



NATIONAL ELECTRIC TRANSPORTATION INFRASTRUCTURE WORKING COUNCIL

**Electric Power Research Institute
3420 Hillview Avenue
Palo Alto, CA 94304**

**Wednesday, July 17, 2013
(Starr Auditorium)**

Day 1 – Agenda

11:00 am – 12:00 pm: Non-Road Electrification	
Topic	Speaker/Leader
11:00 – 11:30 SAE TMC EV Interface TF	John Halliwell / Charlie Groeller
11:30 – 12:00 Non-road Brainstorming	John Halliwell / Bob Hawkins
12:00 pm – 1:00 pm: Lunch	
1:00 pm – 5:00 pm: Plug-In Electric Vehicle Codes and Standards	
1:00 – 1:10 Welcome and Introductions	Mark Duvall / Frank Lambert
1:10 – 1:15 Review Minutes and Action Items	Jorge Emmanuel, EPRI
1:15 – 1:45 EVSE Metering – HB 130	Richard Lowenthal, ChargePoint
1:45 – 2:15 SPIDERS Microgrid V2G Charging Station Testing	Mike Simpson, NREL
2:15 – 2:45 “Grid on Wheels” - V2G PJM Demonstration	Tom Gage, EV Grid, Inc.
2:45 – 3:15 Future of Alternative Fuel Vehicles - GM	George Bellino, GM
Break 3:15 pm – 3:45 pm	
3:45 – 4:15 EVSE Interoperability	Andreas Pfeiffer, Hsubject
4:15 – 4:45 Open Standards-Based Charging Solutions	Brett Hauser, Greenlots
Adjourn	

Guest Wireless Internet

Guest account Username: palguest06
 Guest account Password: Guest0724
 Profile name: EPRIGuest

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Thursday, July 18, 2013
(Starr Auditorium)

Day 2 – Agenda

8:00 am – 8:30 am: Continental Breakfast	
8:30 am – 3:00 pm: Plug-In Electric Vehicle Codes and Standards/Infrastructure Technology	
12:00 pm – 1:00 pm: Lunch	
8:30 – 11:30 DC Fast Charging – Panel Session	Field Deployment Plans – Cedric Daniels, Southern Company
	Combo vs. CHAdEMO – Ron Thompson, Eaton
	Utility Business Case – Morgan Davis, EPRI
	International Standards – Serge Roy, IEC TC69
	Nissan Business Case – Brendan Jones, Nissan
Break 10:00 am – 10:30 am	
11:30 – 12:00 SEP 2.0 Executive Summary	Tobin Richardson, ZigBee Alliance
Lunch 12:00 pm – 1:00 pm	
1:00 – 1:15 IEC Updates	Greg Nieminski
1:15 – 2:00 SAE J1772 Updates	Gery Kissel, GM
2:00 – 2:30 SAE J2836/J2847/J2931 Update	Rich Scholer, Chrysler
2:30 – 2:45 SAE J2953 Update	Rich Scholer, Chrysler
2:45 – 3:00 Wrap-up, Items for Next Meeting	Frank Lambert
Adjourn	

Note!
Following pages are not in sequence.

MARCH 27-28, 2013— PEVWG: CODES AND STANDARDS/INFRASTRUCTURE TECHNOLOGY MEETING

AGENDA

Day One 10:30am-5:00pm: Plug-In Electric Vehicle Codes and Standards/Infrastructure Technology	
Topic	Speaker/Leader
8:30 – 10:00 Non Road Electrification Roadmap	CANCELLED
Break 10:00 – 10:30AM	
10:30 – 11:30 Future of Alternative Fuel Vehicles/ Ford's Technology Roadmap for Vehicle-to-X	Dave McCreddie/ Jeanette Clute, Ford
11:30 – 12:00 Grid Resiliency	Arindam Maitra / John Halliwell, EPRI/ Watson Collins, Northeast Utilities
Lunch 12:00pm-1:00pm	
1:00 – 1:10 Welcome and Introductions	Mark Duvall / Frank Lambert
1:10 – 1:20 Review Minutes and Action Items	Jorge Emmanuel, EPRI
1:20 – 1:45 NIST WG on EV Fueling	Marc Buttler, NIST
1:45 – 2:05 Collaboratev: Platform for EV Interoperability & Data Exchange	Colin Read, ECOtality
2:05 – 2:30 FedEx PEV Infrastructure	Keshav Sondhi, FedEx Express
2:30 – 3:00 Fleet PEV Infrastructure	Efrain Ornelas, PG&E
Break 3:00pm – 3:30pm	
3:30 – 4:00 V2G DEWG presentation	Krishnan Gowri, PNNL
4:00 – 4:30 PEV Charging Infrastructure Usage Patterns – 60M Miles	Jim Francfort, INL
Day Two 8:00am – 3:00pm: Plug-In Electric Vehicle Codes and Standards/Infrastructure Technology	
8:00 –9:30 Vehicle to Grid, Home, and Load – Panel Session	Watson Collins, NE Utilities
	Rich Scholer, Chrysler
	David Patterson, Mitsubishi
9:30 – 10:00 Duke – Toyota Smart Charging Pilot	Steve Hinkel, Duke Energy Akihisa Yokoyama , Toyota
Break 10:00 – 10:30am	
10:30 – 10:45 Utility Smart Charging Initiatives	John Halliwell, EPRI
10:45 – 10:55 Pricing Strategies to Manage Charging	John Halliwell, EPRI
10:55 – 11:25 EVSE Interoperability Testing – SMUD Pilot	Denver Hinds, SMUD
11:25 – 12:00 NEC 2014 Changes / SAE J1772 Updates	Gery Kissel, GM
Lunch 12:00 – 1:00pm	

Sandy. Mr. Collins showed cost comparisons of hardening options. Utility practices and measures for each component of resiliency (i.e., prevention, recovery and survivability) were presented and the EPRI grid resiliency initiative was explained. They listed issues that need to be understood when EVs are involved in these solutions. The Nissan 6.6 kW home appliance system was given as an example. During discussion, Mr. Collins explained that of the different options for grid hardening, the regulators decided on the least cost. Dan Mikat, Toyota, mentioned that their V2L city project demonstration is still at the halfway point. Cliff Fietzek, BMW, stated that they are not doing reverse energy work but are looking at secondary use of batteries. Serge Roy, CHAdeMo, suggested inviting Honda to present their V2H activities using a PEV connected to a smart home. Jordan Smith, SCE, raised concerns regarding untrained customers hacking into vehicles to obtain energy. Efrain Ornelas, PG&E, mentioned his work on redesigning a utility trouble truck for restoration after a disaster.

ACTION ITEM: Arindam Maitra will follow up with Honda on their Smart Home project using PEVs.

NIST WG on EV Fueling

Mark Buttler, NIST, gave a presentation on standards for EV fueling and submetering (see Attachments). His work focuses on the regulation of commercial measuring systems used to determine payment. Although there are no federal regulations and NIST is a non-regulatory agency, NIST has developed Handbooks 44 and 130, which are implemented at the State and local level. Handbook 130 on uniform laws and regulations is developed through the National Conference on Weights and Measures and available on the NIST website. Handbook 44 is on legal metrology requirements for devices. Responding to requests for regulating commercial EVSEs, NIST established the US National Work Group on Measuring Systems for Electric Vehicle Fueling and Submetering (USNWG EVF&S), which has 65 members. Their task is to develop NIST Handbook 130 Method of Sale Regulation for Electricity Vehicle Fuel. Mr. Buttler gave a status on the development of the handbook, uniform standards for measuring devices, and field testing procedures.

Collaboratev: Platform for EV Interoperability & Data Exchange

Colin Read, ECOtality, presented the objectives of Collaboratev, which seeks to make charging on any network seamless, reduce integration costs for service providers, and reduce costs of interoperability (see Attachments). ANSI identified standards gaps dealing with interoperability/roaming, locating and reserving stations, and offline access control. Mr. Read presented the NEMA standards road map with the goal of completing all the standards by the first quarter of 2014. During discussion, Mr. Read affirmed that RFID is their first priority. He noted that while some are utilizing credit cards, there are security issues and the credit card reader is a large cost driver. The NEMA standards are undergoing internal comments and will be disseminated afterwards. Questions can be sent through <http://www.collaboratev.com/contact.php>.

FedEx PEV Infrastructure

Keshav Sondhi, FedEx Express, discussed some of the infrastructure challenges and needs of FedEx.

Day Two

Vehicle to Grid, Home, and Load – Panel Session

Northeast Utilities

Watson Collins, Northeast Utilities, argued that V2X is cleaner and better than small engine generators and opens new business opportunities (see Attachments). During disasters, EVs could play significant roles in emergency shelters, communication sites, wastewater pumping stations, temporary medical clinics, etc. He showed a matrix and examples for different connection approaches for V2X with the inverter on or off the vehicle. In the case of vehicle to home or building with the inverter on the vehicle, a 50A NEMA to a permanently installed inlet connector or a J1772 connector to an EVSE with possibly an isolation transformer may be needed. The V2L with an inverter off-board could be connected directly to the load via extension cords or connected using the SAE Combo / CHAdeMO / J1772 (DC Level 1) to a portable outlet box. A V2H with inverter off-board could be part of an energy management system. The IWC should identify preferred approaches and standards gaps.

Chrysler

Rich Scholer, Chrysler, gave an overview of a DOE project and the role of Chrysler PHEVs.

Mitsubishi

David Patterson, Mitsubishi, discussed their V2X technology (see Attachments). I-MiEVs were used in the post-tsunami recovery effort in Japan. The MiEV power box connects to a CHAdeMO port to provide 100V AC, 1.5kW (maximum rating) to appliances. The Outlander PHEV can provide one day of power for general household use. The Keihanna Project, part of the Japan Smart Cities Project on grid resilience, uses 20kW solar and 3kW wind power connected to 5 rechargeable used EV batteries. Other projects demonstrate factory energy management systems. Among the issues are grounding, line noise, and switching, as well as on-board vs. off-board, portable vs. rack-mounted, and capacity.

Vehicle to Grid, Home, and Load – Discussion

Discussions centered on the compatibility of connectors, the use of auto transformers instead of isolation transformers, and demand charges. Ray Strods, Siemens, noted that many solutions have already been developed in earlier work related to solar generation. Mr. Collins stated that utilities do not view V2H or V2L as competing with electrical utilities, but rather as providing customer resiliency during storms. The value proposition for utilities is strong storm performance and helping customers survive disasters. Another advantage of PEVs is that the infrastructure to provide backup energy has to be done by qualified electricians and is therefore safer than an emergency generator. Moreover, using an automotive connector that has gone through compliance testing and provides protection from backfeed adds another measure of safety. Arindam Maitra, EPRI, added that a long term benefit is voltage regulation, but a different mode of inverter would be needed.

Duke – Toyota Smart Charging Pilot

Steve Hinkel, Duke Energy, presented a collaborative project with other partners to test SAE J2931 at a lab and in the field. Duke energy is using three function sets of the SE2 protocol

groups of 60 customers each and their charging and tariff rates. They are testing interoperability from the EV to the DRMS. He explained the two phases of EVSE unit testing, end-to-end system testing, and interoperability test procedures. Of the nine EVs tested, six passed their interoperability tests, and three failed. The impact of incompatibility with J1772™ includes reduced demand response and disgruntled EV and utility customers. During discussion, Mr. Hinds explained that the study groups can opt-in to the study and are notified via email, text or call the day before a conservation event.

NEC 2014 Changes / SAE J1772 Updates

Gery Kissel, GM, gave an update on J1772™ and J2894 (see Attachments). The J1772™ document was reopened in January 2013 to allow harmonization with IEC 61851-x and 62196-x. The estimated publication for Version 6 is end of 2013 or early 2014. SAE J2894-1 on power quality requirements was completed in December 2011. J2894-2 on test procedures has been delayed, but the publication date for Version 1 is estimated to be the third quarter of 2013. Mr Kissel also gave an update on the changes to NEC Article 625, noting that his summary is only for guidance and may not contain the final text of the publication (see Attachments). Changes were made to the layout, scope, definitions, voltages, polarization, grounding pole, rating, cords and cables, personnel protection systems, and other provisions.

Plug-in Cord Connected EVSE Incident

Jordan Smith, SCE, described the failure of a 240V receptacle. The incident involved a failure of a plug-in receptacle installed on a cement brick wall exposed to the weather. From their investigations they found one of the sleeves was loose, causing micro arcing in the sleeve and subsequent degradation of the plastic insulation due to heating. The pin of the plug had missing material. SCE's EV technical center then conducted an immediate inspection of all receptacles and plugs and replaced all receptacles. They also instituted a regular inspection program with replacements at the life cycle limit. His recommendations include requiring a rugged and long lived plug/receptacle pair, a means to prevent an unintentional disconnect, and discouragement of mobile EVSE. During discussion, Mr. Smith explained that the assembly was outdoor rated and involved insertion and removal of the plug only a few times a month. During inspection, they found five receptacles that were not in good shape. They measured the insertion/removal forces as well as the spade dimensions.

SAE J2894 Update

Richard Hodson, SCE, gave an update on the J2894-2, Power Quality Test Procedures for PEV Chargers (see Attachments), described the test system boundaries, and the procedures for power quality parameters and grid events such as voltage swells, surges, and sags. The voltage distortion procedure is being finalized and the voltage surge test references IEC 61000-4-5. He also explained the procedure for energy efficiency tests based on standardized battery capacity test discharges. Recommendations for energy efficiency parameters will be based on test results. He explained that they did not use a "standardized" EVSE since test results are specific to the whole system of which the EVSE is a part. During discussion, Jordan Smith explained that they felt the best place to address energy efficiency of the PEV system was under SAE J2894 even though energy efficiency depends on the battery. A

SAE J2836/J2847/J2931 Update

Rich Scholer, Chrysler, reviewed the open and active documents and summarized the SAE communications standards and document interactions (see Attachments). He then listed all the use case documents as Technical Information Reports (TIR), signals/messages documents as Recommended Practice (RP), requirements and protocol documents as TIRs, and interoperability documents as RPs. He noted that TIRs can later be upgraded to RPs. During discussion, differences between compliance vs. compatibility vs. interoperability were noted.

Wrap-up, Items for Next Meeting

Mr. Lambert requested participants to inform him, John Halliwell or Arindam Maitra of any topics that they would like the IWC to discuss in upcoming meetings. He again thanked Kathy Knoop and SRP for hosting the meeting.

Announcements

The Plug-In 2013 Conference & Exposition takes place on September 30 – October 3, 2013 with a public day on September 29. The event takes place in San Diego, CA and more information is found at www.plugin2013.com

Next Meetings

The next meetings of the IWC are scheduled for:

- *July 16-17, location to be determined*
- *December 3-4, location to be determined*

Summary of Action Items

	ACTION ITEM
New action items	
Arindam Maitra	will follow up with Honda on their SmartHome project using PEVs
Frank Lambert	will arrange a presentation by Jim Francfort on generic data from DOE's wireless charging tests after the data has been analyzed

Adjournment

With no further business, the meeting was adjourned.

Last Name	First Name	Company
Humes	Tracee	Eaton Corporation
Huston (via web)	Dennis	SMUD
Hsu (via web)	Steve	ABB Taiwan
Hwang	Tobin	Commonwealth Edison
Ivanic (via web)	Ziga	Energetics
Johnson	Travis	NV Energy
Kirby	Eddie	CPS Energy
Kissel	Gery	General Motors Company
Knoop	Kathy	Salt River Project
LaGrow	Joe	Intertek Testing Services
Lambert	Frank	Georgia Tech/NEETRAC
Leary	Kevin	PowerHydrant
MacCurdy (via web)	Dwight	Sacramento Municipal Util. Dist.
Maitra (via web)	Arindam	Electric Power Research Institute (EPRI)
Malotte	Chris	APS
Manley	Mark	Public Service Electric & Gas Co.
Mannon	Tanya	Salt River Project
Markel (via web)	Tony	NREL
Markowitz	John	New York Power Authority
McCreadie	David	Ford Motor
McDonald (via web)	Joshua	SCE
McLaughlin (via web)	James	Volvo Trucks North America
Menig	Jeffrey	General Motors Company
Morrow	Kevin	Ravin Energy
Muller	Mike	SPX Service Solutions
Narita	Yusuke	Mitsubishi Motors R&D of America
Nieminski	Greg	Gregory C Nieminski, LLC
Ornelas	Efrain	Pacific Gas & Electric Co.
Owen	David	CenterPoint Energy Houston Electric, LLC
Patterson	David	Mitsubishi Motors R&D
Pointon	Joel	San Diego Gas & Electric Co.
Rodine	Craig	Greenlots
Read	Colin	ECOtality
Roy (via web)	Bryan	Energetics
Roy (via web)	Serge	CHAdEMo Association
Scholer	Rich	Chrysler Group, LLC
Shah (via web)	Vishant	VRS Work
Shimizu	Takayuki	Toyota InfoTechnology Center
Simpson (via web)	Mike	NREL
Smith	Jordan	Southern California Edison Co.
Sondhi	Keshav	FedEx
Strods	Ray	Siemens Industry, Inc.

Update from Greg Nieminski

National Electric Code 2014

CMP12 and its Task Group on EVs and Articles 625 and 626 met on November 27-30, 2012. Several significant proposals, including changes and the reorganization of Article 625, were discussed. These proposals were voted on by CMP 12 members. The results can be found in the National Electrical Code Committee Report on Comments (ROC), issued in March, 2013. They can also be viewed and downloaded from NFPA's website:

<http://www.nfpa.org/categoryList.asp?categoryID=124&URL=Codes%20&%20Standards>

Final actions on the proposals (ROP) and comments (ROC) will take place during the NFPA, Annual Association Technical Meeting to be held on June 10-13, 2013, in Chicago, Ill.

UL, IEC and related Electric Vehicle Standards

1. Work has been completed to transform UL's EV related Standards into Bi-national (US and Canada) or Tri-national (US, Canada and Mexico) Standards, containing common requirements for EV related products, identified as **UL/CSA/ANCE Standards**.

These standards are co-published by UL, the Association of the Electrical Sector (ANCE), and the Canadian Standards Association (CSA). These standards reflect the requirements of the US, Canada, and Mexico.

The Canadian Standards Association, which operates under the name CSA International (CSA), provides certification services for manufacturers who, under license from CSA, wish to use the appropriate registered CSA Marks on certain products of their manufacture to indicate conformity with CSA Standards. ANCE is a National Organization for Standardization (ONN) registered by the DGN (Dirección General de Normas) in the electrical sector and household appliances which develops Mexican Standards (NMX) and collaborates in the development of the Mexican Official Standards (NOM), voluntary and mandatory standards, respectively.

This includes:

Std. No.	Name	Issue Date
2231-1	Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: General Requirements	September 7, 2012
2231-2	Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: Particular Requirements for Protection Devices for Use in Charging Systems	September 7, 2012
2251	Standard for Plugs, Receptacles, and Couplers for Electric Vehicles	February 22, 2013
2594	Standard for Electric Vehicle Supply Equipment	February 22, 2013

2. There have been no changes to the work of the IEC Committees since last reported last November except for one item described below. Several documents with IEC SC23H and

TC69 were distributed for comment and vote. The responses are being collected and will be discussed at meetings later in April and May, 2013.

3. One New project to be handled by TC69 covers Light Electric Vehicles (LEV), including electric motorcycles, motor scooters, bicycles, mopeds, etc.:

(Future IEC 61851-3-1/-2/-3/-4): Electric Vehicles conductive power supply system –

- Part 3-1: General Requirements for Light Electric Vehicles (LEV) AC and DC conductive power supply systems
- Part 3-2: Requirements for Light Electric Vehicles (LEV) DC off-board conductive power supply systems,
- Part 3-3: Requirements for Light Electric Vehicles (LEV) battery swap systems
- Part 3-4: Requirements for Light Electric Vehicles (LEV) communication

A similar project team will be established for connection devices (connectors and inlets) for these applications.

Anyone interested in participating in this work should contact Greg Nieminski (silvergregn@verizon.net).

Last Name	First Name	Company
Thompson	Ron	Eaton Corporation
Turik	Scott	BMW of North America, LLC
Urabe	Hayato	Sumitomo Electric
Vogt	James	Leviton Manufacturing Co., Inc.
Yokoyama	Akihisa	Toyota InfoTechnology Center

ATTACHMENTS
IWC Attendance List

Last Name	First Name	Company
Anthony	Tom	Oncor Electric Delivery Co.
Beauregard	Garrett	Ecotality North America
Bellino	George	General Motors Company
Berezin	Slav	GM Global Technology Engineering
Bohn (via web)	Ted	ANL
Bourton	Mike	Grid2Home, Inc.
Brooks	Alec	AeroVironment, Inc.
Brown	Kenneth	Leviton Manufacturing Co., Inc.
Burke	Bill	National Fire Protection Association
Buttler (via web)	Marc	NIST
Clute	Jeanette	Ford
Colgan	Robert	National Electrical Contractors Assoc.
Collins	Watson	Northeast Utilities
Coop (via web)	Mike	Think Smart Grid
Cordova	Juan	Salt River Project
Coutinho Santos	Mario	EFACEC
Cunningham	Timothy	Intertek
Daniels	Cedric	Alabama Power Co.
Davis	Stephen	KnGrid
Duval	Vincent-Michel	Hydro-Quebec
Duvall	Mark	Electric Power Research Institute (EPRI)
Dwyer (via web)	Michael	Energetics
Echols	Ben	Georgia Power Co.
Ellis	James	Nissan North America
Emmanuel	Jorge	E&ER Group
Engle (via web)	John	Center Point
Farley	Blair	Southern Co.
Fietzek	Cliff	BMW of North America, LLC
Francfort	Jim	Idaho National Labs
Frye	Andrew	Tennessee Valley Authority (TVA)
Garcia (via web)	Josephine	EPRI
Gowri (via web)	Krishnan	Pacific Northwest National Lab
Griffin	Gregg	Tennessee Valley Authority (TVA)
Halliwell	John	Electric Power Research Institute (EPRI)
Hanks	Chris	Salt River Project
Hinds (via web)	Denver	Sacramento Municipal Utility District
Hinkel	Steve	Duke Energy
Hodson	Richard	Southern California Edison Co.

suggestion was made to change the name of the standard to reflect that the tests pertain to the system as a whole and not just the charger.

NEC / IEC Updates

Greg Nieminski, EPRI consultant, said that the results of the NEC Report on Comments, issued in March 2013, can be viewed and downloaded from the NFPA website shown below: <http://www.nfpa.org/categoryList.asp?categoryID=124&URL=Codes%20&%20Standards> Final actions will take place during the NFPA meeting in Chicago this June. Mr. Nieminski reported that work has been completed to transform UL's EV standards into tri-national (US, Canada, Mexico) standards containing common requirements identified as UL/CSA/ANCE Standards. Nieminski also reported on a new project under IEC TC69 for Light Electric Vehicles (LEV) including electric motorcycles, scooters, etc. They will be covered under a future IEC 61851-3 with subparts dealing with general requirements, off-board conductive power supply systems, battery swap systems, and communications. A similar project team will be established for connectors and inlets for these applications. Anyone interested should contact Mr. Nieminski (see Attachment at the end of the minutes).

Notification and Multi-Unit Dwelling Vehicle Charging

Joel Pointon, SDG&E, compared PEV charging loads with those for household appliances, described SDG&E's EV TOU rates, and listed the different phases of notification (see Attachments). They get fewer notifications from EV buyers. Notifications from permitting depend on the communities and notifications from rebate information require CARB and owner permissions. They are able to get information from the DMV after they notify the owners, but OEMs need to let them know how to read the VIN information to determine if the vehicle is a plug-in. They may also be able to detect EV loads through algorithms using AMI. Mr. Pointon discussed a multi-unit dwelling case study of a midrise luxury condominium community. The property managers and residents wanted a billing arrangement that allowed residents to pay for energy usage directly. However, parking spaces were far from the residents' individual meters and the common area meters were on commercial rates and subject to demand and TOU impacts. Mr. Pointon described the technical challenges and compromise solution. A process of consensus building allowed residents to have a choice and resulted in a solution that is scalable over time. Mr. Pointon co-chairs the California PEVC Multi-Unit Dwelling Workgroup.

SAE J2953 Update

Ted Bohn, ANL, presented the status of ANL activities related to SAE J2953 PEV-EVSE Interoperability (see Attachments). Fifty authors are involved in the work. The goal is to have J2953-1 requirements ready for comments in 30 days, J2953-2 on procedures ready by the end of summer, and J2953-1 v2 on DC communications started at the end of summer. The three tiers of interoperability involve normal, non-normal, and optional test cases. He discussed interoperability benchmarking, validation of testing standards, and DC charging communication interoperability, as well as an AC/DC charging communication controller and a wireless charging fixture developed by ANL. During discussion, Mark Duvall, EPRI, suggested that public charging stations with wireless connections should also include a J1772 connector to insure that everyone can charge. Mr. Bohn offered to present on safety and human exposure issues in the future.

stack: time, pricing, and demand response functions. They use a simulated whole-house tariff to observe consumer behavior. Among the early lessons is initial confusion regarding SE2 terminology and other issues. Duke Energy is now discussing with other parties to expand functionality. Akihisa Yokoyama, Toyota, summarized the main features of the field testing in Indiana using a cloud-assisted system for analyzing and controlling the optimized charge settings (see Attachments). He described the data flow and communication architecture between the utility, internet, and vehicle. All the customer has to do is connect the charging cable to the PEV and optimal charging is set automatically. Notification pops up in the customer's iPad. He gave examples of five charging cases. The tests currently involve five Duke Energy employees for the first half of 2013 followed by five regular customers. During discussion, Mr. Hinkel stated that the test participants are given the EV, EVSE, and iPad. He explained that some of the confusion had to do with the complicated whole-house rate and 21 different riders in the tariff. With regards to the communications options, HomePlug Green PHY was selected since they want to use existing technologies.

Utility Smart Charging Initiatives

John Halliwell, EPRI, reported on the results of an online survey on smart charging initiatives among utilities (see Attachments). He highlighted the smart charging projects of Arizona Public Service, FirstEnergy, Northeast Utilities, New York Power Authority, and Southern Company. They include a project integrating PV, ZnBr flow battery, and EV chargers; PEV smart charging with a Chevy Volt; a smart charging interface to the grid using light and medium duty PHEVs; evaluation of smart grid analysis tools; cost and implementation issues associated with EV specific TOU rates; public charging EVSE with the ability to respond to peak load management signals; and a residential load-flattening project using off peak rates for customers with registered EVs.

Pricing Strategies to Manage Charging

John Halliwell, EPRI, along with Watson Collins, NU, and Dwight MacCurdy, SMUD, collaborated on the presentation (see Attachments), which was the result of a discussion at the last ISC meeting on the value proposition for managed charging. They presented various value proposition scenarios and cost benefit assessments for the utility, the consumer, and the OEM. They are asking for input. Given the diversity of utility structures, climates, and regulatory regimes, can utilities be categorized in a systematic way to narrow the value proposition options? How does consumer value vary across utilities? Is the OEM value proposition consistent across utilities? They are looking for utilities to present their perspectives. During discussion, it was suggested that the value proposition to EVSE manufacturers should also be considered.

EVSE Interoperability Testing – SMUD Pilot

Denver Hinds, SMUD, presented on SMUD's EV Innovator pilot program testing, which is part of the DOE Smart Grid Investment Grant (see Attachments). The SmartSacramento grant is divided into 7 domains, the largest of which is AMI/smart meters. Smart Charging is under the Customer & Partnerships domain. The EV Innovator project seeks to conduct a pilot program with up to 180 residential PEV participants, conduct market research on PEV driver attitudes, test interoperability of EVSE with the Demand Response Management System (DRMS), and measure EVSE electricity use. Mr. Hinds described the three study

Fleet PEV Infrastructure

Efrain Ornelas, PG&E, presented the challenges and lessons learned from their fleet vehicle charging systems (see Attachments). Mr. Ornelas gave an overview of the project, the steps for planning, evaluation criteria, and siting decisions. He also showed photos of the new heavy duty materials handler trucks with Electric Worksite Idle Management Systems (eWIMS). Among the key lessons were that costs were always higher than anticipated, the availability of fleet-style EVSE and charging pedestal products is an issue, local planning and permitting agencies are often unaware of codes and standards, parking lot politics can be a hindrance, and no one solution fits for fleet charging systems. Planning is a key to success.

V2G DEWG presentation

Krishnan Gowri, PNNL, presented the history, value proposition, and technical activities of the Smart Grid Interoperability Panel (SGIP), which created various Domain Expert Working Groups (DEWG) including Vehicle-to-Grid (see Attachments). He described the scope, vision, mission, subgroups, and current activities of the V2G DEWG. There is a new Priority Action Plan proposal on submetering for mobile and stationary applications. There are biweekly DEWG meetings, quarterly SGIP e-meetings, and an annual conference. Anyone interested can sign up at the NIST TWiki website.

PEV Charging Infrastructure Usage Patterns – 60M Miles

Jim Francfort, INL, described DOE's Advanced Vehicle Testing Activity with ECotality as the project lead, and INL's data collection methods (see Attachments). He presented the EV Project results to date. The EV Project has 44 databases, algorithms generating 56,000 data parameters, and a complicated blend of multiple data streams. Mr. Francfort presented charts showing, among others, vehicle miles, EVSE usage, charge energy, and other national data. He also showed trends relating to average miles per day and miles per charge, residential EVSE Level 2 use, public Level 2 EVSE use, and fee structures. Average residential installation costs \$1,375. For commercial charging, ADA, permit fees, and demand charges significantly drive costs. Mr. Francfort summarized results to date of the ChargePoint America ARRA Project. He discussed infrastructure testing of conductive charging and wireless charging. The results so far showed that EV Project vehicles were connected longer than needed to recharge, customers are price sensitive to TOU rates, and DC fast charging has significant demand impacts. During discussion, some members noted the sudden increase in charging at midnight and encouraged OEMs to incorporate optimized charging schedules. Mark Duvall, EPRI, noted that departure-based charging could still result in a high peak. Others suggested incentivizing customers to charge after midnight or service providers staggering their charging times. This is not just a peak shifting issue, but could also be an issue affecting local transformers.

ACTION ITEM: Frank Lambert will arrange a presentation by Jim Francfort on generic data from DOE's wireless charging tests after the data has been analyzed.

1:00 – 1:20 Plug-in Cord Connected EVSE Incident	Jordan Smith, SCE
1:20 – 1:40 SAE J2894 Update	Richard Hodson, SCE
1: 40 – 2:00 NEC / IEC Updates	Greg Nieminski
2:00 – 2:20 Notification and Multi Unit Dwelling Vehicle Charging	Joel Pointon
2:20 – 2:40 SAE J2953 Update	Ted Bohn, ANL
2:40 – 3:00 SAE J2836/J2847/J2931 Update	Rich Scholer, Chrysler
3:00 – 3:05 Wrap-up, Items for Next Meeting	Frank Lambert
Adjourn	

PERA Club
Tempe, AZ

Plug-In Electric Vehicle Codes and Standards/Infrastructure Technology Meeting Minutes (#13-1)

DAY 1: March 27, 2013
Tempe, AZ

Welcome and Introductions

Mark Duvall, EPRI, welcomed the attendees. The meeting was chaired by Frank Lambert. John Halliwell, EPRI, thanked Kathy Knoop and Salt River Project for hosting the meeting.

Review and Approval of Past Minutes and Action Items

The group approved the minutes (#12-03) of the previous meeting (November 14, 2012) in Palo Alto, CA. There were no Action Items from the previous meeting.

Future of Alternative Fuel Vehicles/Ford's Technology Roadmap for Vehicle-to-X

Dave McCreadie, Ford, presented his company's perspective on the trends in "Energi" including their long term vision for CO₂ reduction (see Attachments). He summarized Ford's EV portfolio, the cost of charging, and infrastructure development. As cities and regions develop, the key to success is product flexibility. He and Jeanette Clute showed Ford's Vehicle-to-X roadmap, which included TOU rates to set vehicle charging times, incorporation of renewable energy, workplace charging, ancillary services, subtractive billing, V2H, and V2G. Ford worked with Georgia Tech on the MyEnergi Lifestyle project to demonstrate smarter energy use in a home with an EV, solar panels, and other devices. The model showed 60% reduction in energy costs and 8,000 kg CO₂ saved from a single home. During discussion, Mr. McCreadie explained that the baseline home was 1,800 sq. ft. for a family of four with two gasoline vehicles driving 37 miles a day each. The use of photovoltaics had a significant positive impact. Joel Pointon, SDG&E, suggested a phased start time for charging based on the state of charge and when the vehicle is needed in order to prevent all EVs starting to charge at the same time.

Grid Resiliency

Arindam Maitra, EPRI, and Watson Collins, Northeast Utilities, discussed grid and customer resiliency initiatives (see Attachments). Super storms and natural disasters create the need for a resilient grid and customer survivability. They described the experiences during Hurricane