CIGRE Study Committee C3

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP[1]

WG* N° C3.17	**Name of Convenor: Katherine Palmquist** (United States) **E-mail address**: kpalmquist@exponent.com
Strategic Directions # (2): 1, 3	**Technical Issues # (3): 7**
The WG applies to distribution networks[4]: Yes	
Potential Benefit of WG work #[6]: 1, 2, 6	
Title of the Group: : Interactions between Wildlife and Emerging Renewable Energy Sources and associated Insulated Cables	

Scope, deliverables and proposed time schedule of the Group:

Background:

Electrical infrastructure interacts with wildlife, and these interactions may be either negative or positive. For example, overhead transmission lines represent a well-known collision risk for various bird species, while poles may provide valuable nesting sites. Emerging renewable energy sources (wind, solar, wave) and accompanying transmission systems are likely to interact with different wildlife, and in different ways, than do overhead transmission lines.

An example is wind farms that are sited to take advantage of wind currents that constitute major migration routes for key bird and bat species, which can result in mass mortality events. These areas, as well as those housing solar farms, are often in rural, remote or natural habitats and comprise a larger footprint than that of transmission corridors. Installation of underground cables connecting renewable projects to the power grid can result in the destruction of additional terrestrial habitat, and the energized cables will emit electromagnetic frequencies and elevated temperatures that may further disturb the surrounding environment. Offshore wind turbine structures are also sited along wind currents, often transecting routes between offshore foraging grounds and rookeries. Submarine transmission circuits, including those that carry power generated from offshore renewable sources and those that simply transverse bodies of water, emit electromagnetic frequencies that can be detected by a number of aquatic species, including fish, marine mammals and sea turtles. Construction of cable routes and turbine footings also may impact benthic communities. Conversely, the foundations and footings of offshore turbines are likely to provide valuable hardground habitat for fish and other marine species.

Depending on the environmental context, these emerging renewable power sources have the capacity to impact a number of important wildlife species, through both direct and indirect effects. However, the ecological risks and benefits of such projects have only been partially studied and defined. Hence, there are significant uncertainties regarding the ecological outcomes of wildlife interactions with renewable power sources. The benefits of operational and technical mitigation measures to protect wildlife from these renewable projects are similarly uncertain.

Scope:

1. The objective of the working group is to gather knowledge and best practices about **interactions of wildlife with renewable projects and the submarine and underground cables that connect them to the power grid.** .
2. For a better understanding of these interactions, the working group will pool the results of some scientific studies and will compile experiences from different TSOs.
3. The working group will conduct an analysis to identify the main drivers regarding TSO´s interest on this issue.
4. Methods for monitoring and analyzing wildlife incidents will be assessed, and areas of uncertainty and knowledge gaps will be identified

5. Potential mitigation methodologies utilized by different TSOs will be identified and compared in terms of efficiency. Areas of uncertainty and knowledge gaps will also be identified
6. The working group will analyze existing studies, projects, solutions, but will not conduct R&D studies or experiments.
7. Lastly, the working group will explore the existing partnerships with scientists, local authorities or Environmental Protection Associations to progress on this issue. Cooperation with existing agencies, such as The Renewable Grid Initiative, will also be pursued. Communication tools could be developed to spread a common level of information.

This WG will mainly work on renewable projects and associated transmission systems and will focus on operational aspects of the grid, though construction impacts will also be considered. Issues with wind turbine farms will be considered first, as these are likely to impact both terrestrial and marine wildlife. Effects of submarine and underground transmission circuits will be considered in conjunction with their respective RES systems. The direct and indirect effects of solar farms on wildlife will also be considered. All these topics should represent the most important part of the work of the group.

Deliverables:

- Report to be published in Electra or technical brochure with summary in Electra.
- Guideline for managing interactions of renewable energies with wildlife.
- Tutorial material as appropriate for dissemination of findings

☒ Technical Brochure and Executive summary in Electra

☒ Electra report

☒ Tutorial[5]

Time Schedule: start: July 2017 **Final Report**: May 2020

Approval by Technical Committee Chairman: M. Waldron

Date: 12/05/2017

Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (ref. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non-technical audience

Table 3: Potential benefit of work

1	Commercial, business or economic benefit 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 direction
5	Guide or survey related to existing techniques. Or an update on past work or previous Technical Brochures
6	Work likely to have a safety or environmental benefit