



IEC TC82 Working Group 6 Balance of System Components

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Solar ABCs NISC Panel Stakeholder Meeting
June 2-4, 2008**

IEC TC82 WG 6 SF 2008-05-22



WG6 Task

To develop international standards for **balance-of-system components** for PV systems. These standards will be in the general areas of **performance, safety, environmental durability** (reliability), **quality assurance** and **quality assessment** criteria.

The standards ultimately produced should be universal and non-restrictive in their application, taking into account different environments and manufacturing technologies.

In addition to the basic **electrical** and **mechanical characteristics**, standards will be written for other important factors such as **thermal performance, electromagnetic interference**, and **climate applicability/rating**.



WG 6 “Official” Participation

| Country | Members | Country | Members |
|-------------|---------|---------------------|-----------------------|
| Austria | 1 | Great Britain | 2 |
| Australia | 2 | Italy | 2 |
| Canada | 3 | Japan | 2 |
| Switzerland | 2 | Korea | 2 |
| Germany | 3 | Netherlands | 0 |
| Denmark | 1 | Thailand | 1 |
| Spain | 3 | USA | 3 |
| France | 4 | <i>TOTAL</i> | <i>31 (-5)</i> |



WG6 Meetings Since Tokyo (October 2006)

- Pamplona, Spain, April 2007 (w/ WG3)
- Burgdorf, Switzerland, October 2007 (w/ WG3)
- San Francisco, May 2008
- 62109 Project Team has held 8 teleconference calls
- Next meeting is tentatively scheduled for October 2008 in Korea



WG6 Current Work Program

- **IEC 62109-1, -2, -3, and -???** Ed. 1.0, *Safety of power converters for use in photovoltaic power systems.* Project Leader Tim Zgonena
- **IEC 62116** Ed. 1.0, *Testing procedure - Islanding prevention measures for power conditioners used in grid connected photovoltaic (PV) power generation systems* Project Leader Izumi Tsuda.
- **IEC 62509** Ed 1.0, *Performance and functioning of photovoltaic battery charge controllers.* Project Leader Nigel Wilmot



IEC 62109 Ed. 1 Safety of power converters for use in photovoltaic power systems

- Minimum requirements for protection against electric shock, energy, fire, mechanical and other hazards for POWER CONVERSION EQUIPMENT (PCE) used in PV
- 62109-1 General Requirements
- 62109-2 Inverter Requirements
- 62109-3 Charge Controller Requirements
- Cooperatively developed with TC22
 - Will provide support for 61800-5-1 (TC22)



62109-1: General Requirements

- CDV Voting Results (2008-04-25):
 - 24 Yes
 - 2 No
 - 2 Abstain
- Reviewed Comments—most were resolved
- Expect to submit revised document for circulation as FDIS in August



62109-2: Inverter Requirements

- Project Team has made substantial revisions via 8 teleconferences.
- Provided progress updates at WG meetings
- Needed input from WG6 to address critical details of protection for transformerless PV inverters
- A few issues left to resolve
- Expect to submit 62109-2 draft for CDV in August



62109-3: Charge Controller Requirements

- No progress on this document due to extended activities on -1 and -2, and 62509



62109-?: Combiner Boxes

- Korea has suggested a possible new project to address design safety of PV Array Combiner boxes.
- Presented outline of Draft Korean Standard
- Will provide Draft prior to next WG meeting



IEC 62116 Ed. 1.0, Testing procedure - Islanding prevention measures for power conditioners used in grid connected photovoltaic (PV) power generation systems

- CDV comments were addressed in Pamplona and Burgdorf
 - Reinserted sentence allowing local pass/fail requirements
 - Added discussion of frequency and voltage trip settings
- Submitted to CO for circulation as FDIS
- French translation has been received in the past few days
- Expect FDIS to be circulated soon



IEC 62509 Ed 1.0 Performance and functioning of photovoltaic battery charge controllers

- NWIP Approved in Nov 2006
- Project team produced several drafts, discussed at each WG meeting
- Current Draft has been circulated as a CD
 - NC Comments are due May 23



WG6 New Work Ideas/Priorities

- Have developed a prioritized list of topics for future work that includes
 - Inverter Performance (8 to 10 parts)
 - DC Plug
 - Array Combiner Box
 - Design Qualification and Type Approval
 - EMC
 - Switches and connectors
 - Surge Protection



BOS Performance Characterization Series

- **62xxx-1 General Document**
 - Introduction
 - Measurement requirements
 - Source (Battery, PV, grid/gen) requirements
 - Reporting requirements
- **62xxx-2 Grid-connected Inverters**
- **62xxx-3 Stand-alone Inverters**
- **62xxx-4 Charge Controllers (from 62509)**



BOS Performance Characterization Series

| Item | GC Inverter | SA Inverter | Charge Controller | Comments |
|--|---------------|------------------------------------|-------------------|-------------------------|
| | 62xxx -2 | 62xxx -3 | 62xxx -4 | |
| Efficiency | X Whitaker | X (+p f) Spooner/ Suponthana | X | 61683, some commonality |
| MPPT | X Infield | X | X | |
| Reporting/labeling/Std Specs. | X | X | X | Coordinate with 62109 |
| Tare/standing/ standby/ start up/shut down /nighttime losses | X Mauch | X | X | |
| Overall Performance Measure (Energy Rating) | X | X | X | Coordinate with WG2 |
| Power Factor | X Kim | -- | -- | Covered by GC standard. |

GC – Grid Connected; SA – Stand Alone

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BOS Performance Characterization Series

| Item | GC Inverter | SA Inverter | Charge Controller | Comments |
|--|---------------------------|--------------------------------------|-------------------|---|
| | 62xxx -2 | 62xxx -3 | 62xxx -4 | |
| Foldback/ derating (Overtemp/Overpower) | X | X | X | Potentially common |
| Ratings | X | X (+pf) Spooner | X | Potentially common 62109 |
| Power Quality Harmonics DC Injection | X Koerner/ Igarashi | X Spooner Koerner/ Igarashi | | 62109 only for standalone, IEEE 519, 61000-3-4, 61727 |
| User Interface measurement accuracy | X Mauch/ Kim | X Mauch | X | Common? |
| DC Ripple (Current) | X Koerner | X | X | Mauch to investigate battery effect |

GC - Grid Connected; SA - Stand Alone



Additional Items Under Consideration

- Standardized DC (appliance) plug
- Standardized module/combiner/inverter connector (WG2?);
- Fuses: failures due to insufficient fault current.
 - 1) Fuse and MCCB testing for PV
 - 2) System and BOS Requirements for fuse-less PV installations (WG3?)
- PV wire and disconnect switches (define what's appropriate)



Proposed IEC Rodent Warning Mark for High Voltage PV Wiring

