CIGRE Study Committee B3

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

WG N° B3.57	**Name of Convenor: Mr. Toshiyuki Saida (JAPAN)** **E-mail address**: toshiyuki.saida@toshiba.co.jp	
Strategic Directions #[2]: 2,3		**Technical Issues #[3]: 9**
The WG applies to distribution networks[4]: yes		
Potential Benefit of WG work #[6]: 2,3,5,6		
Title of the Group: Impact on Engineering and Lifetime Management of Outdoor HV GIS		

Scope, deliverables and proposed time schedule of the Group:

Background:

Gas Insulated Switchgear (GIS) is applied throughout the world since the late 1960s because of its excellent features such as compactness, encapsulated electrical components and to avoid environmental pollution and personnel safety with less exposed high-voltage components.
Because of its compactness, GIS with higher ratings can be used for the replacement of Air Insulated Switchgear (AIS) in the event of growing power demand or for a higher transmission voltage without additional space requirements.
Statistically, most of GIS installations operated in the world are indoor (Refer to CIGRE technical brochure #513 etc.), consequently information on the substation design, construction, operation and maintenance experience of indoor GIS might be more fruitful than those on outdoor GIS.
Until today, there are less publications available in which a comparison is made between indoor and outdoor GIS use based on facts and proven experience.
In addition, it is noted that Indoor GIS also has Gas Insulated Bus (GIB) and bushings for Over Head Line (OHL) which are generally in exposed outdoor environmental conditions. In this regard, those who operate indoor GIS may be interested in this topic.

Scope:

The work is to cover 'Outdoor HV GIS including Mixed Technology Switchgear (MTS)' and will consider the following issues compared with indoor use:

1. Market and standard requirements for outdoor GIS
2. Impact on GIS design including HV connection, layout, foundation and overall substation design
3. Impact on Long-term reliability such as tightness/corrosion behaviour, impact on environmental condition such as solar radiation effect, rain, snow, industrial pollution, etc.
4. Impact on operation and maintenance strategy to ensure the outdoor resistivity
5. Economical comparison (outdoor vs indoor) - initial and life cycle cost during install, maintain, refurbish and replace
6. Case study

<u>*Notes:*</u>

It is considered that there are many examples of service experience of outdoor HV GIS with rated voltage >52kV. In this working group, the scope will be focused on outdoor HV GIS, hence the study result should be useful to all voltage class outdoor GIS.

Target of the brochure:
Recommendations for manufacture and users to increase reliability of outdoor GIS and give guidance in case of feasible Standard and Regulation optimization

Deliverables:

☒ Technical Brochure and Executive summary in Electra

☒ Electra report

☒ Tutorial[5]

Time Schedule: start: 2019 **Final Report**: 2021

Approval by Technical Committee Chairman:

Date: December 28th, 2018

Notes: [1] or Joint Working Group (JWG), [2] See attached Table 2, [3] See attached Table 1, [4] Delete as appropriate, [5] Presentation of the work done by the WG, [6] See attached table 3

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
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 (ref. 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

Table 3: Potential benefit of work

1	Commercial, business or economic benefit for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical direction
5	Guide or survey related to existing techniques. Or an update on past work or previous Technical Brochures
6	Work likely to have a safety or environmental benefit