**CIGRE Study Committee C4**

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

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| **WG [1]N° C4.63** | **Name of Convenor:** Nigel Shore (UK)<br>**E-mail address**: nigel.shore@hitachi-powergrids.com |
| **Strategic Directions :** 1, 2 | **Sustainable Development Goal :** 9 |
| **The WG applies to distribution networks: ☒ Yes / ☐ No** | |
| **Potential Benefit of WG work :** 1, 2, 3 | |
| **Title of the Group:** Harmonic power quality standards and compliance verification – a comparative assessment and practical guide | |

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

**Background:**

Harmonic power quality standards have, historically, developed separately in different countries and regions worldwide. Despite the existence of international standards and technical reports on the topic, significantly different approaches are applied in the way that aspects of harmonic assessment and control are treated in the grid and/or distribution codes and national regulations of various countries.

While clearly each country has a right to define its own regulations, and may have good reasons for applying specific local requirements, the essential electrical issues transcend national boundaries and there may be scope for differences to gradually dissolve as recognized best practice and attractive concepts from different locations are adopted elsewhere.

These differences arise in various aspects of harmonic standards and assessment, and include topics such as:

- Maximum harmonic order to be considered
- Treatment of inter-harmonics
- Provision of emission limits and allocation of “headroom” at planning stage
- Treatment of pre-existing harmonics
- Consideration of voltage versus current limits
- Assessment of network harmonic impedance
- Compliance verification and measurements
- Appropriateness for current technological developments

**Scope:**

The purpose of the proposed Working Group will therefore be to review as many international and national harmonic standards, regulations and practices as is feasible, and to:

1. Facilitate visibility of the many different standards and practices in use
2. Categorize the similarities
3. Indicate differences
4. Explain the reasoning behind differences, if this is known
5. Explain the implications of differences to understand the impact in terms of study results and equipment design for all stakeholders.

6. Where possible, assess and recommend “best practice” and future trends.

The resulting Technical Brochure will be of value to those concerned, worldwide, with the continuing development and revision of standards, as a guide for engineers working internationally who have to deal with significantly different regulations in different parts of the world, and to local utilities dealing with such international actors and needing to understand the implications of local regulations on international suppliers.

**Deliverables:**

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

**Time Schedule**: **Start**: October 2021 **Final Report**: June 2024

**Approval by Technical Council Chairman**:

**Date**: March 28th, 2021

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

**Table 1: Strategic directions of the Technical Council**

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| **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**

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| | 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**<br>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**<br>Facilitate sustainable infrastructure development; facilitate technological and technical support |
| **11** | **SDG 11: Sustainable cities and communities**<br>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**<br>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**<br>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**<br>E.g. Effects of offshore windfarms; effects of submarine cables on sea-life |
| **15** | **SDG 15: Life on land**<br>E.g. Attention for vegetation management; bird collisions; integration of substations and lines into the landscape |

**Table 3: Potential benefit of work**

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| **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. |