CIGRE Study Committee C6

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

(J)WG [1]N° C6.47	**Name of Convenor:** Daniel Eghbal (Australia)
Strategic Directions #[2]: 1,2,3	**Sustainable Development Goal #[3]: 7,9,13**
The WG applies to distribution networks: ☒ Yes / ☐ No	
Potential Benefit of WG work #[4]: 1,2,3,4	
Title of the Group: DSO-customer interfaces for efficient system operation	

Scope, deliverables, and proposed time schedule of the WG:

Background:

Where DSOs used to design their networks for rather predictable loads and have the required reinforcements in place on time, the world could not be(come) more different. The climate issues (and transition to renewables) force customers to go about their energy use in a different manner, resulting in (rapid) increases in electrical loads (e.g. electric heating and mobility) and generation (e.g. solar and wind) on the distribution networks.

The natural reflex for DSOs might be to ramp up their grid reinforcement efforts to support the electrification. However, shortages in staff and materials do not always allow for timely reinforcement and significant grid reinforcement increases the electricity price for customers. Furthermore, low-capacity factors for certain use cases (e.g. for PV) raises the question whether all reinforcements would be cost effective. These developments require the DSOs to grow into their system operator role. Increasingly, the DSO can (due to increased integration of DERs) and needs to (due to capacity constraints) unlock and orchestrate the customer-side flexibility capabilities. It requires increased communication with the customers on the state of the grid and the behaviour that is expected from the customer. This will require some sort of DSO-customer interface(s).

Purpose/Objective/Benefit of this work:

Communication between the DSO and the customer requires a defined interface – an interface that goes beyond the capabilities of the regular (smart) energy meter. The working group is to investigate the requirements for communication, data exchange, visibility and controllability between a customer and its DSO. These requirements will be translated to (high level) design considerations for such an interface. Note that different design choices may be made for different types of customers and include the role of aggregators. These design considerations will help move towards international best practices and standards for information exchange between DSOs and customers.

Scope:

Customers include all customers connected to the DSO grid (residential, commercial, and industrial; generators and loads; on MV and LV). Also, the role of the aggregator is to be taken into consideration

The working group would investigate and report on:

1. definitions relating to the DSO-customer interface(s).

2. current and future use cases requiring DSO-customer cyber-secure communication, illustrating the purpose of/need for more extensive information exchange and interoperability.
3. levels of controllability and visibility required by the DSO linked to the use cases.
4. use cases for which a new/improved interface is needed/helpful.
5. what data needs to be exchanged to support the identified use cases requiring a DSO-customer interface (e.g., P, Q, I, U, E, instantaneous vs. averages vs. min/max, grid status, setpoints, maintenance schedules, emergency conditions, frequency of data- e.g. 5 minutes or 15 minutes).
6. what moment in time the data needs to be exchanged (e.g., day(s) ahead, intraday, real-time, after the fact).
7. the role of aggregators in the use cases.
8. current standards pertaining to DSO-customer interfaces.
9. past and current DSO-customer interface implementations (hardware and software) and their pros and cons in relation to the current and future use cases.
10. potential novel ways for interface implementations (smart meter, new hardware interface, new software interface, …)
11. design recommendations for a DSO-customer interface, potentially differentiated for different types of customers, considering the roles of the aggregator and retailer, including the physical interface.
12. conclusions, future perspectives, and emerging technologies.

Remarks: The work will be carried out in collaboration with experts from SC's B5, C2, C5, and D2.

Deliverables:

☒ Annual Progress and Activity Report to Study Committee
☒ Technical Brochure and Executive Summary in Electra
☒ Electra Report
☐ Future Connections
☐ CIGRE Science & Engineering (CSE) Journal
☒ Tutorial
☐ Webinar

Time Schedule:

• Recruit members (National Committees)	Q3 2023
• Develop final work plan	Q4 2023
• Draft TB for Study Committee Review	Q4 2025
• Final TB	Q4 2025
• Tutorial	Q1 2026

Approval by Technical Council Chairman:

Date: July 11th, 2023

Notes:
[1] Working Group (WG) or Joint WG (JWG),
[2] See attached Table 1,
[3]See attached Table 2 and CIGRE reference Paper: Sustainability – at the heart of CIGRE's work.
[4] See attached Table 3

WG Membership: refer Comments at end of document

Table 1: Strategic directions of the Technical Council

1	The electrical power system of the future reinforcing the End-to-End nature of CIGRE: respond to speed of changes in the industry by preparing and disseminating state-of-the-art technological advances
2	Making the best use of the existing systems
3	Focus on the environment and sustainability (in case the WG shows a direct contribution to at least one SDG)
4	Preparation of material readable for non-technical audience

Table 2: Environmental requirements and sustainable development goals

	CIGRE selected the 7 SDGs that are the most relevant to CIGRE. In case the WG work refers to other SDGs or do not address any specific SDG, it will be quoted 0.
0	Other SDGs or not applied
7	**SDG 7: Affordable and clean energy** Increase share of renewable energy; e.g. expand infrastructure for supplying sustainable energy services; ensure universal access to affordable, reliable, and modern energy services; energy efficiency; facilitate access to clean energy research and technology
9	**SDG 9: Industry, innovation and infrastructure** Facilitate sustainable infrastructure development; facilitate technological and technical support
11	**SDG 11: Sustainable cities and communities** Increase attention on sustainable and resilient buildings utilizing local (raw) materials, power for electric vehicles, strengthening long-line transmission and distribution systems to import necessary power to cities, developing micro-grids to reinforce the sustainable nature of cities; protect and safeguard the world's cultural and natural heritage; reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and waste management
12	**SDG 12: Responsible consumption and production** E.g. Promote public procurement practices that are sustainable; address reducing use of SF6 and promote alternatives, encourage companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle, address inefficient fossil-fuel subsidies that encourage wasteful consumption
13	**SDG 13: Climate action** E.g. Increase share of renewable or other CO_2-free energy; energy efficiency; expand infrastructure for supplying sustainable energy; strengthen resilience and adaptive capacity to climate-related hazards and natural disasters; integrate climate change measures into national policies, strategies and planning; improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
14	**SDG 14: Life below water** E.g. Effects of offshore windfarms; effects of submarine cables on sea-life
15	**SDG 15: Life on land** E.g. Attention for vegetation management; bird collisions; integration of substations and lines into the landscape

Table 3: Potential benefit of work

1	Commercial, business, social and economic benefits 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 directions
5	Guide or survey related to existing techniques; or an update on past work or previous Technical Brochures
6	Work likely to contribute to improved safety.

Comments:

1) CIGRE Official Study Committee Rules: WG Membership

https://www.cigre.org/GB/about/official-documents

a. Only one member per country (by exception of SC Chair)

b. WG nominees must first be supported by their National Committee (or local SC Member) as an appropriate representative of their country.

c. Acceptance of the nomination is granted by the SC Chair and advised to the WG Convener

2) Collaboration Space

https://www.cigre.org/article/GB/collaborative-tools-2

CIGRE will provision the WG with a dedicated Knowledge Management System Space.

The WG will use the KMS for drafting collaboration, capture and retention of discussion and meeting records.

Official country WG Members will be sent registration instructions by the Convener.

Official country WG Members may request the WG Convener to allow additional access for an extra national subject matter specialist to aid in the work at the national level, including NGN members.