

**CIGRE Study Committee B5**

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

<b>WG 1<sup>o</sup> B5.78</b>	<b>Name of Convenor:</b> Nirmal Nair <b>E-mail address:</b> n.nair@auckland.ac.nz
<b>Strategic Directions #<sup>2</sup>:</b> 1, 2, 3	<b>Sustainable Development Goal #<sup>3</sup>:</b> 7 and 13
<b>The WG applies to distribution networks:</b> <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	
<b>Potential Benefit of WG work #<sup>4</sup>:</b> 1, 2, 3, 4, 5	
<b>Title of the Group:</b> New requirements of network protection and control for renewable energy integration	
<b>Scope, deliverables and proposed time schedule of the WG:</b> <b>Background:</b> <p>CIGRE B5 and other study committees have in recent years completed or undertaking working group activities with regards to understanding impacts due to larger integration of renewable energy plants to existing predominantly synchronous generation powered power system transmission and distribution grids.</p> <ul style="list-style-type: none"> <li>• <u>TB 421 (The impact of renewable energy sources and DG on Substation Protection and Automation)</u></li> <li>• <u>TB 629 (Coordination of protection and automation for future networks)</u></li> <li>• <u>TB 851 Impact of High Penetration of Inverter-based Generation on System Inertia of networks</u></li> <li>• <u>WG B5-48: Protection for developing network with limited fault current capability of generation</u></li> <li>• <u>WG B5/C4.61 - Impact of Low Inertia Network on Protection and Control</u></li> <li>• <u>WG B5.65 - Enhancing Protection System Support by Response of Inverter-based Sources</u></li> </ul> <p>There is a need to review the existing codes of practices, identify distinguishable Protection, Automation and Control System (PACS) boundaries to ensure selectivity and effective coordination for networks across the world. Hence this working group has been constituted to collate and report timely on the emerging new network protection and automation requirements</p> <b>Scope:</b> <ol style="list-style-type: none"> <li>1. Review of existing codes of practices and standards for PACS from the CIGRE technical brochures and working groups identified in the background.</li> <li>2. A synthesizing document that addresses the following items that is not addressed/solved by the existing review of existing documents from (1) will need to be identified and developed in this working group under “End-to-End renewable power system network protection coordination” <ol style="list-style-type: none"> <li>i. Developing PACS boundaries (HV, MV, LV) for effective protection selectivity, sensitivity and reliability</li> <li>ii. Any new control strategy for DER inverter to make traditional principle more adequate for relay protection. Any new control strategy for DER inverter shall attempt to allow traditional protection principles to work reasonably well</li> <li>iii. Fast protection adaptively coordinated with fault ride-through requirements</li> <li>iv. New methods and technologies for anti-islanding protection and intentional islanding</li> <li>v. PACS schemes enabled by latest communication technologies</li> <li>vi. Control functions on the integrated network</li> <li>vii. Automation strategy for secure end-to-end renewable integrated grid</li> </ol> </li> </ol>	

3. This working group will keep a regular track of what is going on globally in terms of standardization efforts and trends among utilities and manufacturers, either through mechanism of survey or through a preferential subject session during CIGRE SC B5 Colloquium or CIGRE B5 Paris session.

**Liaison member:**

SC C6 will be invited to have a liaison member in the WG

**Deliverables:**

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

**Time Schedule:** start: 08/2022

**Final Report:** Month 06/2025

**Approval by Technical Council Chairman:**

**Date:** August 2, 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.