



CIGRE Study Committee C4

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

WG* N° C4/C6.29	Name of Convenor : Jeff Smith (USA) E-mail address: jsmith@epri.com
Technical Issues (2): 5, 8	Strategic Directions # (3): 1, 3
Title of the Group: Power-quality aspects of solar power	
<p>Scope, deliverables and proposed time schedule of the Group :</p> <p>Scope:</p> <p>There has recently been a huge increase in the amount of solar power connected to the grid and this trend is expected to continue and even grow during the coming years.</p> <p>A possible concern with the connection of solar-power installations is their potential impact on the voltage and current quality in the grid. The principle aim of this working group is a mapping and quantification of that impact where it concerns power quality disturbances. A decision about possible negative impacts can only be made, most likely on a case by case basis, after the completion of the working-group activities.</p> <p>The following power-quality disturbances will be covered by this working group:</p> <ul style="list-style-type: none"> • Characteristic harmonics (odd harmonics up to 2 kHz for single-phase installations; odd non-triple harmonics for three-phase installations). • Low-order non-characteristic harmonics (even harmonics and interharmonics up to 2 kHz, also odd triple harmonics for three-phase installations) • High-frequency distortion (frequency-components in the frequency range 2 to 150 kHz) • Single rapid voltage changes, flicker and other voltage-magnitude variations at time scales below 10 minutes. • Unbalance due to single-phase installations • Supply voltage variations at time scales of 10 minutes and longer <p>For supply voltage variations at time scales of 10 minutes and longer, already well documented from work done elsewhere, a brief description of the basics and of the state-of-the-art will be given.</p> <p>For each of the other listed disturbances, the emission by solar-power installations will be mapped based on detailed measurements. As much as possible measurements from actual installations will be used. Information from relevant literature will be used as well.</p> <p>The impact on voltage quality will be studied where this differs from the impact of emission by other equipment. This part of the work will cover a combination of measurements, simulation studies and information from relevant literature.</p> <p>For low-order non-characteristic harmonics, high-frequency distortion and other voltage-magnitude variations at time scales below 10 minutes, proposals for appropriate compatibility levels, voltage characteristics, and emission limits will be given.</p> <p>Power frequency variations, overloading and increased losses due to reverse power flow, voltage dips, voltage transients, and other impacts or disturbances not mentioned above, are beyond the scope of this working group.</p>	

Composition of the WG:

The list of potential members of the WG will be composed at the later stage through consultation with representatives of national committees. Particular attention will be paid to creation of balanced industry/academia membership that will include only members willing to actively and continually contribute to the work of the group and to writing of intermediate and final reports.

As the practical knowledge on the impact of solar-power installations to the grid is limited to a small number of countries, no limits will be set on the number of members per country.

Liaisons:

This working group should be a joined working group with CIGRE C4, CIGRE C6 and CIRED as sponsors.

Deliverables :

1. A CIGRE report containing the results from the studies mentioned above.
2. Electra publication summarising major conclusions and recommendations and technical papers reporting intermediate results

The working group will be active for 3 years from the date of kick-off meeting. The work should start between 1 July 2012 and 1 December 2012 and finish approximately 36 months later. The recommended deadline for the final report is September 2015.

Time Schedule : start : July 2012

Final report : September 2015

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman : Klaus Fröhlich

Date : 10/06/2012

(1) Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2

Table 1: Technical Issues of the TC project “Network of the Future” (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Interactive communication with the public and with political decision maker