"DER Certification Laboratory Pilot, Accreditation Plan, and Interconnection Agreement Handbook"

Presented by:

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Project Information

Certification Lab Pilot, Accreditation Plan and Interconnection Agreement Handbook

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Awarded Under: NREL/DOE Distributed Power System Integration Research and Development Letter of Interest (LOI) Competitive Solicitation

NREL Technical Monitor: Tom Basso

Principle Investigators: Tom Key and Gene Sitzlar
EPRI PEAC Corp.

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Project Perspective

- **Broad Objective** – Promote distributed power in the US by simplifying efforts required to make effective DER-Grid connections.
- **Opportunity** – From the "Making Connections" study to utility industry sponsored testing, emerging national standards, and related public and private inter-connection research it will be possible to define a path for **"certified grid-compatible DER"**

Project Overview

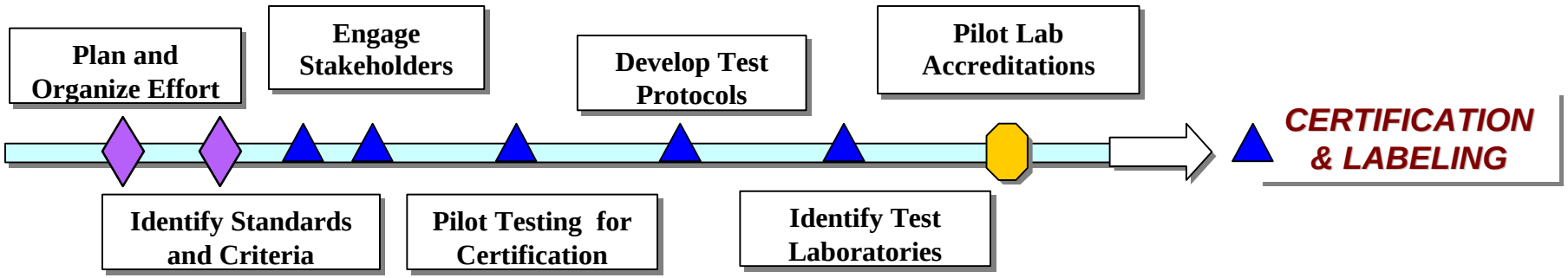
- **Scope of Work:**
  - 3rd party certification and lab accreditation pilot effort applying lessons-learned and demonstrating feasibility.
  - Interconnection agreement handbook and support tools including future web based, library, training and hotline
- **3-year Deliverable Highlights:**
  - Plan and roadmap for certification criteria and labeling
  - Solicit stakeholders and develop communication site
  - Produce handbook on interconnection agreements
  - Develop test protocols and run pilot tests
  - Create model lab accreditation criteria and procedures
  - Build web-based info, hotline, and other supporting technical materials

Project Significance

- It focuses efforts on a path to DER certification thus helping to coalesce many independent and necessary activities.
- It promotes the use of latest research results in writing criteria, best practices, and standards, which can significantly reduce development time as in other new technology areas ….. PV, PQ and Utility Communication Architecture.
- It links hands-on testing with criteria development and rule making to enhance technical results and credibility

Summary of 3-year Effort

- Planned path to certification and labeling



- Progress down this path will draw on many parallel activities such as DOE DPP interconnection research, EPRI "completing the circuit" testing, IEEE 1547 Interconnection and UL 1741 Standards

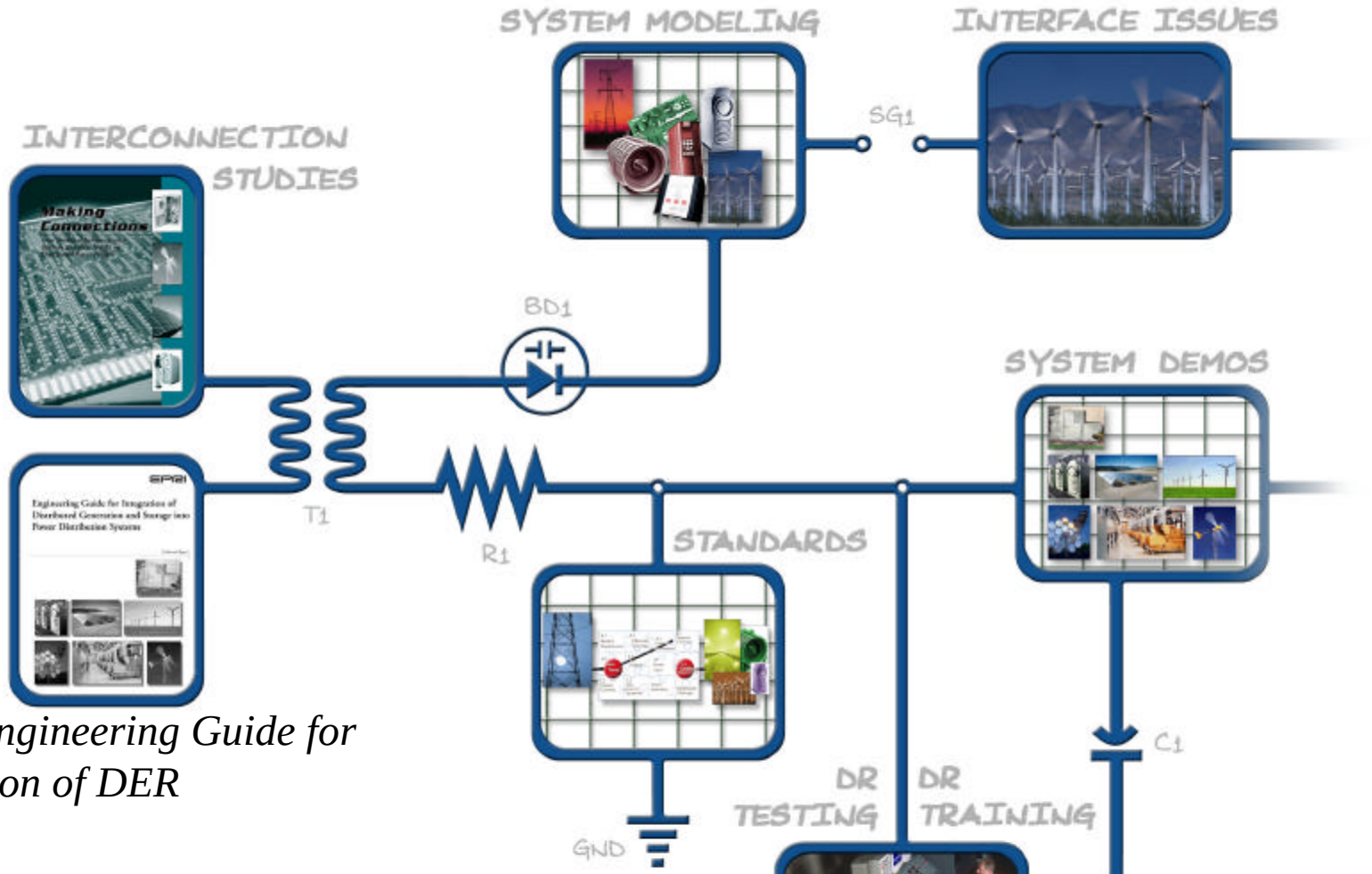
Project Approach: Build on Existing Experience

- DR certification will build on existing power industry, national and international standards, e.g.
  - IEEE "Standards" for terminology, functions, control, specification and performance of power generation
  - DOE-NREL Handbook and Criteria for Certification and Laboratory Accreditation of PV (NREL/TP-412-7680 and 21291)
  - UL 1741 Standard for Safety in Power Systems
  - Electrical Generating Systems Association Guide Specs and Performance Standards
  - NFPA, NEMA and CSA Documents related to power systems

Coordination Efforts are not only Technical Standards

- Areas that need to be considered
  - State and federal regulatory actions
  - Economics, costs vs benefits
  - Availability of practical interconnection hardware
  - Quality, availability, and reliability
  - Education and Training
- Organizations with Related Activities
  - Department of Energy, DPP interconnection projects
  - California Energy Commission PIER
  - New York, Texas, California and other states rules
  - EPRI and Utility Industry Interconnection Research
  - Other Private and Public Activities Research

“Completing the Circuit”



DOE

EPRI

Utility Engineering Guide for Integration of DER

COMPONENTS FOR REMOVING BARRIERS TO INTERCONNECTION OF DR		
Part No.	Part	Description
T1	Transformer	Transforming electric power delivery.
BD1	Barrier Diode	Breaking down barriers to interconnection.
R1	Resistor	Overcoming resistance to new DR technologies.
GND	Ground	Grounding through national consensus.

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Collaborative Testing Activity: e.g. Lab Trials of IEEE P1547

- Objective – test drive proposed standard 1547, gain experience, validate applications, identify issues and solve problems
- Scope – conduct coordinated lab and field tests on machines used for interconnection (induction, synchronous and inverters)
- Schedule – Started Nov. 2001

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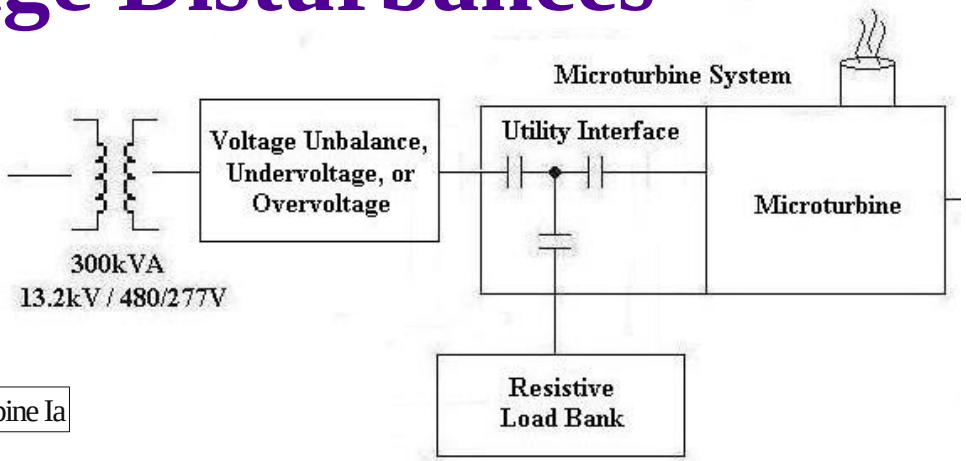
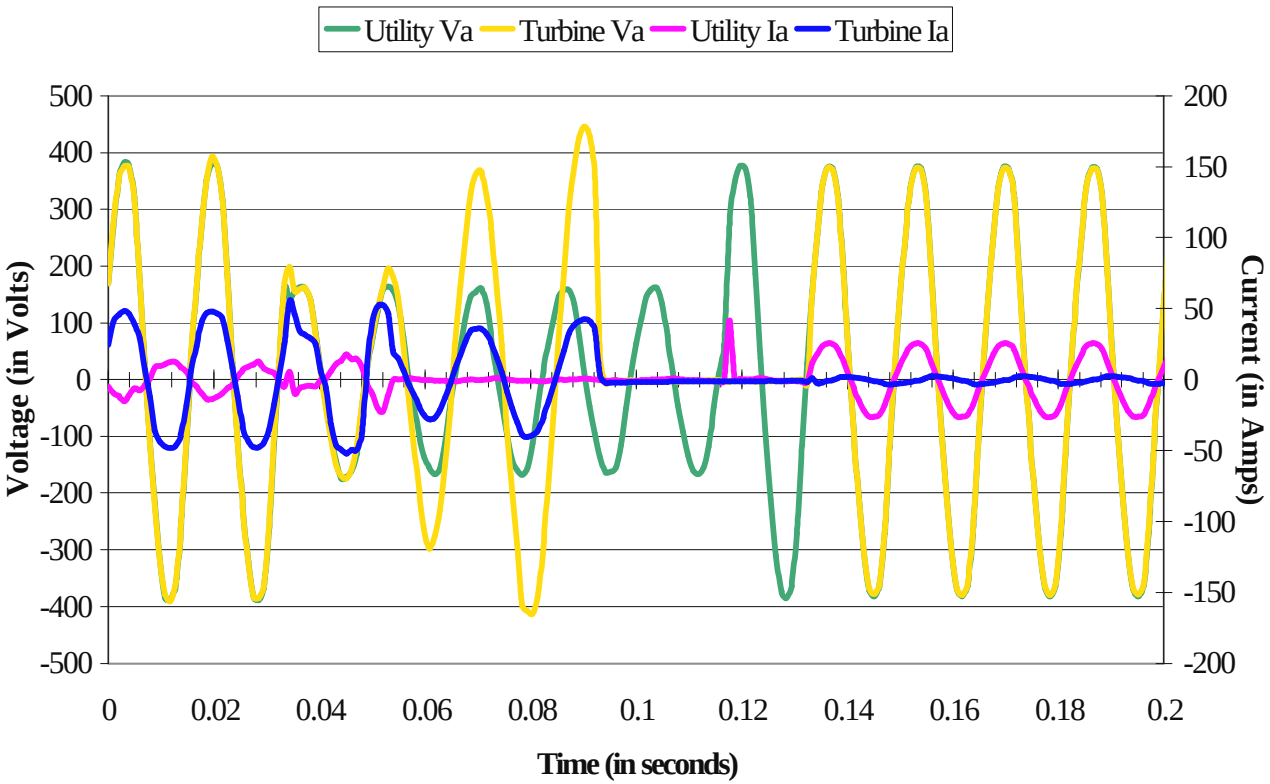
IEEE P1547 – Response to Abnormal Utility, 4.2.1 Voltage Disturbances

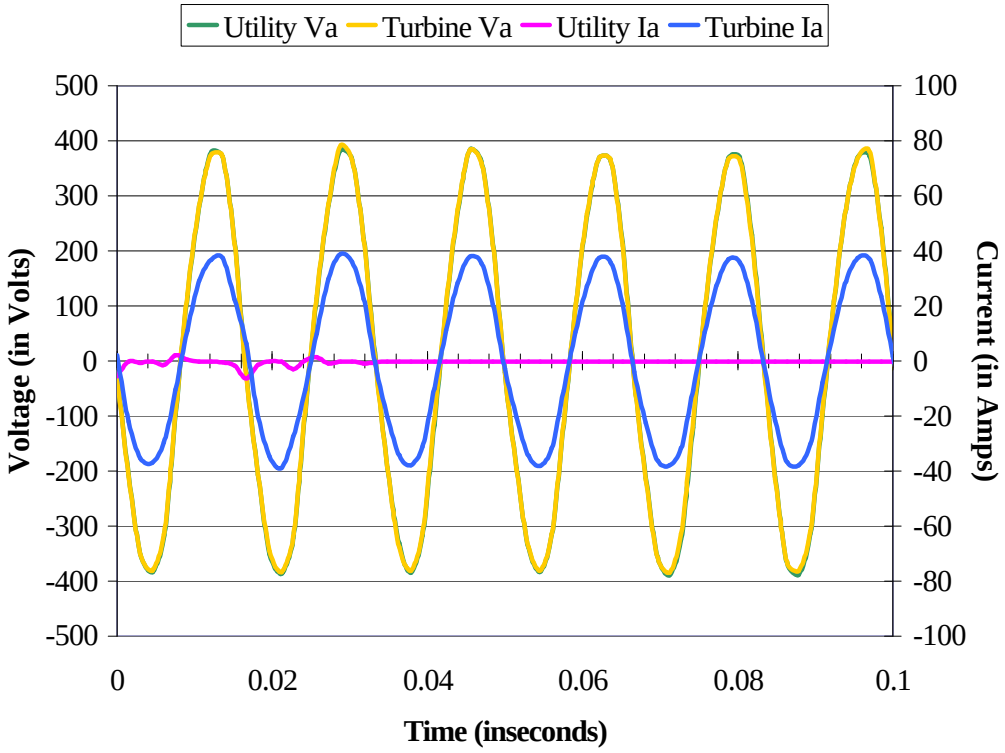
- Applied three-phase voltage sag to 40% of nominal for 5 Cycles

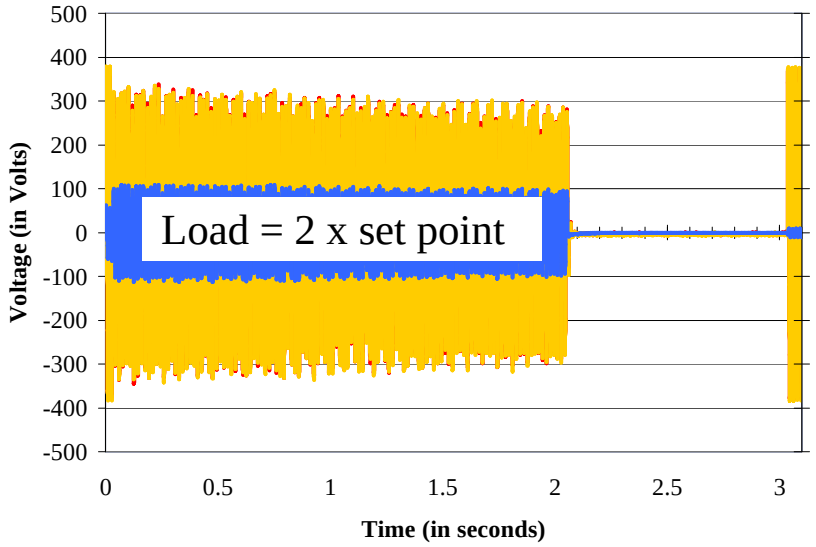


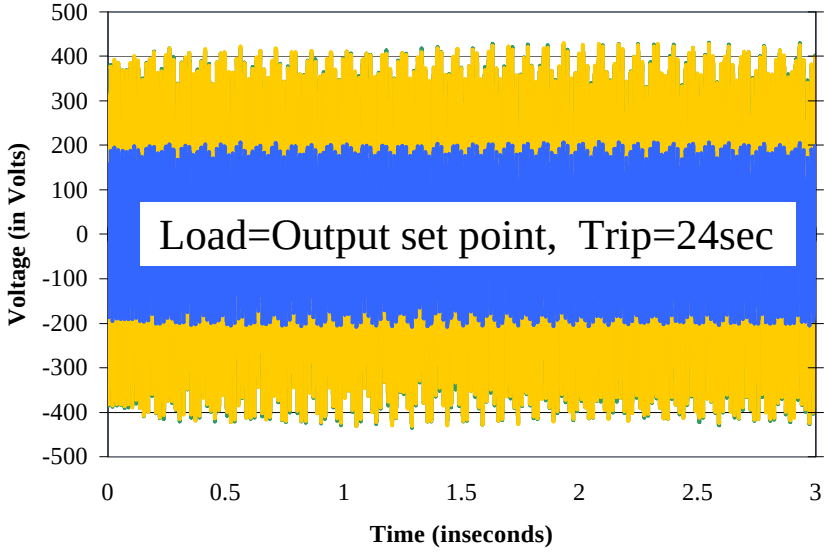


- DER trips off at utility PCC in less than 2 cycles, drops load in 3.5 cycles, and transfers load to utility in 6 cycles.
- 1547 Draft 8 requirement for 10 cycle trip is met without ambiguity.

IEEE P1547 – Response to Abnormal Utility, 4.2.1 Voltage Disturbances

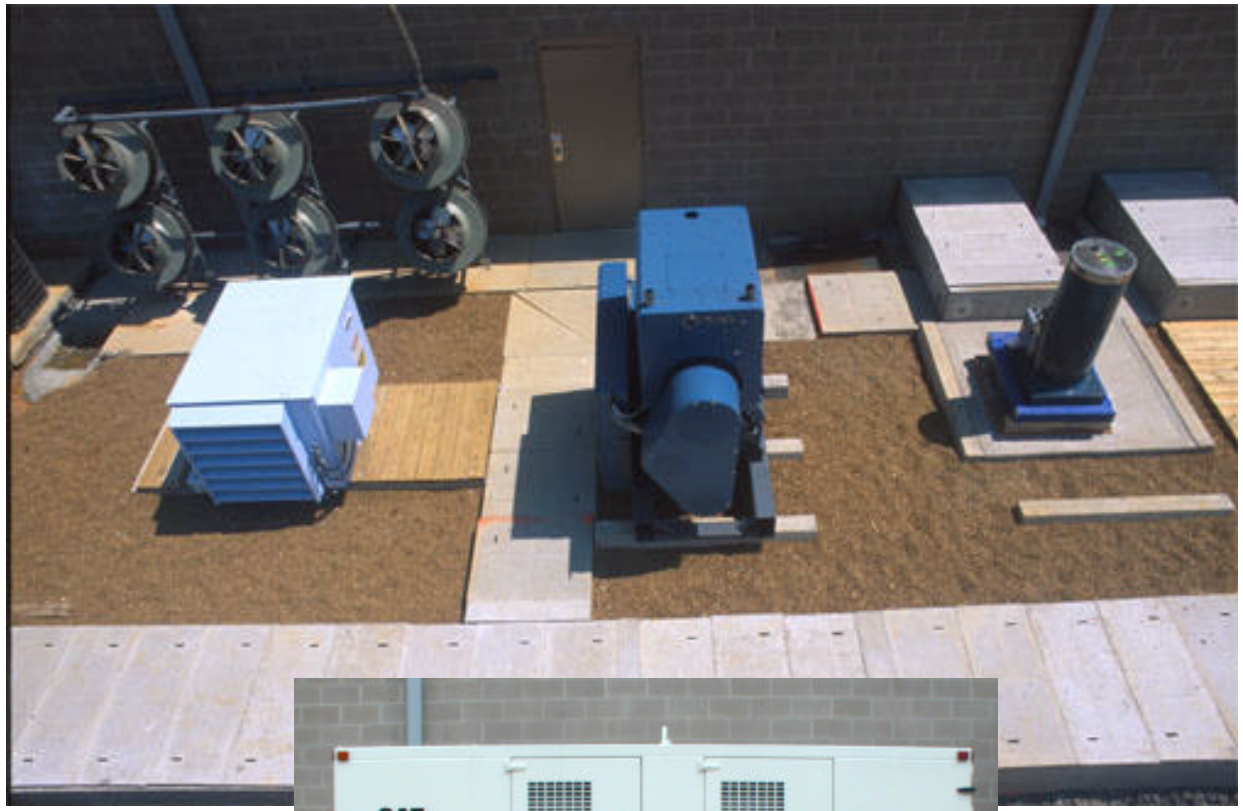


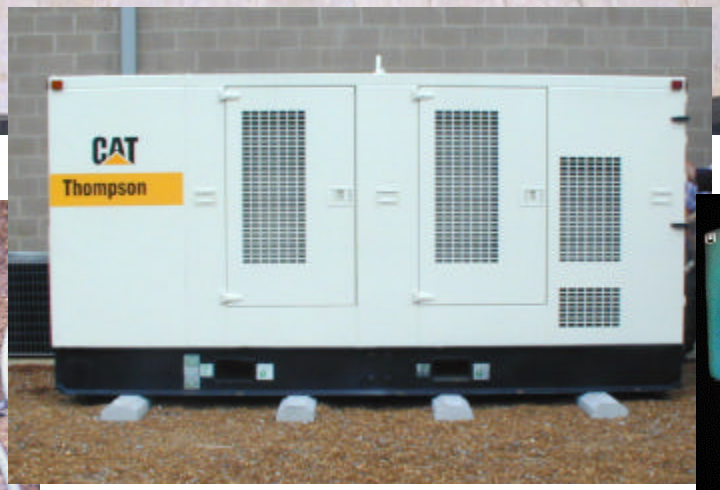




- Test result shows DER response to loss of phase A (2 good phases, 1 missing phase). Utility expects tripping within .16 sec or 10 cycles. DER manufacture expects to detect low effective RMS……1547 needs better definition of abnormal voltage.

DER System Test Facility





Progress in establishing a web-site for stakeholders

- Web-based Information Resource
  - Project milestone chart, plans, deliverables
  - Library for connection
  - Tools for connection
  - Summary of other interconnection activities
- Communication links to interconnection information
- Information transfer area for stakeholders participating in certification and accreditation efforts
- URL "derConnections.com" (a working area on www.EPRI-PEAC.com website)

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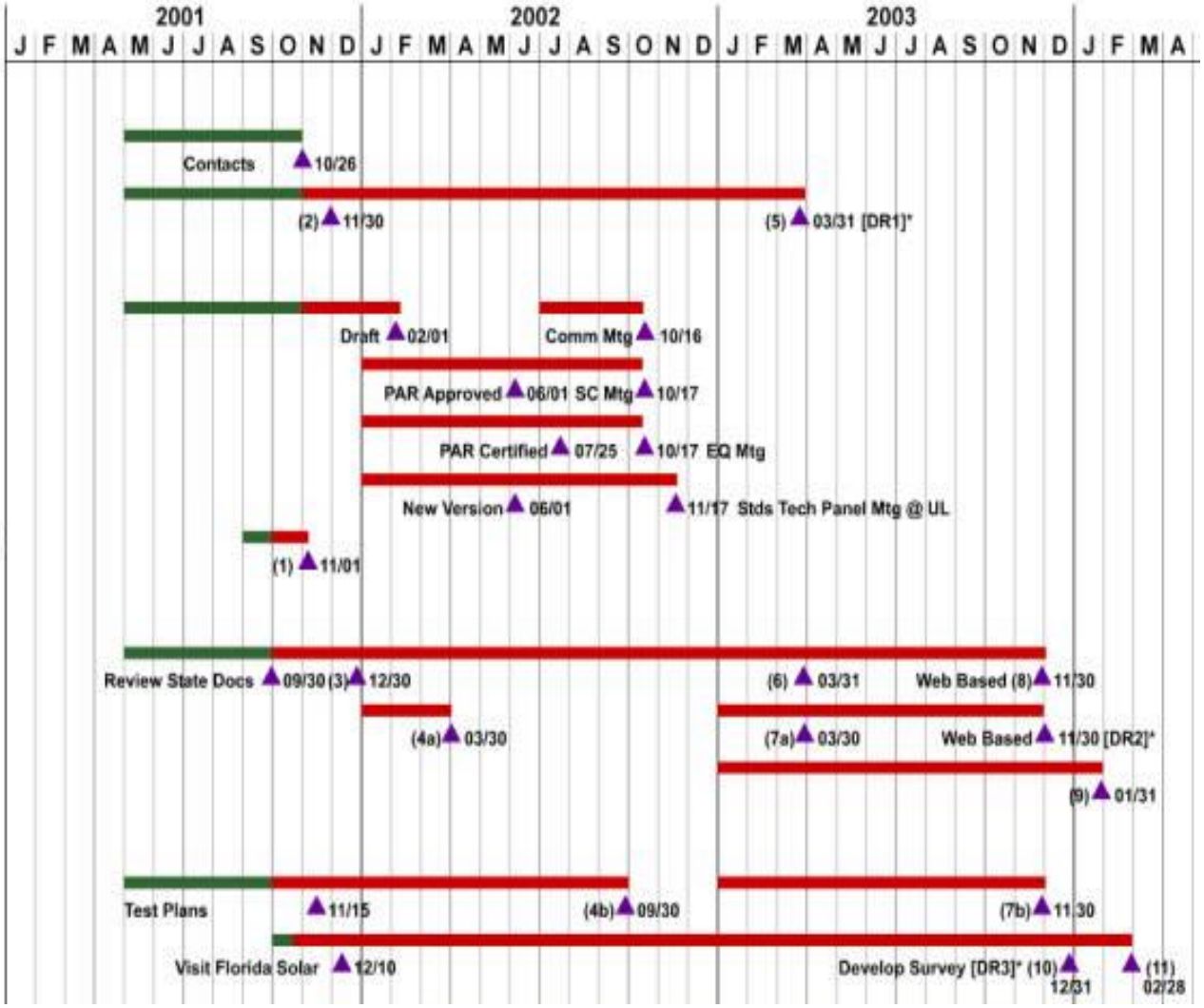
Activities and Milestones to Certification and Lab Accreditation

I. Define Infrastructure for Certification & Accreditation
- Organize DER Stakeholders
- Develop Certification and Accreditation Plan
- Coordination with Related Standards Activities
  *IEEE SCC-21:
  - Interconnect (P1547)
  - Testing (P1589)
  - Certification

  *UL for Safety (UL1741)
- Certification Home Page (www.DER-Connections.com)

II. Provide Support Materials and Services for Certification & Accreditation
- Agreement Handbook
- Protocol Development
- Training Materials

III. Conduct Testing as a Pilot for Certification & Accreditation
- Pilot Testing
- Lab Accreditations

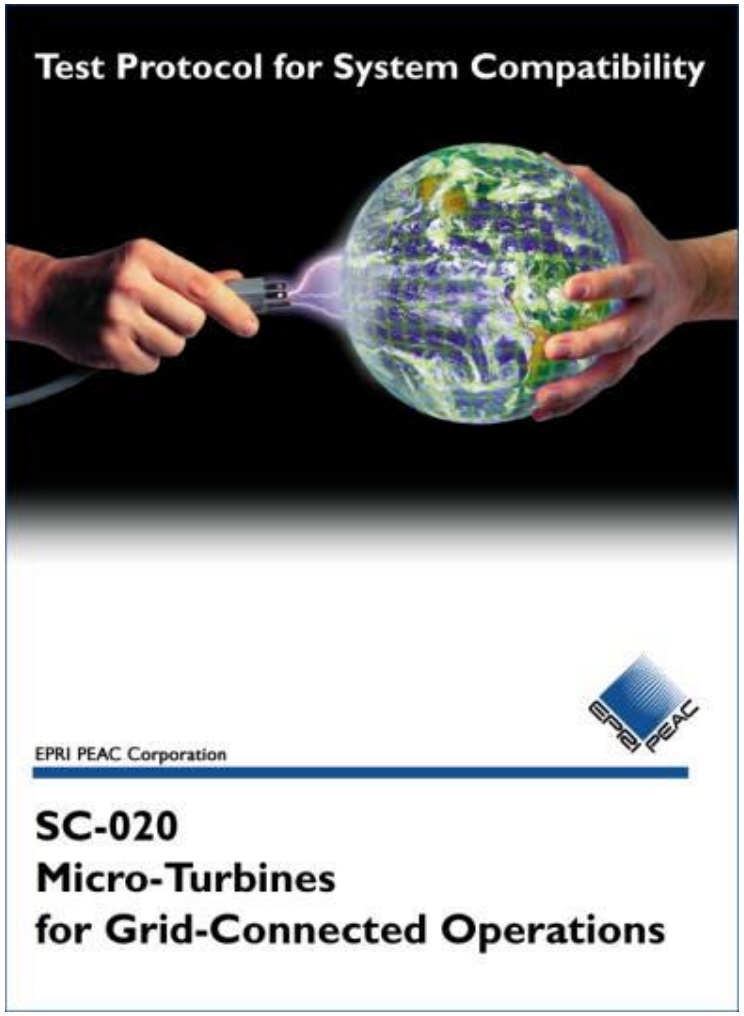


Active timeline tracking and milestone links on web site

Proposed Roadmap Plan

- Defines criteria for certification and accreditation as well as vehicles for soliciting stake holder participation
- Identifies support materials to be developed
  - Interconnection Agreement Handbook
  - Protocols for Testing DER Equipment
  - Training Tools and Resources
- Sets activities and milestones for conducting pilot certification testing and creating lab accreditation criteria

Plan to develop application-specific test protocols



Required Steps

- Define baseline for electrical environment
- Develop consensus performance criteria and test methods
- Test DER equipment with utility and equipment manufacturer participating
- Develop certification protocols for DER

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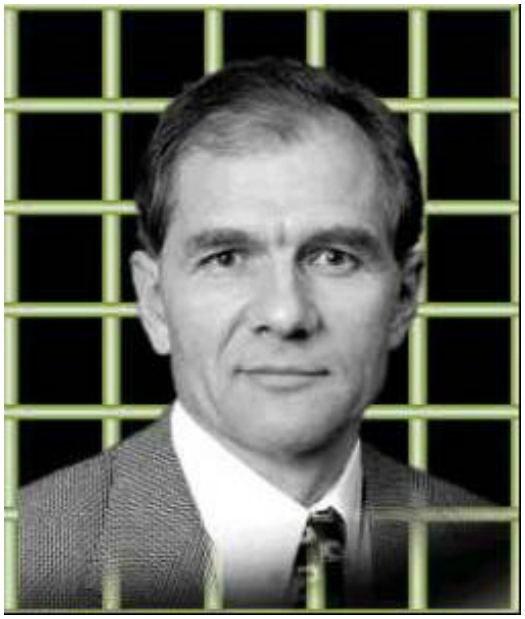
Wanted:
DER Stakeholder Participation

Contact Information



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