CIGRE Study Committees D2 and C2

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

JWG N° D2/C2.48	**Name of Convenor:** Gareth Taylor (UK) **E-mail address**: gareth.taylor@brunel.ac.uk
Strategic Directions #[2]: 1,2	**Technical Issues #[3]:** 8,6
The WG applies to distribution networks[4]: Yes	
Potential Benefit of WG work #[6]: 3,4	
Title of the Group: Enhanced Information and Data Exchange to Enable Future Transmission and Distribution Interoperability	

Scope, deliverables and proposed time schedule of the Group:

Background:

Overall power system operation and planning needs to change significantly to exploit ongoing and emerging smart grid developments. The conventional approach to the operation and planning of transmission and distribution networks, as virtually separate entities with limited interoperability, will no longer be applicable or practical in the near future especially with regard to achieving whole system flexibility as made available by distributed generation, active consumers and new market options. As economic and public pressures increase on grid operators and grid development, through the progressive evolution of smart grid functionality and reduced costs, distribution networks are transitioning towards active network management and are therefore posing serious challenges with regard to conventional transmission system operational procedures. Future transmission and distribution operational planning as well as real-time tools and modelling approaches will need to be modified, revised, updated and integrated with different ICT techniques as well as whole system data management that will consider overall system security, need of flexibility, stability, resiliency and affordability. By way of example, appropriately detailed representation of distribution networks as required in operational procedures for transmission systems needs to be specified. However, such representations will be constrained by computationally demanding processes, intensive data management, data confidentiality and cybersecurity issues at both distribution and transmission system operator levels. Therefore, enhanced Information systems and data exchange will be essential with regard to enabling future transmission and distribution system interoperability

Scope:

1. Identify the key parameters and information as required for the Transmission System Operator–Distribution System Operator (TSO-DSO) information and data exchange processes with regard to formally defined business and use cases as based on IEC 62559 standard and the Common Information Model (CIM) as defined in the IEC 61970/61968/62325 standard series. For complex systems, the standardized use case methodology as based on IEC 62559 supports a common understanding of functionalities. The CIM standardizes semantics in order to achieve interoperability across areas such as, network operations, asset management and electricity markets.
2. Critical assessment and evaluation of information and data requirements for whole system network modelling approaches and analyses within operational time frames.
3. Develop novel information systems and data exchange to support integrated modelling procedures to enhance whole system modelling and analysis, thereby providing the level of modelling accuracy required for coordinated operational planning. Including improvements through new standardised types of static and dynamic equivalent model representation with regard to both transmission and distribution levels.

4. Develop standardised procedures for management and mitigation of cyber security risks resulting from the introduction of intelligent devices in the distribution and transmission networks and the increasing exchange of data between TSO and DSO. Define and develop roles and responsibilities for the TSO and DSO.
5. Develop and establish standardised business and use cases based on IEC 62559 standard and IEC 61970/61968/62325 standard series in order to justify required levels of enhanced transmission and distribution interoperability. For example, ancillary services as provided by DSOs in order to deliver such services to a TSO.
6. Investigate and design secure, scalable and standardised information systems and data exchange platforms to enable enhanced transmission and distribution interoperability.

Deliverables:

Technical Brochure and Executive summary in Electra

Contributions to national and international CIGRE events

Tutorial[5]

Time Schedule: start: August 2018 **Final Report**: July 2020

Approval by Technical Council Chairman:

Date : 21/08/2018

Notes: [1] or Joint Working Group (JWG), [2] See attached Table 2, [3]See attached Table 1, [4] Delete as appropriate, [5] Based on 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