

**CIGRE Study Committee D2**

**PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP**

<b>WG 1<sup>o</sup> D2.53</b>	<b>Name of Convenor:</b> Zhengyun Sun <b>E-mail address:</b> szyd2@sgcc.com.cn
<b>Strategic Directions #2: 1</b>	<b>Sustainable Development Goal #3:9</b>
<b>The WG applies to distribution networks:</b> <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	
<b>Potential Benefit of WG work #4 :</b> 3,2,4	
<b>Title of the Group: Technology and Applications of Internet of Things in Power Systems</b>	
<b>Scope, deliverables and proposed time schedule of the WG:</b> <b>Background:</b> <p>The Internet of Things (IoT) represents the penetration, expansion and extension of the Internet into the physical world, connecting power system assets to themselves and to people. To achieve its full potential, data silos between operations and business management should be eliminated. The expected benefits of IoT are: internal and external resources sharing, building industrial ecology, creating innovative business models, and promotion of digital transformation in companies. The IoT provides a new mode of production and consumption, with which the generated massive data become a valuable asset itself, thus lead to the extensive participation of stakeholders. It has become a core element of value re-creation and economic development in power systems.</p> <p>In line with the development trend of the energy revolution and the digital revolution, the construction of the IoT is a new solution for challenges brought by power grid digitalization. Some of its effects are:</p> <ol style="list-style-type: none"> <li>1. Improving full range perception: the perception of equipment in energy production, transmission and consumption sectors and consumers' state.</li> <li>2. Improving ubiquitous connectivity: realization of full-time, universal connectivity among energy sector stakeholders.</li> <li>3. Improving the ability of integration and innovation: construction of the deep integration and data fusion between the "Internet of Energy" and "Strong &amp; Smart Grid". Establishment of resource sharing and creation, continuous innovation of energy Internet business.</li> </ol> <p>The IoT technology will be increasingly utilized within the scope of all CIGRE's 16 Study Committees, as they in conjunction form the entire scope of CIGRE activities. Therefore, this new WG will focus on the technology developments as at the same time most or all other SCs will focus on applications under their own scopes. Study Committees D1 and D2 were formed to work transversally, i.e., interacting with all other SCs.</p> <b>Scope:</b> <p>The aim of the WG is to establish a reference document on a IoT platform solution for the electric power industry, including recommendations and best practices for related specifications and designs. This working group will cover:</p> <ol style="list-style-type: none"> <li>1. IoT's architecture in power system</li> </ol>	

Research on overall architecture of IoT in electricity, improving the full range sensing capability, ubiquitous connectivity and integration innovation capabilities by upgrading the information and communication infrastructure, promoting grid business optimization, and promoting emerging business expansion.

2. Edge & cloud collaborative computing model for the IoT  
Research on the architecture of the edge & cloud collaborative computing model and advanced technologies such as “cloud & fog cooperation” to support the opening up of device layer, network layer and platform layer.
3. Interfaces and protocols for the IoT.
4. Cybersecurity in sensors, interfaces and communications.
5. Information model for IoT  
Research of device-level and enterprise-level data model to solve information sharing and exchange problem between different devices, service terminals and business systems.
6. Research on integration of IoT technology on power industry and advice to application developer from technology's perspective.
7. New challenges brought by the IoT

**Deliverables:**

- Technical Brochure and Executive Summary in Electra
- Electra Report
- Future Connections
- CSE
- Tutorial
- Webinar

**Time Schedule:** start: Apr. 2020

**Final Report:** Apr. 2022

**Approval by Technical Council Chairman:**



**Date:** April 9<sup>th</sup>, 2022

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

**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	<b>SDG 7: Affordable and clean energy</b> 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	<b>SDG 9: Industry, innovation and infrastructure</b> Facilitate sustainable infrastructure development; facilitate technological and technical support
11	<b>SDG 11: Sustainable cities and communities</b> 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	<b>SDG 12: Responsible consumption and production</b> 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	<b>SDG 13: Climate action</b> E.g. Increase share of renewable or other CO <sub>2</sub> -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	<b>SDG 14: Life below water</b> E.g. Effects of offshore windfarms; effects of submarine cables on sea-life
15	<b>SDG 15: Life on land</b> E.g. Attention for vegetation management; bird collisions; integration of substations and lines into the landscape

**Table 3: Potential benefit of work**

<b>1</b>	Commercial, business, social and economic benefits for industry or the community can be identified as a direct result of this work
<b>2</b>	Existing or future high interest in the work from a wide range of stakeholders
<b>3</b>	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
<b>4</b>	State-of-the-art or innovative solutions or new technical directions
<b>5</b>	Guide or survey related to existing techniques; or an update on past work or previous Technical Brochures
<b>6</b>	Work likely to contribute to improved safety.