CIGRE Study Committee D1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP [1]

WG* N° D1.51	**Name of Convenor :** Hiroyuki Hama (JP) **E-mail address**: Hama.Hiroyuki@bk.MitsubishiElectric.co.jp
Technical Issues # [2]: 7	**Strategic Directions # [3]: 3**
The WG applies to distribution networks [4]: No	
Title of the Group: Dielectric performance of eco-friendly gas insulated systems	

Scope, deliverables and proposed time schedule of the Group :

Background :

In near future, eco-friendly gas insulated systems are required in order to reduce the environmental impacts. To realize such systems, various basic techniques that are different from those of SF6 insulated systems are needed. These are, for example, the insulating and small current interruption capacity of environmentally-friendly gases and the diagnostics and monitoring techniques for the relevant gas insulated systems. In addition, the studies on testing and the future perspectives of practical applications of eco-friendly systems are essential.

Scope :

The WG is to study the basic techniques and practical applications from technical points of view. First, the motivation and necessity to use eco-friendly gas insulated systems are reviewed, and possible alternatives, application criteria of alternatives and their effects are indicated.
The main topics of the WG are:

1. Insulation and small current interruption capacity
   - Gaseous insulation of eco-friendly gases (e.g. N_2/SF_6 gas mixtures, dry air, CO_2, N_2)
   - Eco-friendly solid insulation (e. g. biodegradable polymeric insulating material, recyclable PET spacer)
   - Small current interruption of disconnecting switch and earthing switch in eco-friendly gases
2. Diagnostics and monitoring
   - Partial discharge monitoring in eco-friendly gases
   - Other monitoring techniques
3. Testing
   - Dielectric testing techniques using eco-friendly gases to reduce SF6 emission during the tests
4. Practical applications
   - Application examples to, e.g. gas insulated transmission line using N2/SF6 and non-SF6 gas insulated system, recyclability of equipment components and parts
   - Perspectives of environmental and economic impacts on gas insulated systems and their reliability

The WG will summarize the available information and look for the state-of-the-art of environmentally-friendly gases and solid insulation techniques. Furthermore, the WG will identify open questions.

Deliverables : Report to be published in Electra or technical brochure with summary in Electra

Time Schedule : start : January 2013 **Final report** : 2016

Comments from Chairmen of SCs concerned : SC A3, B3, C3

Approval by Technical Committee Chairman :
Date : 1st October 2012

(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