CIGRE Study Committee A1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG [1]N° A1.72	**Name of Convenor:** Yoon Duk Seol (CANADA) **E-mail address**: seol.yoonduk@hydro.qc.ca
Strategic Directions #[2]: 2	**Sustainable Development Goal #[3]: 9**
The WG applies to distribution networks: ☐ Yes / ☒ No	
Potential Benefit of WG work #[4] : 5	
Title of the Group: Survey on Generator and Motor multi-turn coils with dedicated turn insulation versus coils without dedicated turn insulation	

Scope, deliverables and proposed time schedule of the WG:

Background:

Multi-turn coil winding failures occur often due to inter turn insulation faults, possibly caused by inappropriate design, lack of manufacturing quality, thermal aging, partial discharges, switching surge voltages from circuit breakers, etc. In order to mitigate the impact from the destructive turn to turn faults, the coils are made with one of the following turn insulation systems:

1. Dedicated turn insulation (DTI) - each strand is insulated and each turn consisting of several insulated strands is insulated again.

2. Without dedicated turn insulation (without DTI) - each strand is insulated, and the strand insulation also acts as a turn insulation.

In North America, most of the multi-turn coils installed in generators and motors have DTI and many utilities require that the new stator coils include DTI. Nevertheless, the coils without DTI is a standard design for some manufacturers and this type of winding seems to be widely installed and operated outside of North America. Purpose of the survey is to compare the two types of turn insulation systems in terms of technical and economic aspects by gathering experiences and perspectives from different experts around the world.

Scope:

1) Characteristics DTI vs. without DTI coils
2) Criteria for choosing DTI vs. without DTI coils
3) Manufacturing and testing requirements
4) Technical advantages
5) Economic advantages
6) Experience sharing - premature failure and cause (DTI vs. without DTI coils)
7) Compile reference projects list: Year of Installation, MVA, kV, Country, etc.
8) Statistics: Percentage of rotating machines with non-DTI coils, etc.

Deliverables:

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

Time Schedule: start: November 2020 **Final Report**: August 2023

Approval by Technical Council Chairman:

Date: October 25th, 2020

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

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.