

Design and Development of Enhanced Data Exchange to Enable Future TSO-DSO Interoperability

Gareth A. Taylor¹, Eric Lambert², Frank Marten³ and Mathias Uslar⁴

¹ Brunel Institute of Power Systems, Brunel University London, Uxbridge, UK

² EDF R&D, EDF Lab Paris-Saclay (Essonne), France

³ Fraunhofer IEE, Kassel, Germany

⁴ OFFIS, Oldenburg, Germany

¹gareth.taylor@brunel.ac.uk, ²eric.lambert@edf.fr, ³frank.marten@iee.fraunhofer.de, ⁴Mathias.Uslar@offis.de

Presenters – Gareth A. Taylor and Eric Lambert

Keywords – TSO-DSO Interoperability, Smart Grid Architecture Model, Use Case

Abstract – This presentation will present the design and development of novel Information and Communication Technology (ICT) tools and techniques that can facilitate scalable and secure information systems and data exchange between Transmission System Operators (TSOs) and Distribution System Operators (DSOs) [1]. The presentation addresses three novel aspects in the development of ICT tools and techniques development: scalability – ability to deal with new users and increasingly larger volumes of information and data; security – protection against external threats and attacks; and interoperability – information exchange and communications based on existing and emerging international smart grid ICT standards [1]. In addition, the formal specification of standardised uses cases [2, 3] will be described from the perspective of the Smart Grid Architecture Model (SGAM) [4].

The presentation will focus on enhanced TSO-DSO interoperability, but will also consider DSO interaction with other market-participants (DSOs, Aggregators, Distributed Energy Resource Operators, Micro-grid Operators) [1]. Furthermore, the design and development of information or data access portals that enable business processes involving relevant actors in the electrical power sector will also be presented [1]. The presentation will also present details of the research and development as required to ensure that greater levels of TSO-DSO interoperability can be realized, and to also harmonise a wider range of standardisation activities that are presently underway or complete [1].

The presentation will also address Unified Modelling Language (UML) defined interface specifications for information exchange between TSOs and DSOs that will be provided based on Use Case analysis and IEC 61970/61968/62325 standards [2,3]. UML defined interface specifications for information exchange between DSOs and market participants will also be presented based on Use Case analysis and IEC 61850 and IEC 62325 standards to support highly automated information exchanges [2,3]. The presentation will also include details of a suite of information and communication protocols as integrated with the defined interfaces. Details of Proof of Concept will also be presented with reference to using field tests and demonstration with industry specification at both TSO and DSO levels.

References

1. TDX-ASSIST, Coordination of Transmission and Distribution data eXchanges for renewables integration in the European marketplace through Advanced, Scalable and Secure ICT Systems

and Tools, H2020 research and innovation programme, www.tdx-assist.eu (last accessed 16/3/18)

2. IEC 62559-2:2015: Use case methodology - Part 2: Definition of the templates for use cases, actor list and requirements list, 2015
3. IEC TR 62357-2: Power Systems and Information Exchange Use Cases (Technical Report), 2017
4. CEN-CENELEC-ETSI Smart Grid Coordination Group, Smart Grid Reference Architecture, November 2012

Acknowledgement - This research presented in this presentation has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774500.