

P1547.7 Ad hoc Working Group Meeting Minutes
IEEE P1547.7 Draft Guide to Conducting Distribution Impact Studies
for Distributed Resource Interconnection
January 27-28, 2009, Las Vegas, NV

The meeting of the P1547.7 ad hoc working group (WG) was called to order by Robert (Bob) Saint, chair P1547.7 (**Attachment 1 - Attendees**). The agenda and IEEE SA Bylaws on Patents in Standards and other guidelines were reviewed and discussed (**Attachment 2 – P1547.7 Agenda and Meeting Introductory Information**). The status of 1547 series projects was discussed.

Bob Saint reported on the PES DR Integration Working Group meeting held on January 12, 2009 in Atlanta, GA (**Attachment 2**). Bob reported that PES group wants to be involved in the preparation of P1547.7 by reviewing drafts during their 2-hour meeting, which is held twice a year with the other Distribution Subcommittee working groups, and providing their feedback to the P1547.7 WG. Bob also reported the PES DR Integration Working Group also wants the PES T&D Committee to be considered as a secondary sponsor of the P1547.7 PAR. Bob stated he will discuss these wants with the SCC21 Committee.

The PAR for IEEE Std P1547.7 *Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection* was discussed. The attendees were leaning toward P1547.7 being a recommended practice, and also suggested changes to the PAR purpose (**Attachment 3 – P1547.7 Proposed Outline**). And, attendees discussed and established a first draft of the P1547.7 document proposed outline (**Attachment 3**).

Writing assignments were recorded as shown in the proposed outline (**Attachment 3**). These inputs are due by May 1, 2009 via email to both Robert.Saint@nreca.coop and Thomas.Basso@nrel.gov. The inputs will be entered into the proposed outline with the target date of May 15, 2009 to be posted on the SCC21 P1547.7 WG password protected Web page “Special Topics.” Everyone is welcomed to make contributions. You can either coordinate with the volunteer stated under a particular outline topic or you can submit inputs to both Robert Saint and Thomas Basso.

We are soliciting background information such as regulator and utility procedures, papers, and other documents relative to this guide. This information will be included in a resource list on the P1547.7 password protected Web page “Special Topics.” Send your inputs via email to both Robert.Saint@nreca.coop and Thomas.Basso@nrel.gov.

{P1547.7 secretary post-meeting note: contributors are responsible for providing copyright release as applicable, and full citation when submitting documents, references, or Web links.}

The P1547.7 Web site and email Listserv will be set up soon. Everyone who attended this ad hoc meeting, members of the PES DR Interconnection Working Group, and others who have replied to the P1547.7 officers will be included in the Listserv. When the Listserv is set up, an email will be sent to all subscribers and will provide instructions on how to use the Listserv, a

list of commonly used subscriber commands, and a username and password for access to the “P1547.7 Work Group” Web page of the SCC21 Web site. That Web page will also provide you access to the messages sent to the Listserv.

After lunch on January 28, the SCC21 chair, Dick DeBlasio gave a presentation to the combined participants of the P1547.6 and the ad hoc P1547.7 group (**Attachment 4 – Status of {IEEE} Standards for the Smart Grid**). Dick introduced the draft project authorization request (PAR) P2030 and answered some general questions.

The next meeting for P1547.7, along with the P1547.4 and P1547.6 working groups is currently being scheduled for the week of June 8 in a location yet to be determined. And the following meeting is tentatively scheduled for the week of October 5 in Atlanta, GA, and will be hosted by Georgia Power Company.

{P1547.7 secretary post-meeting note: for the June meeting, the Boston MA location discussed at the P1547.7 ad hoc meeting, is no longer being considered. The tentative schedule is P1547.6 on June 9-10; P1547.7 on June 10-11; P1547.4 on June 11-12}

Respectfully submitted,

Bob Saint, P1547.7 chair, and Tom Basso, P1547.7 secretary

Attachment 1 – Attendees

Attachment 2 – P1547.7 Agenda and Meeting Introductory Information

Attachment 3 – P1547.7 Proposed Outline

Attachment 4 -- Status of {IEEE} Standards for the Smart Grid


ATTACHMENT 1 – Attendees
P1547.7 Ad Hoc Working Group Meeting, January 27-28, 2009, Las Vegas, NV

Name	Company
Chad Abbey	Natural Resources Canada
Bob Arritt	EPRI
David Bassett	PPL Electric Utilities
Tom Basso	NREL
David Beach	Portland General Electric
David Bosack	Northeast Utilities System Co.
Kenneth Brunkehoefer	Oncor Electric Delivery
Paul Collins	Pepco
Michael Doyle	Oncor Electric Delivery
Jeffrey Duff	Duke Energy
George Muskos	NSTAR Electric
John Gajda	Progress Energy
Tom Gordon	Siemens Power Geeneration
Jack Haggemiller	Southern California Edison
Benj Hoffner	Exponential Engineering Co.
Gerald Johnson	Basler Electric
Ben Kroposki	NREL
Daniel Sammon	Consolidated Edison Co. of NY
Scott Malinowski	UTC Power
C. M. Miller	American Electric Power
Janos Rajda	Satcon Technology Corporation
Charles Rogers	Consumers Energy
Robert Saint	NRECA
Roger Salas	Southern California Edison
Paul Mattes	Nisource Energy Technologies
Colin Schauder	Satcon Technology Corporation
Mark Smith	American Electric Power
Sanjeev Srivastava	Florida State University
Wayne Stec	Distregen LLC
Sylvester Toe	Georgia Power
Mohammad Vaziri	Pacific Gas and Electric
Vladimir Vujicic	BC Hydro
Charlie Williams	S&C Electric Company

**ATTACHMENT 2 – Agenda and Meeting Introductory Information
P1547.7 Ad Hoc Working Group Meeting, January 27-28, 2009, Las Vegas, NV**

Slide 1


**P1547.7 (System Planning Studies)
Working Group
January 27-28, 2009
Las Vegas**



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Agenda


- Call to Order/Review Agenda
- Review IEEE SA Bylaws on Patents in Standards
- Introduction of Attendees
- Review Status of 1547 Series Working Groups
- Review PAR for IEEE Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection
- Report on PES DR Integration WG Meeting
- Review proposed outline of Guide
- Make assignments for first draft of document



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Highlights of the *IEEE-SA Standards Board*
Bylaws on Patents in Standards

- **Participants have a duty to tell the IEEE if they know (based on personal awareness) of potentially Essential Patent Claims they or their employer own**
- **Participants are encouraged to tell the IEEE if they know of potentially Essential Patent Claims owned by others**
 - This encouragement is particularly strong as the third party may not be a participant in the standards process
- **Working Group required to request assurance**
- **Early assurance is encouraged**
- **Terms of assurance shall be either:**
 - Reasonable and nondiscriminatory, with or without monetary compensation; or,
 - A statement of non-assertion of patent rights
- **Assurances**
 - Shall be provided on the IEEE-SA Standards Board approved LOA form
 - May optionally include not-to-exceed rates, terms, and conditions
 - Shall not be circumvented through sale or transfer of patents
 - Shall be brought to the attention of any future assignees or transferees
 - Shall apply to Affiliates unless explicitly excluded
 - Are irrevocable once submitted and accepted
 - Shall be supplemented if Submitter becomes aware of other potential Essential Patent Claims
- **A "Blanket Letter of Assurance" may be provided at the option of the patent holder**
- **A patent holder has no duty to perform a patent search**
- **Full policy available at <http://standards.ieee.org/guides/bylaws/sect6-7.html#6>**



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IEEE-SA Standards Board Bylaws on Patents in Standards


6.2 Policy

IEEE standards may be drafted in terms that include the use of Essential Patent Claims. If the IEEE receives notice that a [Proposed] IEEE Standard may require the use of a potential Essential Patent Claim, the IEEE shall request licensing assurance, on the IEEE Standards Board approved Letter of Assurance form, from the patent holder or patent applicant. The IEEE shall request this assurance without coercion.

The Submitter of the Letter of Assurance may, after Reasonable and Good Faith Inquiry, indicate it is not aware of any Patent Claims that the Submitter may own, control, or have the ability to license that might be or become Essential Patent Claims. If the patent holder or patent applicant provides an assurance, it should do so as soon as reasonably feasible in the standards development process. This assurance shall be provided prior to the Standards Board's approval of the standard. This assurance shall be provided prior to a reaffirmation if the IEEE receives notice of a potential Essential Patent Claim after the standard's approval or a prior reaffirmation. An asserted potential Essential Patent Claim for which an assurance cannot be obtained (e.g., a Letter of Assurance is not provided or the Letter of Assurance indicates that assurance is not being provided) shall be referred to the Patent Committee.

A Letter of Assurance shall be either:

- a) A general disclaimer to the effect that the Submitter without conditions will not enforce any present or future Essential Patent Claims against any person or entity making, using, selling, offering to sell, importing, distributing, or implementing a compliant implementation of the standard; or
- b) A statement that a license for a compliant implementation of the standard will be made available to an unrestricted number of applicants on a worldwide basis without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination. At its sole option, the Submitter may provide with its assurance any of the following:
 - (i) a not-to-exceed license fee or rate commitment, (ii) a sample license agreement, or (iii) one or more material licensing terms.



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IEEE-SA Standards Board Bylaws on Patents in Standards


Copies of an Accepted LOA may be provided to the working group, but shall not be discussed, at any standards working group meeting.

The Submitter and all Affiliates (other than those Affiliates excluded in a Letter of Assurance) shall not assign or otherwise transfer any rights in any Essential Patent Claims that are the subject of such Letter of Assurance that they hold, control, or have the ability to license with the intent of circumventing or negating any of the representations and commitments made in such Letter of Assurance.

The Submitter of a Letter of Assurance shall agree (a) to provide notice of a Letter of Assurance either through a Statement of Encumbrance or by binding any assignee or transferee to the terms of such Letter of Assurance; and (b) to require its assignee or transferee to (i) agree to similarly provide such notice and (ii) to bind its assignees or transferees to agree to provide such notice as described in (a) and (b).

This assurance shall apply to the Submitter and its Affiliates except those Affiliates the Submitter specifically excludes on the relevant Letter of Assurance.

If, after providing a Letter of Assurance to the IEEE, the Submitter becomes aware of additional Patent Claim(s) not already covered by an existing Letter of Assurance that are owned, controlled, or licensable by the Submitter that may be or become Essential Patent Claim(s) for the same IEEE Standard but are not the subject of an existing Letter of Assurance, then such Submitter shall submit a Letter of Assurance stating its position regarding enforcement or licensing of such Patent Claims. For the purposes of this commitment, the Submitter is deemed to be aware if any of the following individuals who are from, employed by, or otherwise represent the Submitter have personal knowledge of additional potential Essential Patent Claims, owned or controlled by the Submitter, related to a [Proposed] IEEE Standard and not already the subject of a previously submitted Letter of Assurance: (a) past or present participants in the development of the [Proposed] IEEE Standard, or (b) the individual executing the previously submitted Letter of Assurance.



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IEEE-SA Standards Board Bylaws on Patents in Standards

The assurance is irrevocable once submitted and accepted and shall apply, at a minimum, from the date of the standard's approval to the date of the standard's withdrawal.

The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of those Patent Claims, or for determining whether any licensing terms or conditions are reasonable or non-discriminatory.

Nothing in this policy shall be interpreted as giving rise to a duty to conduct a patent search. No license is implied by the submission of a Letter of Assurance.

In order for IEEE's patent policy to function efficiently, individuals participating in the standards development process: (a) shall inform the IEEE (or cause the IEEE to be informed) of the holder of any potential Essential Patent Claims of which they are personally aware and that are not already the subject of an existing Letter of Assurance, owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents; and (b) should inform the IEEE (or cause the IEEE to be informed) of any other holders of such potential Essential Patent Claims that are not already the subject of an existing Letter of Assurance.



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Other Guidelines for IEEE WG Meetings

- All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.
- Do sign the attendance list - be sure to include your affiliation and employer.
- Don't discuss the interpretation, validity, or essentiality of patents/patent claims.
- Don't discuss specific license rates, terms, or conditions.
 - Relative costs, including licensing costs of essential patent claims, of different technical approaches may be discussed in standards development meetings.
 - Technical considerations remain primary focus
- Don't discuss fixing product prices, allocation of customers, or dividing sales markets.
- Don't discuss the status or substance of ongoing or threatened litigation.
- Don't be silent if inappropriate topics are discussed... do formally object.

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at patcom@ieee.org or visit <http://standards.ieee.org/board/pat/index.html>

See *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and "Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association's Antitrust and Competition Policy" for more details.

This slide set is available at <http://standards.ieee.org/board/pat/pat-slideset.ppt>




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Introduction of Attendees

Working group Officers

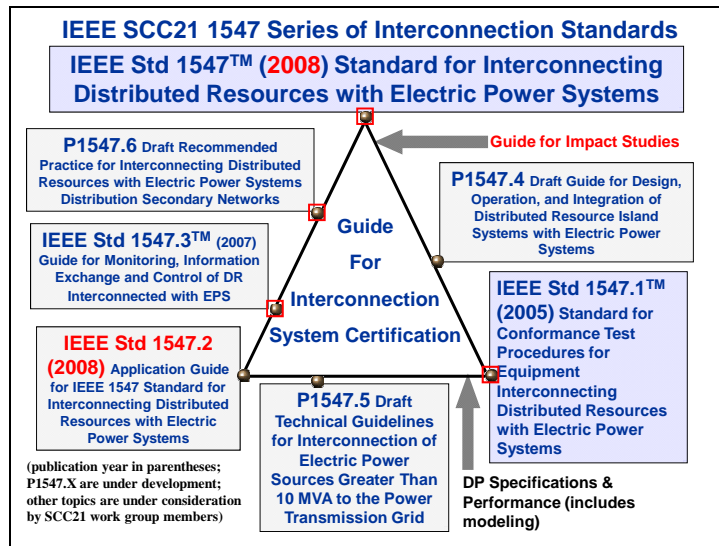
Chairman
Bob Saint
Robert.saint@nreca.coop

Secretary
Tom Basso
Thomas.Basso@nrel.gov



Status of SCC21 (1547) Working Groups

- This Meeting – January 27-30 – Las Vegas
 - P1547.6 (Networks) – Tuesday – Wednesday
 - P1547.4 (Intentional Islands) – Thursday – Friday
 - P1547.7 (Impact Studies) – Tuesday - Wednesday
- <http://grouper.ieee.org/groups/scc21/>



“Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection”

Scope

- This guide describes criteria, scope, and extent for engineering studies of the impact on area electric power systems of a distributed resource or aggregate distributed resource interconnected to an area electric power distribution system.



“Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection”

Purpose

- The creation of IEEE Std 1547 “IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems” has led to the increased adoption of DR throughout distribution systems. This document describes a methodology for performing engineering studies of the potential impact of a distributed resource interconnected to an area electric power distribution system. Study scope and extent are described as functions of identifiable characteristics of the distributed resource, the area electric power system, and the interconnection. Criteria are described for determining the necessity of impact mitigation.



“Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection”

Purpose (cont.)

- Establishment of this guide allows distributed resource owners, interconnection contractors, area electric distribution power system owners and operators, and regulatory bodies to have a described methodology for when distribution system impact studies are appropriate, what data is required, how they are performed, and how the study results are evaluated. In the absence of such guidelines, the necessity and extent of DR interconnection impact studies has been widely and inconsistently defined and applied.



PES DR Integration WG


- The group met on Monday, January 12, 2009 from 8 am until 10 am with 32 present.
- As a minimum, the current members of this working group will be included in the email list for P1547.7.
- After the meeting, it was learned that the PAR can have a joint sponsorship; the primary sponsor being SCC21 and the secondary sponsor the PES T&D Committee.




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Annex F of 1547.2


{P1547.7 secretary post-meeting note:
this information is NOT Annex F of IEEE
Std 1547.2 (2008).}



Microsoft Word
Document



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Outline for P1547.7


Microsoft Word
Document



ATTACHMENT 3 – P1547.7 Proposed Outline
P1547.7 Ad Hoc Working Group Meeting, January 27-28, 2009, Las Vegas, NV

Guide or Recommended Practice????

{P1547.7 Secretary post-meeting note: PAR P1547.7 was approved by IEEE Standards Board January 30, 2009}

Scope: (P1547.7 PAR)

This guide describes criteria, scope, and extent for engineering studies of the impact on area electric power systems of a distributed resource or aggregate distributed resource interconnected to an area electric power distribution system.

Purpose: (PAR P1547.7)

The creation of IEEE Std 1547 “Standard for Interconnecting Distributed Resources with Electric Power Systems” has led to the increased adoption of distributed resources (DR) throughout distribution systems. This document describes a methodology for performing engineering studies of the potential impact of a distributed resource interconnected to an area electric power distribution system. Study scope and extent are described as functions of identifiable characteristics of the distributed resource, the area electric power system, and the interconnection. Criteria are described for determining the necessity of impact mitigation.

Establishment of this guide allows distributed resource owners, interconnection contractors, area electric distribution power system owners and operators, and regulatory bodies to have a described methodology for when distribution system impact studies are appropriate, what data is required, how they are performed, and how the study results are evaluated. In the absence of such guidelines, the necessity and extent of DR interconnection impact studies has been widely and inconsistently defined and applied.

Purpose: (proposed version by ad hoc working group meeting attendees)

This document describes a methodology for performing engineering studies to identify the electric system impacts that will result if a proposed individual or aggregated DR is interconnected without project or electric system modifications. Criteria are also described for determining the necessity of mitigation of identified impacts.

Establishment of this guide allows all stakeholders in the interconnection process to have a described methodology to determine when distribution system impact studies are appropriate, what data is required, how they are performed, and how the study results are evaluated.

Intended Audience: (as drafted by ad hoc working group meeting attendees)

This document is intended for use by:

- ◇ Area Electric Power System Operators (as defined by IEEE 1547), specifically including
 - Area EPS owners
 - Area EPS planners
 - Area EPS designers
 - Area EPS dispatchers
- ◇ DR developers
- ◇ Distributed Resource owners
- ◇ Equipment manufacturers
- ◇ Other knowledgeable parties
- ◇ Regulators

Limitations (as drafted by ad hoc working group meeting attendees)

This guide applies to all DR technologies of aggregate capacity of 10 MVA or less at the point(s) of common coupling (PCC) that are interconnected with an area EPS at typical primary or secondary distribution voltage.

1. This guide does not provide guidance on how to meet business or tariff issues. However, it does recognize that these are important to the interconnection of DR.
2. This guide addresses distribution system configurations typical to North America.
3. This guide does not apply to automatic transfer schemes in which load is transferred between a DR and an area EPS in a momentary make-before-break operation if the duration of paralleling is less than 100 ms. However, it does address installation and application considerations (such as failure modes) that may be useful when designing specific installations that use this type of product.
4. This guide does not interpret IEEE Std 1547 or other standards in the IEEE 1547 series and does not provide additional requirements or recommended practices related to those other IEEE 1547 standards.
5. This guide does not address time frames to do the necessary impact studies.
6. This guide does not address secondary or spot networks; these issues are addressed in IEEE Std 1547.6.
7. This guide does not address DR on intentional islands; this issue is addressed in IEEE Std 1547.4.

Proposed Outline (as drafted by ad hoc working group meeting attendees)

{P1547.7 secretary post-meeting note: IEEE style is numerical 1, 1.1, 1.1.1, etc. and no indents.}

1. Overview
 - a. Scope
 - b. Purpose
 - c. Intended Audience
 - d. Limitations
2. References
3. Definitions, acronyms and abbreviations
 - a. Definitions
 - b. Acronyms and abbreviations
4. General Considerations
 - a. Technical basis for impact studies
 - b. Reliability perspectives related to EPS and DR – Charlie Williams to contribute discussion
 - c. Penetration concerns – Charles Rogers to draft work on Integration of Variable and Intermittent Generation
5. Study Sequence
 - a. Application information required to facilitate studies – Mark Smith to contribute discussion; everyone is asked to contribute their application request.
 - i. Intended operational use of DR
 - b. Provide a “directory” of what studies may need to be done, based on a variety of considerations (DR type, EPS system configuration, etc) – Wayne Stec and Mark Smith to take a shot
 - c. Screens – Approval by review and inspection of application details with very minimal and simple calculations – Typically requires 30 minutes or less to complete
 - i. Assumes little local penetration
 - d. Supplemental Review – Approval by review and calculations short of use of detailed study tools (load-flow programs, etc)
 - i. Discuss by DR technology (inverter/induction/synchronous)
 - e. Detailed impact study
6. Simple impact studies (a.k.a. “Screens”) – Satisfy all screens to avoid a more-extensive study – How do we address multiple installations (each at separate PCC’s) aggregated on a “local” level? – Jack Haggemiller to contribute technical basis for CA Rule 21 screens
 - a. Is the aggregate capacity less than a pre-determined value (California uses 11 kva gross nameplate)
 - i. Discuss single-phase vs. three-phase
 - ii. Discuss unbalance across single-phase 240-volt center-tapped service
 - b. Use of certified or listed DR system
 - c. Does DR export to Area EPS?
 - d. Aggregate capacity in relationship to Line section Peak Load as defined by smallest configurable system arrangement and/or nearest automatic protection device (Michigan and California use 15%)

- i. Ability to create an undetected and unintended island
 - ii. Propensity to cause the area EPS to operate in excess of its ratings under normal conditions.
 - e. Is Starting Voltage Drop within acceptable limits?
 - i. Propensity to adversely affect power quality on the area EPS
 - f. Is the Short-circuit Current Contribution within acceptable limits (Michigan uses 25% or less of utility contribution)?
 - i. Propensity to adversely affect protection on the area EPS
 - ii. Propensity to cause the area EPS to operate in excess of its ratings under fault conditions.
 - g. Is the interconnection compatible with the EPS configuration
 - i. Unfaulted phase voltages are limited to acceptable levels – Roger Salas to contribute discussion on Grounding
- 7. Detailed impact studies
 - a. Data requirements for impact studies – Mark Smith to contribute discussion; everyone is asked to contribute their application request.
 - b. System modeling
 - i. Modeling the area EPS
 - ii. Modeling the DR installation – Colin Schauder to contribute discussion
 - iii. General comments on system modeling software
 - iv. Cross-platform compatibility of software model
 - c. Types of Studies
 - i. Design review
 - 1. DR compatibility with Area EPS – Roger Salas to contribute discussion
 - 2. Grounding compatibility – Roger Salas to contribute discussion on Grounding
 - 3. Communication and Control of the EPS (Distribution automation, etc)
 - 4. Communication and Control of the DR (IEEE 1547.3) – Bob Saint will look at .3 for relevant info
 - ii. System protection study (consider normal and contingency conditions) – Mark Smith to contribute
 - 1. Fault study
 - 2. Protective device coordination
 - 3. Utility protective device sensitivity
 - 4. Reclosing coordination
 - iii. Steady state performance study (consider normal and contingency conditions) – Roger Salas to contribute
 - 1. Load flow (real and reactive)
 - 2. Dispatchability
 - 3. Voltage regulation
 - 4. Voltage stability
 - 5. Voltage unbalance
 - 6. Reliability
 - iv. Power quality study – Bob Saint to contribute
 - 1. DC Injection
 - 2. Flicker
 - 3. Harmonics
 - v. Dynamic Study – Benj Hoffner to contribute
 - 1. Interconnected system response to load and generation fluctuations

- 2. System stability study (look at P1547 Draft 5 for a discussion on stiffness ratio)
 - a. Normal operations
 - b. Transient conditions
 - d. Analysis Software tools
 - i. Power flow
 - ii. Short-circuit analysis
 - iii. Protective device application
 - iv. Dynamics
 - v. Harmonic load flow and frequency scan
 - vi. Electromagnetic transients
 - e. Sample outlines of detailed impact studies (Attachment material?)
 - i. Outline of a system protection study
 - ii. Outline of a steady-state performance study
 - iii. Outline of a power quality study
 - iv. Outline of a system stability study
8. Using the results of impact studies
- a. Mitigation of system protection concerns
 - b. Mitigation of steady-state performance concerns
 - c. Mitigation of power quality concerns
 - d. Mitigation of system stability concerns
9. Bibliography - Attendees asked to provide any available
- a. Regulatory Commission Impact Study Rules
 - i. FERC
 - ii. Various States
 - b. Specific Utility Impact Study Criteria
 - c. NERC report: Integration of Intermittent and Variable Generation
 - d. "System Impacts from Interconnection of Distributed Resources: Current Status and Identification of Needs for Further Development" – NREL – January 2009
 - e. "Impact of Distributed Resources on Distribution Relay Protection" – IEEE PSRC Working Group D3 – August 2004

Attachment A – Case Study – Plug-in Hybrid Electric Vehicle (PHEV) as Distributed Resources

Attachment B – Case Study – Significant penetration single-phase residential Photovoltaic (PV) as Distributed Resources – Chad Abbey to contribute discussion related to a PV Plant connected to a rural system

Attachment C – Case Study – Distribution-system connected small wind generation as Distributed Resources


**ATTACHMENT 4 – Status of {IEEE} Standards for the Smart Grid
P1547.7 Ad Hoc Working Group Meeting, January 27-28, 2009, Las Vegas, NV**

Slide 1

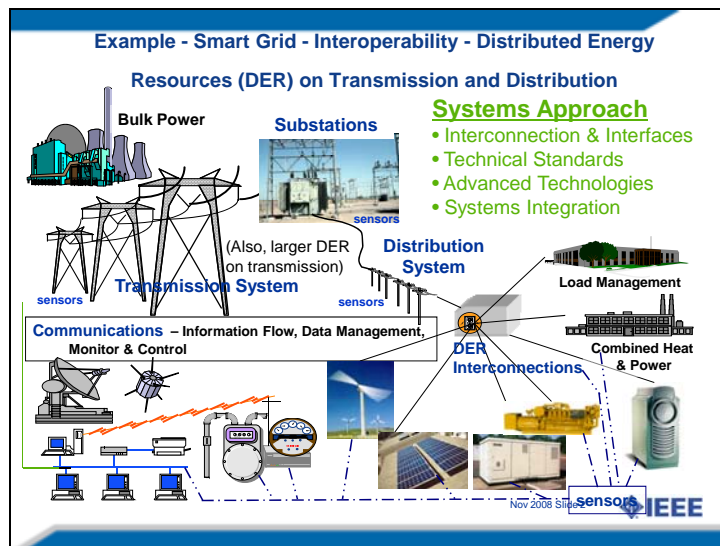
**Status of STANDARDS
FOR THE Smart Grid**

December 10, 2008
IEEE Standard Board Meeting


Dick DeBlasio
IEEE Standards Board Member and
Liaison to U.S. DOE, and SCC21 Chair



Slide 2



Slide 3




- Two things make electricity unique and a challenge for Smart grid:
 1. Lack of flow control (Grid Management and control transformation is needed – i.e., communications)
 2. Electricity storage requirements (static or dynamic storage and load optimization/power electronics – efficiency)
- Change either of these and the grid delivery system will be transformed
- Smart Grid Design and Operation can Enable this to Happen.

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IEEE's role in smart grid standards

- Numerous IEEE standards relate to the smart grid including diverse fields of digital information and controls technology, networking, security, reliability assessment, interconnection of distributed resources including renewable energy sources to the grid, sensors, electric metering, broadband over power line, and systems engineering. The standards are developed by a variety of expert groups within IEEE.


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NIST Interoperability Framework of standards and protocols

- Energy and Security Independence Act of 2007
- NIST Domain Expert Working Groups (DEWGs)
 - to identify use cases, key standards, standards gaps, for inclusion in the future Smart Grid Standards Interoperability Roadmap.
 - Building-to-Grid (B2G)
 - Industrial-to-Grid (I2G)
 - Home-to-Grid (H2G)
 - Transmission and Distribution (T&D)
 - Vehicle to Grid (V2G) – future
 - Cyber Security - new


Source - NIST EISA Smart Grid Coordination Plan 6/2/08 at <http://www.nist.gov/smartgrid/>

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NIST activity continued


- Face to Face meetings at Gridweek (Sept), Gridinterop (Nov) plus telecons and Twiki
- Current areas of focus: use cases, taxonomy, December progress report to Congress
- Dick DeBlasio ,provided a presentation at IEEE 2030 Energy Conference, in Atlanta. On November18,2008. (Co-authored a paper with Cheery Tom)
- Draft report to Congress from NIST expected in early December, 2008. (Early indications are that it will be preliminary with suggested recommendations on series of white papers in 2009)

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IEEE Task Force supporting NIST Smart Grid Interoperability Framework

- IEEE Point of Contact (POC) and *IEEE* Smart Grid Ad-Hoc Review Group Lead - Dick DeBlasio, SCC21 chair
- Power Engineering Society POC - Steve Pullins, Secretary, Intelligent Grid Coordinating Committee
- Computer Society POC – John Waltz, IEEE CS/VP
- **Members at large to Date:** Sam Sciacca (CEO/Microsoft), James Pace /George Flammer /Jay Ramasastry (Silver Spring Networks), Chris Knudsen (PG&E), Phil Slack/George Casio (FPL), Bob Heile (chair IEEE 802.15), Geoff Mulligan (chair – 6LoWPAN), Alex Gelman (CTO/ NETovations), Chuck Adams (Program Director Standards – IBM), Larry Kotewa (SCC31/Community Energy), Joe Koepfinger (Standards Board Emeritus), Bob Grow (IEEE Standards Board Chair/Intel, Corp.), Steve Mills (Hewlett-Packard Company), Jean-Philippe Faure (P1901 chair), Tom Basso (SCC21 Representative/NREL), Cherry Tom (IEEE Standards Office), Tom Field, Bartosc Wojaszczk, Joe Waligorski, and Pat Duggan.

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Proposed IEEE Interoperability SCC21 Standards Project

Proposed Title and Purpose:

Title - IEEE Standard 2030 Guide for Smart Grid Interoperability of Energy Technology and Information Technology operation with the Electric Power System (EPS) and End-Use Applications and Loads.


Purpose – This standard provides guidelines in understanding and defining smart grid interoperability of the electric power system with end use applications and loads. Integration of energy technology and information and communications technology is necessary to achieve seamless operation for electric generation, delivery, and end-use benefits that will permit two way power flow with communication and control. Interconnection and intra-facing frameworks and strategies with design definitions will be addressed that will provide guidance in expanding the current knowledge base. This knowledge base will become a key element in grid architectural designs and operation that will promote a more reliable and flexible electric power system.

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IEEE Standards in green technology


- Energy – renewables/ greener, clean technologies
 - Published 1547 series for Distributed Resources
 - P1547 ongoing projects
 - Published 1680 for Electronic Product Environmental Assessment (EPEAT)
 - New Potential Project Areas
 - PHEV (plug-in hybrid electric vehicles)
 - Grid interface (SCC21)
 - Batteries
 - Smart Grid
 - Future wind, solar, geothermal, hydro
 - GHG emissions calculations
 - Industrial Energy Efficiency

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OBSERVATIONS

- Smart grid Standards will extend across the entire grid (i.e., need interoperability standards (top down) and building block standards (bottom up).
- Smart grid Equipment Standards will be needed to handle information data management, communications and control.
- Flexible smart grid system Interoperability Design and operational Standards will allow near term and long term smart grid evolution.
- Development of a body of Interoperability Smart grid Standards need to be initiated know.

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Contacts

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