CIGRE Study Committee N° B2

PROPOSAL FOR CREATION OF A NEW WORKING GROUP

WG* N° B2.63	**Name of Convenor:** Rob Stephen (South Africa) E-mail address: StepheRG@eskom.co.za
Technical Issues # 7, 9	**Strategic Directions # 1, 2, 3**
The WG does not apply to Distribution Networks	
Title of the Group: Compact AC Transmission Lines	

Scope, deliverables and proposed time schedule of the Group

Background:

Given the difficulty in obtaining new servitudes (i.e. right-of-way) and the need to reduce the visual impact of overhead lines, utilities must consider designing and building new compact AC transmission lines to reduce their height and width, to increase line reactance/surge impedance, and to facilitate increasing the operating voltage of existing lines with minimal physical modifications.

The largest opportunity for compaction exists at line voltages from 100 to 400 kV where traditional line phase spacing may be more generous. AC lines at this voltage level are often subject to large post-contingency loadings from the loss of higher voltage lines and generating stations and often must be maintained without taking them out of service. Therefore, compact designs must accommodate live line working and possess high power flow capacity.

Scope:

The objective of the proposed WG is to identify the balance between reduction in phase-phase spacing and structure height with the need to perform routine maintenance without taking these lines out of service. The scope will include finding ways to maximize their emergency power flow capacity to handle occasional but severe post-contingency loads. In certain line routes, it may be required to add a section of cable in areas where the overhead line cannot be placed. The scope includes consideration of compact overhead-underground transition structures used where underground cable sections may be necessary.

Where possible the cost of compacting lines as well as the cost of profiling to reduce blowout will be evaluated.

The main tasks of the WG will include the study of the following line design parameters:

a) Corona
b) Bundle design (expanded, asymmetrical)
c) Audible noise and Radio Interference
d) Overvoltage (switching and lightning surges)
e) Live line maintenance clearances
f) Conductor mechanical parameters

The compaction techniques that will be covered include:

a) Tower spotting

b) Reduction of blowout to limit servitude width
c) Bundle conductor choices including HTLS conductors
d) Insulator selection and arrangements
e) Tower types (cross rope, Racket type, pole. lattice)
f) Live-line maintenance techniques
g)

Specific Actions are:

1. Prepare a Technical Brochure or Electra scientific paper
2. Prepare a tutorial, including possibly a demo

Target date – 2018

Deliverables : Report to be published in Electra or as a Technical Brochure

Time Schedule: Start: May 2015 **Final Report:** 2018

Comments from Chairmen of SCs concerned:

Approval by Technical Committee:
Date: 23/04/2015

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