**CIGRE Study Committee B1**

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

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| **WG N° B1.67** | **Name of Convenor:** Volker Werle (GERMANY)<br>**E-mail address**: volker.werle@tennet.eu |
| **Strategic Directions #[2]: 1, 2, 3** | **Technical Issues #[3]: 5, 8, 9** |
| **The WG applies to distribution networks[4]: No** | |
| **Potential Benefit of WG work #[6]**: 1, 3 | |
| **Title of the Group: Loading Patterns on Windfarm Array and Export Cables** | |

**Scope, deliverables and proposed time schedule of the Group:**

**Background:**

Wind farms, both on-shore and off-shore, produce electricity in a non-continuous way, mostly depending on the time dependent wind intensity. The wind farm, the individual wind turbines and the infrastructure around have to be dimensioned such taking this into account. From a cable perspective the Array and Export cables must be dimensioned in a certain way; and several fundamental choices can be made.
Currently it is not clear what methods to use to represent the load, or what boundary conditions to use. Previous Cigré TB610 (specifically sections 4.5 – 4.7 and Appendix D.4) gives some examples which provides useful insights.

**Scope:** The Working Group shall answer the following questions:

1) To suggest and discuss various methods of assessment and assess the suitability of the method(s) given the benefits and limitations. The availability and the validity of data and what data is required are very important factors.
2) To study the impact of the different technical regimes, operating regime, and effects of overplanting, high wind ride through and other potential future impacts to the technical regime, to the methods of load representation and to the owners / operators of the assets.
3) To study the impact on the models with respect to the differences in environmental considerations from around the world
4) To discuss the impact of the load representation method(s) and where applicable, to determine benefits and disadvantages of the different dynamic thermal models based upon a load representation(s).
5) To study how the degree of cable design optimisation, environmental factors and regulatory regime affect the requirement to have thermal monitoring.
6) To discuss the benefits of dynamically rated cable systems. This can be further broken down to installation conditions, statutory constraints and economic impact.
7) To comment on the bi-lateral influence of the method(s), the economic regime(s) and political stakeholders and the bearing it may have on the Total Cost of Energy / Total Cost of Ownership.

**Deliverables:**

☒ Technical Brochure and Executive summary in Electra

☐ Electra report

☒ Tutorial[5]

**Time Schedule**: start: Late 2018 **Final Report**: April 2021

**Approval by Technical Committee Chairman**:

**Date**: December 19th, 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)**

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| **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)**

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| **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**

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| **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 |