

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP¹

WG C6.39	Name of Convenor: Jan von Appen (Germany) E-mail address: Jan.vonAppen@iee.fraunhofer.de	
Strategic Directions #²: 1, 2, 3		Technical Issues #: 1, 2, 5, 8, 10
The WG applies to distribution networks⁴: Yes		
Potential Benefit of WG work #⁶: 1, 2, 4, 5		
Title of the Group: Distribution customer empowerment		
Scope, deliverables and proposed time schedule of the Group: Background: <p>A more effective and efficient operation and use of distribution assets has a direct impact on the operation of the distribution system, and thereby the transmission system which provides the bulk electric power, and the dispatch of central power plants. The increasing deployment of Distributed Energy Resources (DER), particularly at the end-user point, including the consumer, and the empowerment of the consumer to make choices regarding consumption, are key elements in this evolution towards a more active and controlled distribution system. This working group examines the role of the consumer, customers buying electrical services, in managing the DER installed on their premises to achieve benefits to the distribution system operator (DSO). The relevant DER include solar power generation, battery energy storage, and controllable loads such as electric vehicles (EV), which can also provide electricity storage, heating and air conditioning systems and smart appliances. The integration and control of DER is enabled by the rapidly evolving sensor, communication and information technology infrastructure being deployed and the associated intelligent control systems.</p>		
Scope: <p>The scope of this working group is to study the contributions to the operation of distribution systems that can be made by customers through the deployment of distributed energy resources (DER) on their premises, supported by modern control and communication systems. Customer empowerment approaches include providing them the information required to understand their impact in better managing their consumption and the tools available to implement this management in a manner agreed with the distribution system operator. Load shifting and levelling are some of the tools. The following topics will be explored and elaborated within the WG.</p>		
<p>1. General context to customer engagement and empowerment opportunities – Distribution utility interests, expectations and requirements in-regard to the consumer. Potential role of the consumer in a more active distribution system and in an enhanced control of the distribution load.</p>		

2. Integration of DER available for customer empowerment – solar power generation, battery energy storage, and controllable loads such as electric vehicles (EV), which can also provide electricity storage, heating and air conditioning systems and smart appliances.
3. Sensing, communication and control infrastructure required – Integration and interconnection of sensor, communication and information technology infrastructure. Intelligent control systems. Demand response implementation. Role and uses of smart meter data in providing information for decision making.
4. Implementation of customer empowerment and interaction with stakeholders – Benefits of demand response. Incentives provided to the customer. Establishing business cases for the installation of DER, EV charging, load control devices and smart appliances. Electricity markets, consumers' choices and time-of-use electricity pricing.
5. Review of current and planned practices and approaches to empower customers and the available power, control and communications.
6. Experiences and examples of deployments. Case studies.
7. Guidelines and existing practices, techno-economic challenges and present and future solutions.

Deliverables:

- Technical Brochure and Executive summary in Electra
- Electra report
- Tutorial⁵

Time Schedule: start: August 2018

Final Report: December 2020

Approval by Technical Council Chairman:

Date: 13/07/2018



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