government Relations, Technical Services, and Industry Operations groups who manage policy and technical issues related to standards and protocols for U.S. and International Smart Grid activities.
Mr. Molitor is a former Plenary Secretary of the Smart Grid Interoperability Panel (SGIP), and is active in the International

Electrotechncical Commission Strategy Group 3 (IEC SG3) on Smart Grid. He is also a member of the IEEE Power & Energy Society and the IEEE Standards Association, and is a standards development representative to the Canadian Task Force on Smart Grid Technologies and Standards (TF-SGTS). Paul has had several Smart Grid articles published in U.S. and International publications, is a core member of the Gridweek and Grid-Interop Organizing Committees, and is a member of the editorial board for ElectroIndustry Magazine.

Paul Steffes, Steffes Corporation

Paul Steffes is the CEO for Steffes Corporation, an American manufacturer of residential, commercial and industrial electric thermal storage (ETS) space and water heating systems. He has 25 years of experience designing load and demand management products to better utilize electric utility assets. He has worked with hundreds of power companies across the US and Canada helping them to evaluate the economics of off-peak programs as a means to improve operational efficiency and reduce cost. Today, Paul's work focuses on transforming ETS into aggregated grid-interactive and dispatchable assets that assist utilities with balancing supply and demand in real-time. Paul has been a presenter at many national conferences on topics related to demand management, fast regulation, renewable integration, and cost effective scalable electric storage for grid reliability, stabilization, and optimization.

Paul is a Registered Professional Engineer and a charter member of the Smart Grid Interoperabity Panel (SGIP). He is nationally recognized by the Electric Power Research Institute (EPRI), the National Rural Electric Cooperative Association (NRECA) and others as an expert in ETS technology and is called upon often to provide insight and expertise into the ETS industry. He has received numerous local, state, and national awards for his entrepreneurial spirit and commitment to innovation.

Percy Haralson, Southern California Edison

Percy Haralson, Manager of Field Technologies in Engineering Advancement for Southern California Edison. Graduated from the University of California at Irvine School of Engineering with a bachelors of science. 23 years at SCE including Nuclear Computer Engineering and Distribution Automation

Phil Davis, Schneider Electric

Phil Davis serves as Senior Manager, Demand Response Solutions for Schneider Electric, and develops strategies for deployment of energy efficiency and renewable programs for large energy users. Prior to joining Schneider Electric via an acquisition he was Chief Operating Officer for RETX Energy Services engaged in similar activities. Trained in Economics, Mr. Davis has an extensive professional background in applying efficient energy strategies to support disparate management goals. Among his recent credits is the design and installation of a groundbreaking "intelligent building system" at Rockefeller Center in New York.

Davis began his energy career with Equifax, Inc., developing commercial and residential energy audits in response to the initial middle east oil embargo in the late 1970's. Since then, he has spent the bulk of his career developing and implementing innovative infrastructure designs to improve energy efficiency in government, industrial and large commercial sites. In doing so, he considers human factors as part of the infrastructure equation and has been able improve client job satisfaction along with process efficiencies.

Phil is a recognized authority on energy infrastructure support systems. With a rare career combination of sales, IT, Finance, Marketing, and Operations, he has developed an empathetic ear for customer needs and makes it a point of pride to provide good value for the investments. Phil holds degrees in Economics and Political Science from Macalester College in St. Paul, MN.

Phillip Slack, Florida Power & Light

Phil Slack is the Senior Group Manager of Enterprise Architecture for Florida Power & Light. Born and educated in England, with post graduate work at Darden, Phil joined Florida Power & Light Company in 1982, where he has held a wide range of roles including Telecommunications, IT Architecture, Research and Development, and Strategic Planning. Phil has been heavily involved in the design of FPL's AMI program, and holds a leadership role in the development of their enterprise wide Smart Grid program. Phil is the SGIP voting member for FPL, and sits on the NIST SGAC, and Cisco, SAP and SilverSprings Advisory Boards.

Raja Iyengar, EBiz Labs Inc.

Mr. Raja Iyengar is a results-driven leader and a visionary change agent with demonstrated capacity to successfully conceptualize, develop and deliver breakthrough strategies and solutions. He has extensive experience with private and public stakeholders in the energy and utilities space, including significant international perspective.

He currently leads commercialization of a decision-guided optimization framework for Smart Grid application, with specific focus on microgrid, applying his expertise with control systems and market optimization to real time economic dispatch of local and external power resources, consumption behavior and energy efficiency controls, and green energy and market commitments while minimizing overall energy costs. He has implemented several software engineering and business solutions with a focus on delivering results consistently in the field of ISO/RTO market operations, wholesale electricity market systems, meter data management, billing and settlement, and load forecasting. He has recently completed the Software Engineering Institute's certification program to become a Smart Grid Maturity Model Navigator.

Raja builds networks and relationships with internal and external stakeholders, sharing information and insights, and also participates actively in industry standards. He has a master's degree in engineering from the University of Kansas and a Bachelor of Technology degree from the Indian Institute of Technology, Delhi.

Ray Bariso, Telecordia Technologies

Ray Bariso has 20 years of management, business and technical experience developing, delivering, selling and managing complex software and services solutions. He has held various roles in systems engineering, solution architecture, consulting, program management & delivery,

sales & marketing and product line management.
Bariso is an industry though leader in the area of communications and operations and has spoken at numerous Wireless and Smart Grid events such as IEC Grid ComForum, TMC Smart Grid Summit, TM Forum Management World and CTIA Wireless on topics such as Smart Grid Operations and 4G/LTE Evolution. He also leads the Next Generation Wireless/Wireline industry initiative within the TM Forum on Convergent Network Operations and Interface Harmonization.
Bariso has sold and delivered multiple successful multi-year, multi-million dollar solution implementations for customers around the world, including in Brazil, Argentina, Mexico, Italy, South Africa, Hong Kong and Australia, as well as North America.
His current responsibility includes managing Telcordia's Wireless & Smart Grid solutions business, which includes the definition and execution of Telcordia's overall Smart Grid go-to-market strategy, partner ecosystem development, solution architecture, and business management.

Rik Drummond, Drummond Group Inc.

As Chief Executive Officer and Chief Scientist of Drummond Group Inc. (DGI), the trusted global interoperability certification authority, Rik Drummond has led the company's technical and research strategies while steering DGI to constant growth and innovation. He is a widely respected thought leader in the eBusiness industry with over 30 years of experience and a driving force in the technical standards bodies and vertical industry groups supporting B2B commerce.
In his is two and a half years as the original chairman of the GridWise Architecture Council, Rik guided and shaped the Council as one of the primary advocacy bodies for a smart electric grid. He remains an instrumental member in advancing the benefits of improving the interoperation between automation systems needed to enable smart grid applications. Rik demonstrated the courage to rally the thirteen members of the Architecture Council around notions of interoperability and the need to develop a crosscutting electricity community of people and organizations representing industrial system, buildings automation, home automation, and economic and regulatory policy in addition to electric service providers.
The concept for a "constitution" of interoperability principles, the interview process to engage a larger community and the GridWise Constitutional Convention originated with Rik. This work has been captured in the GWAC Interoperability Constitution Whitepaper. Rik was also part of the GWAC team which created their Interoperability Context-Setting Framework (v1.1) document and their Interoperability Path Forward whitepaper. Through his efforts with the GWAC, Rik was awarded the Smart Grid Award for "Outstanding Leadership in the Advancement of a Smart Grid."
In his work with Drummond Group, Rik has a front seat view of enabling software/ firmware vendors to develop and work together in the goal of interoperability, his hands on knowledge is immensely valuable. Drummond Group today provides interoperability certification for machine to machine (M2M) or business-to-business (B2B) standards which are used for the Fortune 500 financial information backbone, representing billions of dollars exchanged per year. Cyber security of data interoperability and transfer is critically tested. And his company also provides world-wide interoperability certification for other organizations such as Liberty Alliance for Identity information exchange for the U.S. government and the global leaders in identity. Major supply chains in retail, financial services, pharmaceutical, consumer product goods, automotive and petroleum industries rely on the Drummond Certified program to provide a wide selection of software tested for compliance and interoperability.
Rik was the chair of the IETF WG which produced the AS2 standard (RFC 4130) that allowed the transmission of EDI (Electronic Data Interchange) to move from VANs (Value Added Networks) to the Internet, saving companies millions of dollars in transmission fees. Today, AS2 is the workhorse for the Fortune 500 Internet Messaging and is one of the most widely implemented messaging standards around the globe.
Rik also chaired the initial version of the ebXML Messaging Service (ebMS) work group. ebMS is widely used B2B standard in the US, Europe and Asia.

Rish Ghatikar, Lawrence Berkeley National Laboratory

Girish Ghatikar is a Program Manager with U.S. Department of Energy's Lawrence Berkeley National Laboratory overseeing Demand Response (DR) technologies and Open Auto-DR (OpenADR) standards, and U.S. and International Smart Grid and energy-related technology and business activities. Ghatikar's background and industry experiences are in key areas of information technology, standards, software programming, collaboration, technology transfer, and business and policies for Energy Efficiency, DR, Smart Grid, and Internet applications.
Over these years, Ghatikar has identified and executed new opportunities in key areas of applied research, program and financial management, and cost benefit analysis. Ghatikar serves on the Steering Committee for the "OASIS (Organization for Advancement of Structured Information Standards) Blue," other OASIS technical committees, and UCA (Utilities Communication Architecture) user groups to advance standards in energy- and Smart Grid-related areas.
Ghatikar holds Master degrees in Telecommunication Systems/Computer Technologies and Infrastructure Planning/ Management.

Robert Burke, ISO New England

Mr. Burke is a Principal Analyst in Market Development department with ISO New England (the Regional Transmission Organization "RTO" for the New England control area). He has over thirty-five years of experience in the energy industry. Since joining ISO-NE, he has held various positions and been involved with the development and subsequent on-going improvement of the wholesale energy markets, and worked with market Participants regarding Demand Resource integration issues. In his present position, he works on development of market rule changes for all areas of the New England wholesale markets and their FERC fillings.
Mr. Burke has been directly involved in the New England Demand Response programs since the 2000 summer program. As ISO-NE implemented Standard Market Design (SMD) on March 1, 2003, Mr. Burke worked on the

melding of all the existing load response programs into New England's SMD. Since that time, Mr. Burke has been involved in the development and implementation of new Demand Response programs and ISO-NE's Internet based demand response dispatch open solution (IBCS-OS). He has been directly involved in the development of the new dispatch methodology implemented by ISO-NE for June 1, 2010.

Mr. Burke has a B.E. in heat and power from Stevens Institute of Technology, MBA and MS in Computer Science, both from Rensselaer Polytechnic Institute, and has completed all examination requirements in Connecticut for a CPA. He is a member of the GridWise Architecture Council since 2009 and a member of IEEE. The GridWise Architecture Council works to foster smart grip interoperability. He has made presentations on more than three-dozen panel discussions and technical seminars, and authored or coauthored more than a dozen technical papers.

Rolf Bienert, OpenADR Alliance

Rolf Bienert is the Technical Director of the OpenADR Alliance. In this capacity, Rolf oversees the technical developments and the currently forming certification program of the Alliance. Most recently Rolf was the Technical Manager for Telecom and the Global Competence Center for emerging communication protocols at TUV Rheinland. In this role at TUV, Rolf was involved in many international standardization efforts and guided the company's efforts in these areas. Rolf has been an active member of the NIST SGTCC, OpenADR Alliance, USNAP Alliance, SunSpec Alliance, ZigBee Alliance, and other organizations driving the development of new technologies with a specific focus on certification and interoperability.

Ron Ambrosio, IBM T.J. Watson Research Center

Ron Ambrosio oversees IBM's Energy & Utilities Industry activities in its eight world-wide Research Laboratories. Ron joined IBM in 1981 at the T.J. Watson Research Center, working in a variety of areas including embedded operating systems, distributed application frameworks, and pervasive computing environments, ultimately focusing on networked embedded computing with particular emphasis on what he coined "Internet-scale Control Systems" – the interoperability of sensor networks and control systems with enterprise systems and business processes. He helped establish IBM's activities in both Intelligent Utility Networks and Sensors & Actuators.

In 2000, Ron began working with the U.S. Department of Energy on the planning, collaboration and workshops that led to the establishment of the DoE GridWise initiative in late 2002, and then on the planning and launch of the GridWise Alliance industry consortium in 2003. In 2004, he was selected by the Department of Energy to sit on the 13 member DoE GridWise Architecture Council, and was elected Chairman of the Council in 2009.

Ron is active in ISO/IEC JTC 1/SC 25 Working Group 1, where he is the Editor of a new premises automation application interoperability standard (ISO/IEC 18012). He's also a member of the U.S. TAG for IEC TC 8 - System Aspects for Electrical Energy Supply, and various other groups involved in smart grid technology definition and development.

Ron Melton, Battelle/Pacific Northwest National Laboratory

Ron Melton is the administrator of the GridWise Architecture Council (GWAC) and a senior power systems engineer at Pacific Northwest National Laboratory.

He is also Project Director for the Pacific Northwest Smart Grid Demonstration Project managed by the Pacific Northwest Division of Battelle.

Dr. Melton has over 25 years of experience in systems engineering applied to interdisciplinary problems. He received his BSEE from University of Washington and his MS and PhD in Engineering Science from the California Institute of Technology.

Rudi Schubert, EnerNex

Rudi Schubert is the program coordinator for the SGTCC. He is a Principal Engineer with EnerNex Corporation and a technical expert in conformance and interoperability programs. Rudi has a 20+ year record of leading, developing and implementing industry test programs, assuring expectations for functional performance, compatibility, product robustness and safety are achieved.

He began his career as a nuclear power plant design analyst, and then moved to a test engineering position in the telecommunications industry with Telcordia Technologies, establishing technical criteria and test methodologies that would eventually become a mandated compliance and certification standard used by U.S. telecom carriers in assessing product and system suitability for deployment.

His responsibilities at Telcordia expanded to leadership of its Network and Product Integrity organization, providing comprehensive management of the consulting and laboratory technical services delivered to enhance the integrity of its client's communications network infrastructures. His teams consisted of up to 50 technical experts providing services spanning switching, signaling and VoIP technologies, broadband access and optical transport technologies, fiber optic connectivity products, communication facility operations issues including energy efficiency, electrical/ mechanical robustness, and network infrastructure integrity testing. Testing programs included the delivery of certification services for major telecom service providers, as well as major network equipment suppliers.

Significantly, his team played an instrumental role in Verizon's ground breaking fiber optic network deployment (FiOS) providing the product functional and robustness criteria, detailed laboratory and field testing methodologies, and product conformance evaluations required by the carrier to assure that their investment in this first of its kind network delivered customer expectations for high performance and reliability, as well as providing an infrastructure prepared for future demand.

Laboratories under his direction achieved accreditation by the American Association of Laboratory Accreditation (A2LA) through adherence to ISO 17025 lab quality standards. He has been an active participant in national and international standards activities, and has participated in the ANSI Conformity Assessment Policy committee.

Rudi developed the IEEE Conformity Assessment Program (ICAP), focused on supporting development of conformity and certification programs related to IEEE

standards, helping accelerate market adoption of new technologies, including the IEEE 1588 Conformity Alliance launched in 2010.

Russell Silva, Telcordia Technologies, Inc.

Russ has more than 22 years of experience in the field of security and information assurance. Russ manages technical delivery and business development of Telcordia's vulnerability assessment and penetration ("VA/PT") testing services. Russ has successfully managed a wide variety of security assessment projects covering IT infrastructure, high risk web and non-web banking applications, multi-media communications, Smart Meter/AMI, and Conditional Access Systems/Set top boxes across a diverse customer base that includes enterprise, banking, government, utility, and international and domestic service provider and supplier markets. Russ has guided the Telcordia security risk assessment methodology, including the development of a standardized penetration testing platform (hardware and software) that Telcordia security consultants use to ensure repeatable and consistent test results. Russ has a B.S. in Computer Science from Rutgers University in New Jersey.

Sandy Bacik, EnerNex

Sandy Bacik, EnerNex Principal Consultant, author and former CSO, has over 15 years direct development, implementation, and management information security experience in the areas of Audit Management, Disaster Recovery/Business continuity, Incident investigation, Physical security, Privacy, Regulatory compliance, Standard Operating Policies/Procedures, and Data Center Operations and Management.

Ms. Bacik has managed, architected and implemented comprehensive information assurance programs and managed internal, external, and contracted/outsourced information technology audits to ensure various regulatory compliance for state and local government entities and Fortune 200 companies. She has developed methodologies for risk assessments, information technology audits, vulnerability assessments, security policy and practice writing, incident response, and disaster recovery.

Ms. Bacik is a regular presenter at MIS Training Institute security conferences. Ms. Bacik currently volunteers and co-chairs subgroups with NERC, NIST, and UCA in assisting in developing interoperability and security standards for the Smart Grid. Ms. Bacik is the author of Building an Effective Security Policy Architecture (2008) and a contributing author to the Information Security Management Handbook (2009, 2010, 2011).

Scott Crowder, National Renewable Energy Lab

Scott Crowder has over 25 years of experience architecting and building a wide variety of software systems, including systems to manage and analyze large amounts of building energy data. He is currently the architect of the SmartGrid data hub, which has collected data from all 132 SmartGrid projects funded by the American Recovery and Reinvestment Act (ARRA). Mr. Crowder's team has built www.SmartGrid.gov to give public access to descriptions and data from the ARRA projects. Prior to joining NREL he was a solution architect for GridPoint, where he was responsible for designing and implementing GridPoint's Demand Response signaling and control product. He was also responsible for integrating GridPoint's system with other vendor and utility systems as part of Xcel Energy's SmartGrid City project.

Mr. Crowder is an active member of the PAP9, PAP10, and ESPI working groups.

Scott Hublou, EcoFactor

Scott has established himself as a leading voice in the clean tech and energy industries, through his consumer advocacy in the residential energy efficiency space. He is a frequent speaker on emerging smart grid technologies and the important role that smart homes play in creating a truly efficient energy system. Scott has been a featured speaker at VentureBeat's GreenBeat conference and was a regular guest lecturer at both Stanford and the University of California at Berkeley business schools, sharing his knowledge and expertise on business intelligence and SaaS platforms.

Prior to EcoFactor, Scott's has a long history of building successful software solutions that leverage SaaS platform and was the CMO of Sapria Design and Technology Group, as well as the CEO of Asimba. Scott has also held product development and marketing roles at SAP, PeopleSoft and HP.

Stephen Amsbary, EnerNex

Stephan Amsbary has extensive experience architecting and implementing extremely large scale mission-critical integration infrastructures. Before joining EnerNex, Mr. Amsbary worked for HP as a Chief Architect and Global SOA Lead. At EnerNex Mr. Amsbary directs EnerNex's Enterprise Architecture Practice and leads several strategic Smart Grid projects. Mr. Amsbary has over thirty years in IT, eight years in the energy and utility industry and has been involved in energy projects in more than ten countries. He is routinely invited to speak at international events in the industry.

Mr. Amsbary is a TOGAF Certified Architect, and member of both IEEE Power & Energy and Computer Societies.

Steve Widergren, Pacific Northwest National Laboratory

Steve Widergren contributes to the research and development of new solutions for reliable operation of electric power systems. Common throughout his career is the application of information technology to power engineering problems including, simulation, control, and system integration. He is a principal engineer at Pacific Northwest National Laboratory and is the 2010/2011 Plenary Chair for the Smart Grid Interoperability Panel, a group established by NIST to advance interoperability of smart grid devices and system through the coordination of standards and best practices. He was the founding Administrator for the GridWise Architecture Council – a group formed to enable interoperability of automated systems related to the electric system.

Prior to joining Pacific Northwest National Laboratory, he engineered and managed energy management systems (EMS) products for electric power utilities. Application areas included energy trading, supervisory control and data acquisition (SCADA) systems, and power system security assessment tools. Mr. Widergren received M.S. and B.S. degrees in electrical engineering from the

University of California, Berkeley. He is an editor of the IEEE Transactions on Power Systems and participates in standards efforts that bridge power engineering with information technology.

Stuart McCafferty, EnerNex

Stuart is an IT professional with 20 years of experience, with specialized expertise in managing complex systems integration projects, standards development efforts, system architecture design, software development and implementation, real-time data acquisition, business process change, and secure online collaboration. He is known for innovative and out-of-the-box uses of current technology. He is a certified Project Management Professional (PMP®) from the Project Management Institute (PMI).

Stuart's recent projects include:

- NIST Phase II National Smart Grid Standards Acceleration Program. Since August, 2009, Stuart has been the EnerNex Program Manager assisting NIST to accelerate the development and harmonization of Smart Grid standards. He leads the Smart Grid Interoperability Panel (SGIP) PMO, overseeing the various Priority Action Plans, Smart Grid Testing and Certification projects, Cyber Security projects, and Smart Grid architecture projects. In addition, he leads the Administrator team for the SGIP, which is a volunteer organization of approximately 2,000 individuals committed to identifying and accelerating the standards needed to support a Smart Grid.
- National Institute of Standards and Technology (NIST) Plug-in Electric Vehicle (PEV) common object models Priority Action Plan (PAP). Stuart was co-lead for developing a common interoperable model for price, DR events, and energy characteristics for dynamic pricing across markets, signals for curtailment, and distributed generation resources that allow information supporting these uses to flow through the smart grid.
- NIST Phase I Smart Grid Interoperability Roadmap. Stuart led the EnerNex team as the primary subcontractor in supporting EPRI with stakeholder assessments, roadmap development, workshop facilitation, priority action plans, use case identification and extension, and the development of the Smart Grid conceptual model.
- California Energy Commission: Statewide demand response deployment. Stuart is managing a project and the principal investigator in developing the requirements and reference architecture for the California Demand Response Analysis and Control System (DRACS).
- West Virginia Smart Grid Strategy: Stuart co-invented and developed the Modern Grid Maturity Model and self-scoring survey application which performs As-Is and Future State assessments of a utility's smart grid maturity level.

Prior to joining EnerNex Corporation, Stuart was a Managing Consultant at SAIC for nearly nine years. As part of the leadership team, he provided project management support for large IT-related projects across multiple vertical industries. He was division manager and performed program management for SAIC's Collaborative Business Solutions Division, performing business development, leading division strategy, and managing programs, projects, and personnel for commercial and government efforts. Vertical markets supported include energy, health care and pharmaceutical, and government (Army and NASA). He managed as many as 50 people in distributed virtual teams.

He supported utility industry initiatives around Predictive Analytics, Advanced Metering Infrastructure (AMI), Modern/ Smart Grid initiatives, and Utility of the Future (UoF) pilot programs. He led SAIC's AMI Community of Practice and had articles published on that subject. Stuart led an SAIC Research and Development (R&D) project for real time data management, advanced predictive analytics, and knowledge management. He supported the National Energy Technology Laboratory's (NETL) Modern Grid Initiative as manager and chief architect for simulation.

Tariq Samad, Honeywell

Dr. Tariq Samad is a Corporate Fellow in Honeywell's Automation and Control Solutions business group, which services the automation needs of over 5 million buildings, 100 million homes, and 30,000 process-related industries including power plants and manufacturing facilities. Dr. Samad has been with Honeywell for 25+ years and has led initiatives in areas related to smart grids, process automation, intelligent buildings, automotive engine control, and clean coal technology. His interests relate broadly to automation, intelligence, and autonomy for complex engineering systems.

Dr. Samad is a Fellow of the IEEE and the recipient of several awards including the 2008 IEEE CSS Control Systems Technology Award. Dr. Samad served as the President of IEEE Control Systems Society in 2009. He was the editor-in-chief of IEEE Control Systems Magazine from 1998 to 2003. He is the General Chair for the 2012 American Control Conference. Dr. Samad holds 17 patents and has authored or coauthored over 100 publications. He is on the editorial board of IEEE Press. He represents Honeywell on the Global Carbon Capture and Storage Institute and he is a member of the Governing Board of the U.S. Smart Grid Interoperability Panel. Dr. Samad received a B.S. degree in Engineering and Applied Science from Yale University and M.S. and Ph.D. degrees in Electrical and Computer Engineering from Carnegie Mellon University.

Terry Mohn, General MicroGrid

Terry Mohn is founder and Chairman of General MicroGrids, owner of the Balance Energy brand, located in San Diego. He works to ensure clean and renewable electric generation can reliably meet the demands of utilities, municipalities and communities. The company's technology portfolio and capabilities focus on integrated microgrids and sustainable community solutions.

He is also the United Nations Foundation MicroGrid Work Group Chairman and presently serves a three year appointment as the Department of Commerce's federal advisor to NIST in its Smart Grid Federal Advisory Committee. The committee advises NIST on the direction of its smart grid-related programs and activities as the institute leads a nationwide effort to expedite the development of interoperability standards for the smart grid.

He has 30 years' experience in large-scale system architecture, business strategy, and technology investment strategy. Terry specializes in the business integration of technologies, primarily supporting smart grid, home automation systems, communication

systems, distribution automation, smart metering, demand response, and sense and control. He also is very involved in technology research, funding and commercialization and works closely with major California universities.
Terry is an advisor to the DOE for smart grid and advisor to the California Energy Commission for demand response and emerging technologies. He worked closely with LBNL developing the OpenADR standard. He was a co-founder of OpenAMI and UtilityAMI, now part of OpenSG, to develop requirements and standards for AMI and HAN systems. Following these efforts, he worked on the early ZigBee HAN standards as well as Utility Standards Board's meter data standards.
Terry was previously chief technology strategist for the Sempra Energy utilities, with emphasis on smart grid. He specialized in the application of modern technology for all parts of the utility business. While with Sempra, Terry became a founding member and Vice Chairman of the GridWise Alliance.
Terry was very involved writing and editing the GWAC Framework for Interoperability, EPRI's Intelligrid and Galvin's Electricity Initiative.
Prior to his energy roles, Terry was chief technology officer for an international broadband media company and founder of two Internet companies.

Terry Oliver, Bonneville Power Administration

Terry Oliver has worked globally to advance energy conservation and renewable energy. He has worked for BPA since 1981.
In the Pacific Northwest, he managed one of the world's largest residential energy conservation programs, the PNW Residential Weatherization Program, lead ground-breaking research on community-based energy conservation applications in the Hood River Conservation Project, and established two enduring icons of energy efficiency innovation, the Lighting Design Lab and the Energy Ideas Clearinghouse.
In 1992, he moved to Bangkok, Thailand, to lead the Asia Regional Office of the International Institute for Energy Conservation (IIEC).
In 2000, Terry returned to BPA where he worked on BPA's Energy Web concept and its application to the PNW. As part of this effort he helped create BPA's Non-Wires Solutions initiative, participated in EPRI's Intelligrid grid architecture initiative, and lead the GridWise Alliance Demonstrations Working Group.
In June 2005, Terry was appointed Bonneville Power Administration's first Chief Technology Innovation Officer, responsible for re-energizing, focusing, and managing BPA's research and development activities.

Thomas Basso, NREL

Thomas (Tom) Basso is a Senior Engineer at the National Renewable Energy Lab (NREL) working as the NREL Principal Investigator for DOE Office of Electricity Smart Grid R&D Interconnection and Interoperability Standards, and as the NREL Photovoltaic Codes and Standards Field Lead for the DOE Solar Energy Technology Program. Tom also serves as the IEEE SCC21 Vice Chair (e.g., IEEE Smart Grid 1547™ interconnection and 2030™ interoperability standards), and leads the IEC/US/TAG/TC8 System Aspects of Electrical Energy Supply.

Tim Schoechle, International Center for Standards Research

Dr. Schoechle is a founder of BI Incorporated, pioneer developer of RFID technology, and former faculty member of the University of Colorado College of Engineering and Applied Science. As an entrepreneur Dr. Schoechle has been engaged in engineering development of electric utility gateways and energy management systems for over 25 years. He presently serves as Secretary of ISO/IEC SC25 Working Group 1, the international standards committee for Home Electronic Systems and he is technical co-editor of several international standards related to the smart grid. He is an expert on the international standards system and serves as secretariat of ISO/IEC SC32 Data Management and Interchange. He holds an M.S. in telecommunications engineering and a Ph.D. in communications policy from the University of Colorado.

Toby Considine, TC9

Toby Considine has 25 years of experience with enterprise applications and the integration of embedded control systems for 25 years. As an Infrastructure Analyst internal to Facilities Services at the University of North Carolina, Mr. Considine gained real world experience with the poor security, poor interoperability, and brittle integrations that characterize last-generation protocols and building systems. This experience drove him to Chair the oBIX Technical Committee, and informs his work integrating buildings with larger systems and each other using enterprise-grade protocols.
Toby Considine is a regular speaker at international forums on e-commerce initiatives in the energy sector and incorporating building systems into the business processes of enterprises. He is a graduate of the Entrepreneurship Program at Kenan-Flagler Business School. Through TC9, Mr. Considine provides business plan analysis and system development guidance to pre-funding and after stage-one companies at the interstices of building systems, enterprise processes, and energy use. Toby also offers services to accelerate standards development and adoption.

Tony Giroti, BRIDGE Energy Group, Inc.

Tony Giroti is the former Chairman and CEO of BRIDGE Energy Group which is focused on Grid Operation, Market Operation and Smart Grid. He specializes in Enterprise Architecture, Integration, Service Oriented Architecture, and Business Intelligence. After completing his Bachelor of Engineering in Electrical Engineering, Tony trained at Crompton Greaves Ltd. in Power Systems division designing large transformers. Tony also holds a Master of Science in Electrical and Computer Engineering from The University of Massachusetts.
He has over 20 years of experience in managing Information Technology products, platforms and applications. Most recently, he has been leading various Smart Grid and Demand Response initiatives with IOUs and T&D operators assisting IT and Management in developing Smart Grid roadmap, business plan, Integration strategy and launching Center of Excellence for Smart Grid, Enterprise and Application Integration. Earlier, Tony also worked in the Telecom and Financial services industry as CIO and CTO developing enterprise platforms and running

large Business and IT transformation programs.

Tony is an active participant in the development of standards with CIM Users Group, GridWise Architecture Council, OASIS and others. Tony is an active speaker at conferences, has written numerous white papers and has been granted 4 patents by U.S. Patent and Trademark office in the areas of SOA/XML/IT platform – Patent #7,492,873 #7,369,540, #7,061,928, and 7,751,347.

Tony had also started two venture capital-backed global companies in the areas of Data Warehouse and Unified Communication. He took the latter one public. He is currently the Executive director of an Australian public company, former Chairman of the IEEE SIG, President of Power Engineering Society SIG, Chairman ISACANE CISA and former President, CEO and Chairman of two technology companies. Tony is CISA certified.

Tracy Markie, Engenuity Systems

Tracy Markie has more than 25 years of experience in the control systems and energy markets. He is President/CEO of Engenuity Systems, Inc., a leading distributor and value-added-reseller of energy solutions and building automation products.

Mr. Markie participates in a number of industry groups. He is currently serving on the GridWise Architecture Council, a group sponsored by the U.S. Department of Energy. Mr. Markie also serves on the boards of LonMark International, as Chairman, LonMark Americas and the SunSpec Alliance, an association dedicated to bring interoperability standards to the solar industry.

A published author and presenter, Mr. Markie's articles on the subjects of automation and energy management using networked solutions have appeared in more than a dozen national publications. He often participates at local and national industry and business events as an invited speaker.

Mr. Markie is a Certified Energy Manager and a Certified LonWorks Professional. He received his B.S. in Electrical Engineering Technology from the University of Maine and his MBA from the University of Connecticut, specializing in marketing, finance and management information systems. He has held various technical and managerial positions at National Semiconductor, Norden Systems/United Technologies, Intel Corporation, and Tronix Corporation.

Vint Cerf, Google, Inc.

Vinton G. Cerf is vice president and Chief Internet Evangelist for Google. He is responsible for identifying new enabling technologies and applications on the Internet and other platforms for the company.

Widely known as a "Father of the Internet," is the co-designer with Robert Kahn of TCP/IP protocols and basic architecture of the Internet. In 1997, President Clinton recognized their work with the U.S. National Medal of Technology. In 2005, Vint and Bob received the highest civilian honor bestowed in the U.S., the Presidential Medal of Freedom. It recognizes the fact that their work on the software code used to transmit data across the Internet has put them "at the forefront of a digital revolution that has transformed global commerce, communication, and entertainment."

From 1994-2005, Vint served as Senior Vice President at MCI. Prior to that, he was Vice President of the Corporation for National Research Initiatives (CNRI), and from 1982-86 he served as Vice President of MCI. During his tenure with the U.S. Department of Defense's Advanced Research Projects Agency (DARPA) from 1976-1982, Vint played a key role leading the development of Internet and Internet-related data packet and security technologies.

Since 2000, Vint has served as chairman of the board of the Internet Corporation for Assigned Names and Numbers (ICANN) and he has been a Visiting Scientist at the Jet Propulsion Laboratory since 1998. He served as founding president of the Internet Society (ISOC) from 1992-1995 and was on the ISOC board until 2000. Vint is a Fellow of the IEEE, ACM, AAAS, the American Academy of Arts and Sciences, the International Engineering Consortium, the Computer History Museum and the National Academy of Engineering.

Vint has received numerous awards and commendations in connection with his work on the Internet, including the Marconi Fellowship, Charles Stark Draper award of the National Academy of Engineering, the Prince of Asturias award for science and technology, the Alexander Graham Bell Award presented by the Alexander Graham Bell Association for the Deaf, the A.M. Turing Award from the Association for Computer Machinery, the Silver Medal of the International Telecommunications Union, and the IEEE Alexander Graham Bell Medal, among many others.

He holds a Ph.D. in Computer Science from UCLA and more than a dozen honorary degrees.

V S K Murthy Balijepalli, Indian Institute of Technology Bombay

Active Smart Grid researcher, leader, talented, young, and energetic person. Ethical quotient and professionalism are his natural qualities. He has emerged as the winner of MIT young Indian Innovator in 2012. He has also received the awards like Department of Science and Technology (DST) Lockheed Martin and Gandhian Technological Edge awards. He is associated with many sponsored projects, and few of his other credentials are: CG Fellowship Awardee; Active Reviewer for IEEE Smart Grid Transactions, Power system transactions, International Journal of Emerging Electric Power Systems; Associate Editor, Journal of Electronic and Electrical Engineering, Bioinfo; Member, CIM Working Group (WG3), Bureau of Indian Standard; and Founder, DesiSmartGrid.com and DesiSmart.com. He is the author of the first International publication on the Indian Smart Grids. He is presently finishing his PhD program from department of electrical engineering in IIT Bombay, Powai, Mumbai. He was also served as the General Secretary Academic affairs of Indian Institute of Technology, Bombay, India during the year 2010-11. He has started initiatives like Student Companion Program, Research book, Flexible Teaching Assistant Allotment, Online patenting lessons for Researchers, etc., and grabbed good media attention.

Ward Camp, Landis + Gyr

A 30-year veteran of the energy and utility industry, Camp is VP, Regulatory and Environmental Policy for Landis +Gyr Energy Management Solutions N.A. He is current board member of the GridWise® Architecture Council, Co-Chair of the SGIP Business and Policy,

Domain Expert Working Group and the Demand Response and Smart Grid coalition (DRSG). He is also a member of the GridWise Alliance and the Association for Demand Response & Smart Grid (ADS). Previously, he served in executive roles as part of the Senior Management of DCSI (now Aclara), USPowerSolutions and Avistar, a Public Service Company of New Mexico subsidiary. Camp has worked extensively with utilities and public utility commissions throughout the United States. He spent the first 17 years of his career as an attorney with a focus in energy and utilities. Mr. Camp obtained his Juris Doctor from the University of Oklahoma.

Ward Payles, Southern Company

Ward Pyles is a Sr. Security Analyst with Southern Company the premier energy company serving the Southeast. With more than 10 years of experience in Information Technology, Ward's extensive background in technology, regulatory compliance, and risk management assists Southern Company in security practices and infrastructure protection. He has aided in the development of multiple security programs and teams for public and private corporations enabling organizations to manage business risks and infrastructure threats.

Mr. Pyles leads Southern Company's Smart Grid security strategy and the deployment of solutions with Distribution and Transmission. As a member of the NIST Smart Grid CSCTG and SG Security users groups he has supported the development of the NIST Smart Grid guidelines focusing on threats and privacy. His support of Southern Company's security practices with regulators and auditors ensures a secure foundation and alignment with standard practices.

Mr. Pyles has obtained multiple industry certifications including the Certified Information Systems Security Professional (CISSP). He is an advocate in the community teaching CISSP courses and spreading awareness as an instructor with the Internet Crimes Against Children Task Force. A past officer of the Metro Atlanta ISSA, Ward works closely with state and federal agencies for public security awareness and infrastructure strategy.

Wayne Longcore, SAP

Wayne Longcore works as the Chief Energy Solutions Expert at SAP a producer of software systems for over 40,000 companies worldwide. He also serves as one of the members of the GridWise® Architecture Council and organization funded by the Department of Energy, as a Governance Board member of the Department of Commerce funded NIST Smart Grid Interoperability Panel and as the Vice Chair of the Board of Directors of the UCA International users group. Wayne participates in the Vision Mission and Roadmap team of the SGIP and leads the Declaration of Smart Grid Interoperability Vision team for the GWAC and as the NIST SGIP GB representative to the Program Management Office.

William Cox, Cox Software Architects LLC

Bill is a leader in commercial and open source software definition, specification, design, and development. His work combines business experience with his deep and practical understanding of software architecture and technologies including XML, Web services, Service-oriented architectures, eBusiness, Networking and system software to lead standards and project definition and execution.

Bill is past Chair and elected member of the Organization for Structured Information Systems (OASIS) Technical Advisory Board, the leading XML and Web services standards organization in the world. He has completed major standards projects in OASIS, the Object Management Group, and IEEE. He chairs the OASIS Energy Interoperation Technical Committee which is producing the interoperation standard for the smart grid and facilities (including OpenADR 2.0), and the OASIS Energy Market Information Exchange Technical Committee which has completed version 1.0 of information models for energy market communications (completing SGIP Priority Action Plan 3). He is a member of the OASIS WS-Calendar TC which has delivered the Common Calendar and Scheduling Model 1.0 for the Smart Grid (completing SGIP Priority Action Plan 4).

Bill is a member of the Smart Grid Architecture Committee, and participates in ASHRAE SPC201P for facility information models for energy usage and load.

Zahra Makoui, Pacific Gas and Electric Company

Zahra Makoui is leading PG&E's Advanced Technology Integration (ATI) group, facilitating innovative technology advancements to PG&E through consulting, testing, development, industry standards engagement, simulations and analytics.

Zahra and her team have been at the forefront of developing Smart Grid standards including OpenHAN, Smart Energy 2.0, SAE J2847, etc. After discovering major gaps in the areas of standards interoperability and certification, Zahra joined SGIP's Smart Grid Testing and Certification Committee (SGTCC). In SGTCC, Zahra lead the development of the Interoperability Process Reference Manual 1.0 (IPRM), which was released in 2010 as the first major work product of SGTCC.

Zahra was previously involved in PG&E's SmartMeter project, defining the technology strategy and performing systems analysis.

Zahra has a BS in Engineering, Mathematics and Statistics from UC Berkeley's College of Engineering.

Appendix C: Grid Interop Paper Awards

- Daniel Evans, Sam Hendley, Adam Crain, John S. Camilleri - Next Generation Automation – Effective Platform Design and Practical Implementation – cross cutting
- David Olson, BuildingsQ - New Approaches in Automating and Optimizing Demand Response to Solve Peak Load Management Problems
- Partha Datta Ray, Ranjit Kumar, Christopher Reed, Atul P. Agarwal Albeado, Inc Interoperating Smart Grid Cyber Security Systems: Adaptive Risk Management across Unified OT and IT Domains – architecture track
- Terry Mohn, General MicroGrids - Smart Grid creates an Over-the-Counter Market for Energy Sales

Appendix D: Papers

Business & Policy Track

Transactive Energy

- Edward G. Cazalet - Automated Transactive Energy (TeMIX)
- Gordon Matthews, Terry Oliver, Donald Watkins, Katie Pruder, Joshua Binus, Lee Hall - Bonneville Power Administration (BPA) Grid Operations, Bi-Lateral Markets, and Transactive Energy
- Robert Burke- Where Does Transactive Energy Fit In Wholesale Energy Markets?

Market Participation

- Robert Burke - How Can Mobile Load Participate In New England Wholesale Markets?
- Paul Steffes - Grid-Interactive Electric Thermal Storage (GETS) Space and Water Heating
- Energy, Micromarkets, and Microgrids – William Cox – Cox Software Architects, Toby Considine, TC9 Incorporated

Regulatory

- Chellury Sastry, Toby Considine, William Cox - Price Normalization to Facilitate Energy Efficiency— Algorithms and Issues
- Erik Gilbert, Greg Ekrem, Robin Maslowski, Stuart Schare - Interoperability Lessons from Ongoing Residential Smart Grid Deployments
- Gale Horst - Consumer Engagement Paper
- Paul Steffes - Grid-Interactive Electric Thermal Storage (GETS) Space and Water Heating
- Toby Considine - Semantics to Enabler of Energy E-Commerce
- Jiyan Fan, Ram Shetty - Innovative Retail Strategies in Smart Grid Solutions

Information Interoperability Track

- Andrew Crapo, Ray Plasekl, , Xlaofeng Wang - The Smart Grid as a Semantically Enabled Internet of Things
- Jim Butler - Communicating the Semantics of Resources in Networked Control Systems
- Girish Ghatikar , Rolf Bienert - Smart Grid Standards and Systems Interoperability: A Precedent with OpenADR
- Jin Sinopoli Specifying Energy Management and Integration Software for Buildings

- Nada Reinprecht, Javier Torres & Marilza Maia - IEC CIM Architecture for Smart Grid to Achieve Interoperability International CIM Interop in March 2011
- Ed Koch, Akuacom & Sila Kiliccote - Role of Standard Demand Response Signals for Advanced Automated Aggregation
- Harry Stephey - The Smart Grid Interop Lab - Advancing the State-of-the-Art for Testing Smart Grid Systems and Elements
- Nick McLellan - Information model for the integration of EVSE into a Grid-Enabled CEMS
- Erik Gilbert, Greg Ekrem, Robin Maslowski, Stuart Schare - Interoperability Lessons from Ongoing Residential Smart Grid Deployments
- Dave Hardin - Customer Energy Services Interface White Paper
- James Mater, Shawn Chandler, Linda Rankin, Bora Akyol - Moving from Standards Development to Field Implementation: A Case Study of a Regional Demonstration Project
- Phil Beecher, Donny Helm, James Mater, Mark Ortiz, Clint Powell - Advancing Certification Testing: From Conformity to Interoperability to End-to-End
- William Cox, David Holmberg, Don Sturek - OASIS Collaborative Energy Standards, Facilities, and ZigBee Smart Energy

Architecture Track

- Jeff Gooding Greg Robinson, Steve Van Ausdall - A Smart Grid Reference Architecture Drives Information Management at SCE
- Joaquin Silva - Understanding Wireless Topologies for Smart Grid Applications
- Stan Pietrowicz, Tom Mazzone, Andrew Mayer – Smart Grid Operations and Control Center Design – Vision vs. Reality

Cross-Cutting Issues Track

- John Simmins, Brian Green , Michael K. Tao - A Utility Application Implementation Strategy Using the EPRI IntelliGrid(sm) Methodology and the GWAC Stack as a Model
- James Mater - The SGIMM and Integrated Product Development, Test and Certification
- Bruce Barnett & Andrew Crapo - A Semantic Model for Cyber Security
- Stan Pietrowicz, Tom Mazzone -The Growing Need for Cyber Security in Smart Grid Networks

- Nathan Johnson, Peter Lilienthal , Timothy Schoechle - Modeling distributed premises-based renewables integration using HOMER
- Mike Ahmadi -The Need For Security Testing and Conformance Standards In The Smart Grid
- Thomas Basso, Richard DeBlasio - IEEE Smart Grid Series of Standards IEEE 2030 (Interoperability) and IEEE 1547 (Interconnection) Status
- Charles Speicher Part 1: Flexibility Based on Policy Management
- Part 2: End-to-End Management and Security
- Part 3: A Close-up on Security Management

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