CIGRE Study Committee C4

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

WG* N° XX.YY	Name of Convenor : Ener Salinas (SWEDEN) E-mail address : ener.salinas@se.abb.com	
Technical Issues #(2): 8		Strategic Directions #(3): 1
The WG applies to distribution networks (4): No		
Title of the Group: EMC for Large Photovoltaic Systems		

Scope, deliverables and proposed time schedule of the Group :

Background :

At a global scale solar photovoltaic (PV) systems have shown in the last two decades a consistent exponential growth. Forecast give a total worldwide PV installed capacity of 500 GW by 2020, practically doubling its present (2016) capacity. Since PV is becoming such an important energy source, considerations of electromagnetic compatibility (EMC) are as relevant, especially for large systems (PV solar farms) when these are connected to the grid. Due to their subsystems (cells, wires and the inverter) PV systems conform to an especial EMI/EMC environment. The inverter is often a major source of conductive interference being able to inject disturbances into the power grid. On the other hand long cables can act as antennas thus radiated interference is also typical in these systems. The EU directive and a few standards for PV components exist. The IEC has made efforts to limit these emissions, yet measurement surveys show noncompliance issues which imply that further study is needed in this area. Moreover recent security concerns raise the possibility of intentional EM attacks (HEMP, IEMI) which, again, could come through coupling to the PV wiring. During the last meeting of the WG C4.30 in Curitiba members agreed that as a natural follow up of EMC for wind energy systems we could form a group to address EMC for PV systems and produce a comprehensive technical brochure on this topic.

Scope :

1. To produce a Technical Brochure on EMC for photovoltaic systems, focusing on large PV plants connected to the grid.

2. To consider requirements due to high frequency conductive emissions from the inverter affecting the PV system and the power network.

3. To consider radiated emission requirements from the PV wiring system.

4. To consider immunity requirements for electronics in the vicinity of high EM fields caused by lightning

5. To consider immunity requirements for the PV control and electronics as a result of radiofrequency transmitters or mobile communication antennas operating in the vicinity.

6. To consider immunity requirements for PV systems against high power intentional electromagnetic interference (IEMI) and high electromagnetic pulse (HEMP) attacks.

Deliverables : A Technical Brochure and Summary in Electra

Time Schedule : start: August 2017 Final report : 2019

Comments from Chairmen of SCs concerned :
Approval by Technical Committee Chairman : Date :

(1) Joint Working Group (JWG) - (2) See attached table 1– (3) See attached table 2
(4) Delete as appropriate

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	Preparation of material readable for non technical audience