**CIGRE Study Committee C4**

## PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

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| **WG [1]N° C4.68** | **Name of Convenor: Patricio Munhoz-Rojas (BRAZIL)** |
| **Strategic Directions #[2]: 1,3** | **Sustainable Development Goal #[3]:9,11** |
| **The WG applies to distribution networks: ☒ Yes / ☐ No** | |
| **Potential Benefit of WG work #[4]: 3,4** | |
| **Title of the Group: Electromagnetic Compatibility (EMC) issues in modern and future power systems** | |

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

**Background:**

The electric power systems are undergoing changes that significantly impact their design and operation procedures. These changes include the existence of different parts of the system operating at different frequencies, with non-linear interfaces between them; changes in topology due to the presence of many small, distributed, generating units; changes in the availability of the sources due to the massive introduction of renewable sources; and changes in the control and monitoring processes that have allowed the existence of smart distribution grids and the integration of micro-grids.

With the intention to raise or increase CIGRE engineers' awareness on Power Quality (PQ) issues, former JWG CIGRE/CIRED C4.24 was created with a rather generic scope of producing a systematic overview study and assessment of the severity of the impact, on PQ, of the new characteristics of future power systems. As a result, the JWG produced TB 719-2018, which describes the PQ issues arising from the new characteristics of the power systems in various types of installations, shows the open issues and gives some general recommendations.

The new WG that is being proposed in this ToR should do a similar review but with special focus on EMC. It must produce a TB describing the main electromagnetic interference (EMI) problems, where they come from and the mitigating measures that are being implemented; and showing the open issues or topics where there is insufficient knowledge to implement appropriate mitigating measures.

**Scope:**

The emphasis of this Working Group will be on EMI problems arising from all disturbances (high frequency or low frequency) reaching power system equipment other than through the electricity supply lines and, similarly to JWG C4.24, its scope will be to create an inventory of knowledge on EMI issues in modern and future energy systems, with the aim of producing an overview on the subject. The precise scope will be as follows:

1. Produce an inventory of knowledge on EMI issues due to the non-linear nature of the interfaces between different parts of the system.
2. Produce an inventory of knowledge on EMI issues due to impulsive emissions of electromagnetic disturbances, originated either internally or externally to the power system.

3. Produce an inventory of knowledge on EMI issues arising from the distributed and non-dispatchable nature of new generating units.
4. Produce an inventory of knowledge on EMI issues arising from the changes in control and monitoring processes, such as the introduction of Intelligent Electronics Devices (IEDs), which allow the existence of smart distribution grids and the integration of micro-grids.
5. To review and assess the inventory of knowledge to produce an assessment of the severity of the impact of the new characteristics of modern and future power systems on its susceptibility to electromagnetic disturbances, both of natural and man-made origin, produced either internally or externally to the power system.
6. To summarize the main findings, identify open EMC issues or topics in which more data or research is necessary, and make some recommendations.

**Deliverables:**

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

**Time Schedule**: **Start**: August 2021 **Final Report**: March 2024

**Approval by Technical Council Chairman**:

**Date**: June 7th, 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. |