

## **IEEE SCC21 2001 Annual Report -- Summary Presentation --**

### “IEEE Standards Coordinating Committee 21 on Fuel Cells, Photovoltaics, Dispersed Generation and Energy Storage”

Richard DeBlasio  
SCC21 Chair  
IEEE Standards Board Meeting

December 5, 2001  
Southgate Tower Hotel  
NYC, New York

## **SCC21 Status**

- **Administrative Update**
  - Responsibilities, Members
- **Status of Standards Development**
  - Reaffirmation, New projects, Ballots
- **Year 2002 Proposed Activities**
  - PARs, Ballot Actions, Meetings

## **IEEE SCC21 Responsibilities – *Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage***

Oversees the development of standards in the areas of Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage, and coordinates efforts in these fields among the various IEEE Societies and other affected organizations to ensure that all standards are consistent and properly reflect the views of all applicable disciplines.

IEEE SCC21 reviews all proposed IEEE standards in these fields before their submission to the IEEE-SA Standards Board for approval and coordinates submission to other organizations.

## **IEEE SCC21 Officers**

**R. DeBlasio – Chair**      **S. Chalmers – Vice Chair**  
**T. S. Basso – Secretary**      **N. Ahmad – IEEE Staff Liaison**

- J. Anderson
- J. Chamberlin
- D. Dawson
- N. R. Friedman
- W. Feero
- F. Goodman
- K. Hecht
- B. Hornberger
- J. Koepfinger
- B. Kroposki
- D. Leslie
- J. Daley
- J. Stevens
- J. Wiles
- J. Wohlgemuth
- T. Zgonena

<b>WG Chair</b>	<b>IEEE SCC21 Standards Activity Development Status</b>
R. DeBlasio	<ul style="list-style-type: none"> <li>• <b><u>P1547</u></b> – <b>Standard for Interconnecting Distributed Resources With Electric Power Systems</b> <ul style="list-style-type: none"> <li>- PAR approved 4/99; Draft 8 re-circulation ballot closed 10/2001(not 75% affirmed). Comments under review</li> </ul> </li> </ul>
D. Leslie	<ul style="list-style-type: none"> <li>• <b><u>P1589</u></b> - <b>Draft Standard For Conformance Test Procedures for Equipment Interconnecting Distributed Resources With Electric Power Systems</b> <ul style="list-style-type: none"> <li>- PAR approved 6/01; WG being formed.</li> </ul> </li> </ul>
N. R. Friedman	<ul style="list-style-type: none"> <li>• <b><u>PAR 1608</u></b> <b>Application Guide for IEEE Std. 1547 Standard for Interconnecting Distributed Resources With Electric Power Systems</b> <ul style="list-style-type: none"> <li>- PAR at IEEE Standards Board 12/2001</li> </ul> </li> </ul>

<b>WG Chair</b>	<b>IEEE SCC21 Standards Activity Development Status</b>
S. Chalmers	<ul style="list-style-type: none"> <li>• <b><u>IEEE Std. 928-1996</u></b> <b>IEEE Recommended Criteria for Terrestrial PV Power Systems</b> <ul style="list-style-type: none"> <li>-- PAR approved 9/00; WG being reformulated to revise std.</li> </ul> </li> </ul>
J. Wiles	<ul style="list-style-type: none"> <li>• <b><u>IEEE Std. 1374-1998</u></b> <b>IEEE Guide for Terrestrial Photovoltaic Power System Safety</b> <ul style="list-style-type: none"> <li>-- Reaffirm by 12/2003</li> </ul> </li> </ul>
J. Stevens	<ul style="list-style-type: none"> <li>• <b><u>IEEE Std. 929-2000</u></b> <b>Recommended Practice for Utility Interface of Photovoltaic (PV) Systems</b> <ul style="list-style-type: none"> <li>- Published 2000</li> </ul> </li> </ul>

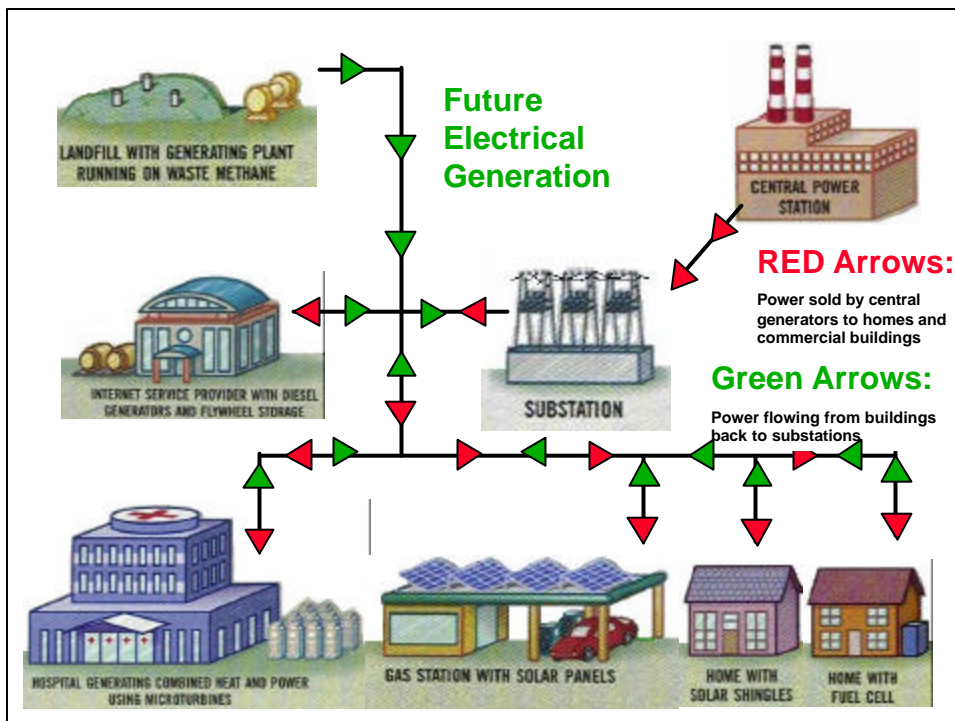
<b>WG Chair</b>	<b>IEEE SCC21 Standards Activity Development Status</b>
J. Chamberlin	<ul style="list-style-type: none"> <li>• <b><u>P1561</u> Guide For Sizing Stand-Alone Hybrid Energy Systems</b> - PAR approved 1/00; Draft 3 established.</li> </ul>
B. Kroposki	<ul style="list-style-type: none"> <li>• <b><u>P1526</u> Recommended Practice For Testing the Performance Of Stand Alone Photovoltaic Systems</b> - PAR approved 3/98; planned completion 12/2002; Draft 4 ballot readiness; ballot group needs more m'fgrs.</li> </ul>
J. Chamberlin	<ul style="list-style-type: none"> <li>• <b><u>P1562</u> Guide For Array and Battery Sizing In Stand-Alone Photovoltaic (PV) Systems</b> - PAR approved 1/00.</li> </ul>
J. Chamberlin	<ul style="list-style-type: none"> <li>• <b><u>IEEE Std. 937 -2000</u> IEEE Recommended Practice for the Sizing of Lead-Acid Batteries for Photovoltaic (PV) Applications</b> - Published 2000</li> </ul>

<b>WG Chair</b>	<b>IEEE SCC21 Standards Activity Development Status</b>
J. Chamberlin	<ul style="list-style-type: none"> <li>• <b><u>IEEE Std. 1013-2000</u> IEEE Recommended Practice for the Installation and Maintenance of Lead-Acid Batteries in Photovoltaic (PV) Applications</b> - Published 2000</li> </ul>
J. Chamberlin	<ul style="list-style-type: none"> <li>• <b><u>P1361</u> Guide For The Selection, Test And Evaluation of Lead Acid Batteries For Stand-Alone Photovoltaic (PV) Systems</b> - PAR approved 3/01; Draft ready for ballot and ballot group being formed.</li> </ul>
J. Chamberlin	<ul style="list-style-type: none"> <li>• <b><u>IEEE Std. 1145-1999</u> IEEE Recommended Practice For Installation and Maintenance of Nickel-Cadmium Batteries for PV Systems</b> - Published 1999</li> </ul>

<b>IEEE SCC21 Standards Activity Development Status</b>	
<b>WG Chair</b>	
<b>J. Wohlgemuth</b>	<ul style="list-style-type: none"> <li>• <b><u>IEEE Std. 1262-1995</u> IEEE Recommended Practice For Qualification Of Photovoltaic (PV) Modules</b></li> <li>- Revision to lapse as per WG recommendation.</li> </ul>
<b>B. Kroposki</b>	<ul style="list-style-type: none"> <li>• <b><u>P1479</u> Recommended Practice For The Evaluation of Photovoltaic (PV) Module Energy Production</b></li> <li>- PAR approved 9/96; planned completion 12/2001; draft ready; ballot group to be determined.</li> </ul>
<b>R. McConnell</b>	<ul style="list-style-type: none"> <li>• <b><u>IEEE Std. 1513-2001</u> Recommended Practice for Qualification of Concentrator Photovoltaic (PV) Receiver Sections and Modules</b></li> <li>- Published 2001</li> </ul>

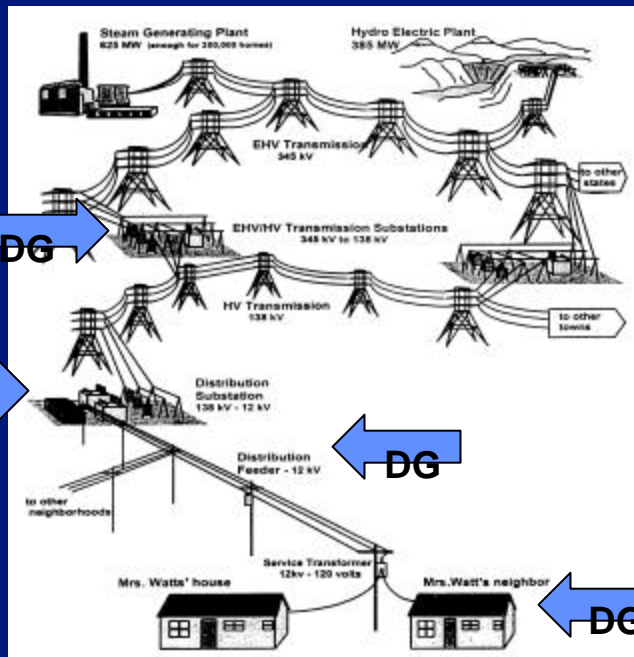
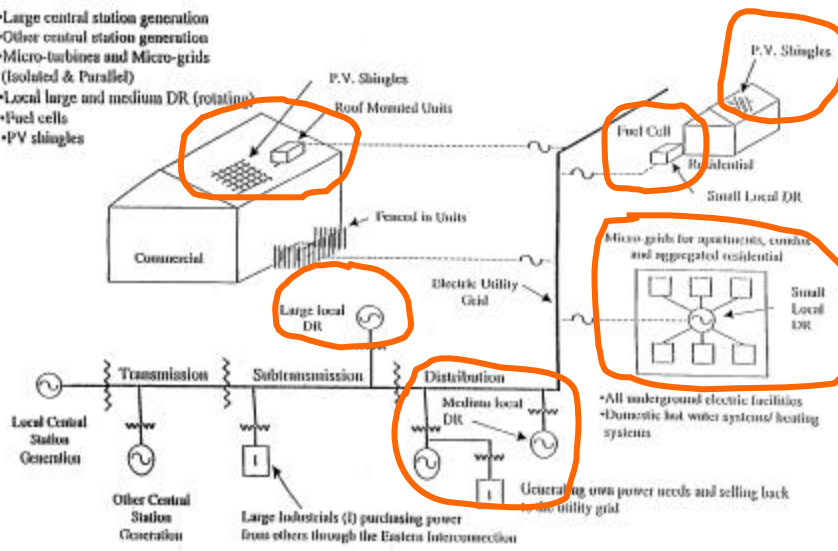
<b><u>SCC21 Upcoming Activities</u></b>	
<ul style="list-style-type: none"> <li>• <b>PAR submittals</b> <ul style="list-style-type: none"> <li>- <b>PAR 1608: Application Guide Distributed Resources -- December 2001</b></li> <li>- <b>PAR: Distributed Resources Equipment Certification -- Spring 2002</b></li> <li>- <b>PAR: Monitoring/Control for Distributed Resources -- Spring 2002</b></li> </ul> </li> <li>• <b>Ballot Actions:</b> <ul style="list-style-type: none"> <li>- <b>P1361 Lead Acid Batteries for Stand-Alone PV Systems;</b></li> <li>- <b>P1479 PV Module Energy Production;</b></li> <li>- <b>P1526 Testing Performance of Stand-Alone PV Systems;</b></li> <li>- <b>P1547 Interconnecting Distributed Resources w/EPS;</b></li> </ul> </li> <li>• <b>Proposed SCC21 Meetings -- Spring and Fall 2002</b></li> </ul>	

# DISTRIBUTED POWER INTERCONNECTION



## What might the power system of the future look like?

- Large central station generation
- Other central station generation
- Micro-turbines and Micro-grids (Isolated & Parallel)
- Local large and medium DR (rotating)
- Fuel cells
- PV shingles



**IEEE P1547**  
**INTERCONNECTION STANDARD**  
**STATUS**  
(IEEE -- INSTITUTE of ELECTRICAL and  
ELECTRONIC ENGINEERS)

**IEEE Interconnection Standard P1547**

- **Title:** *Standard for Interconnecting Distributed Resources with Electric Power Systems*
- **Scope:** This standard establishes criteria and requirements for interconnection of distributed resources (DR) with electric power systems (EPS).
- **Purpose:** Provide a uniform standard for interconnection of distributed resources with electric power systems, and requirements relevant to the performance, operation, testing, safety considerations, and maintenance of the interconnection.
- **Sponsor:** IEEE SCC21 -- *Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage*; Chair, R. DeBlasio.

## **IEEE P1547/D8 Contents**

- **INTRODUCTION**
- **1.0 OVERVIEW**
- **2.0 REFERENCES**
- **3.0 DEFINITIONS and ACRONYMS**
- **4.0 INTERCONNECTION TECHNICAL SPECIFICATIONS AND REQUIREMENTS**
- **5.0 TEST SPECIFICATIONS AND REQUIREMENTS**
- **ANNEXES – INFORMATIVE**
  - ANNEX A -- FLICKER INFORMATION
  - ANNEX B -- INTERCONNECTION TESTS
  - ANNEX C -- COMMISSIONING TESTS
  - ANNEX D -- BIBLIOGRAPHY

## **Technical Requirements Fall Into Several Categories**

- **General Requirements**
- **Response to Area EPS Abnormal Conditions**
- **Power Quality**
- **Islanding**
- **Test Specifications and Requirements**

## IEEE P1547 Development Status

- P1547 Working Group (WG) at 350 members
- P1547 WG organization
  - R. DeBlasio (NREL) -- Chair
  - F. Goodman (EPRI) -- Vice Chair
  - J. Koepfinger (Duquesne) -- Vice Chair
  - T. Basso (NREL) -- Secretary
- Ballot Draft 7: Feb. 27 - Mar. 28, 2001
- Ballot recirculation -- Draft 8: Completed 10/2/01
  - Draft 8: 34 pages of criteria, requirements, and information
  - 167 Ballot members
- P1547 Meetings every 2 months: 12/98 to 4/01
- Last P1547 WG Meeting October 16-19, 2001
  - Draft 7 ballot and Draft 8 recirculation ballot results
  - Prospective new IEEE DR project activities
- Next Meeting Jan. 31 – Feb. 1, 2002
- P1547 Web site <http://grouper.ieee.org/groups/scc21/1547>

## IEEE P1547 Interconnection Standard Ballot Status

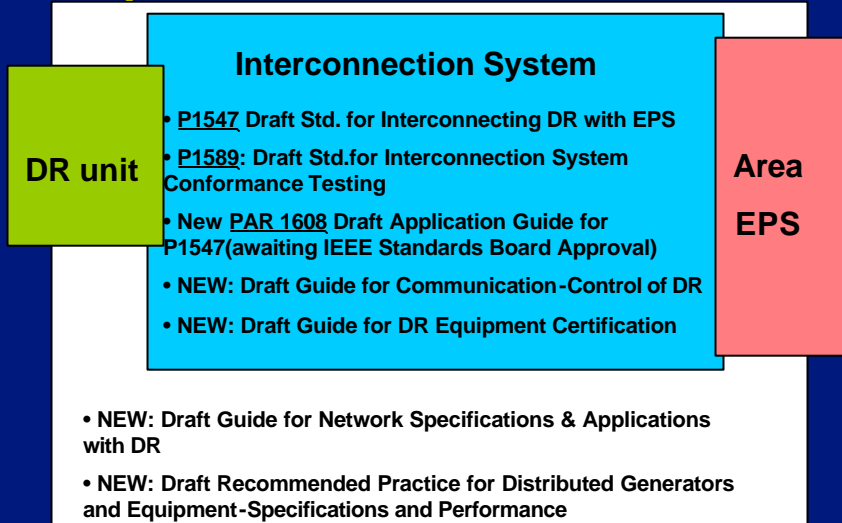
(Requirements for adoption: 75% return, 75% affirmative)

Draft 7			Draft 8		
<ul style="list-style-type: none"> <li>• Ballot completed 4/1/01</li> <li>• 91% ballot returns</li> <li>• 66% affirmative</li> <li>• Addressed negative comments rewording P Draft 8</li> </ul>			<ul style="list-style-type: none"> <li>• Recirculation completed 10/2/01</li> <li>• 96% ballot returns</li> <li>• 66% affirmative</li> <li>• Reworded Draft for recirculation: TBD</li> </ul>		
<u>Voter Category</u>	<u>Affirm</u>	<u>Negative</u>	<u>Voter Category</u>	<u>Affirm</u>	<u>Negative</u>
- User	30	23	- User	25	33
- Producer	35	12	- Producer	43	6
- General Interest	28	15	- General Interest	35	14

## SOME KEY ISSUES

- MINIMUM VS MAXIMUM REQUIREMENTS
- FIELD TESTING VS TYPE TESTING
- SECONDARY GRID AND SPOT NETWORKS
- GRID/DG MONITORING AND CONTROL
- VOLTAGE REGULATION/STABILITY
- GROUNDING/FAULTS
- DG PENETRATION/AGGREGATION

## Prospective New IEEE DR Activities



## Contact Information

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    voice: (303) 275 - 4333                      Golden, CO 80401-3393
- NREL -- <http://www.nrel.gov>
- IEEE SCC21 -- IEEE Standards Coordinating Committee 21 on Fuel Cells, Photovoltaics, Dispersed Generation, & Energy Storage  
    <http://grouper.ieee.org/groups/scc21/>
- P1547 Interconnecting Distributed Resources With Electric Power Systems -- web site and archives  
    <http://grouper.ieee.org/groups/scc21/1547>  
    <http://grouper.ieee.org/groups/scc21/1547/archives/>
- DOE Distributed Power Program  
    <http://www.eren.doe.gov/distributedpower>