

Study Committee C3

POWER SYSTEM SUSTAINABILITY

AND ENVIRONMENTAL PERFORMANCE

Tuesday 27/08/2024

Chairman: Mercedes Vázquez (REDEIA-ES)

Secretary: Angel Salinas (REDEIA-ES)

Special Reporters:

- **PS1: Marta Sacha (PSE-POL)**
- **PS2: Klemens Reich (APG-AUT)**
- **PS3: Tor Laneryd (HITACHIENERGY-SE)**

1. INTRODUCTION

The 2024 discussion meeting of Study Committee C3 was held on 27th September in room Havane (PS1, PS2 & PS3) at the Palais des Congrès in a full day session. The sessions were mainly face to face. Sparkup used as the tool for local and online interactivity.

The Group Discussion Meeting (GDM) was held for discussing the following three Preferential Subjects:

- PS1: Public acceptance and stakeholder engagement in power system generation, transmission & distribution infrastructures
 - PS2: Climate change and impact on power system, a holistic approach
 - PS3: Sustainability starting for the supply chain.
-
- PS1: 12 papers, 15 questions. 13 contributions with presentations to 10 questions; 3 questions did not have a written contribution. There was a total of 1 spontaneous contribution with discussion.
 - PS2: 12 papers, 12 questions. 11 contributions with presentations to 7 questions. There was a total of 0 spontaneous contributions with discussions.
 - PS3: 11 papers, 14 questions. 27 contributions with presentations to all the questions (14). There was a total of 2 spontaneous contributions with discussions.

There were no spontaneous contributions through *Sparkup*.

2. RUNNING OF THE MEETING

The Discussion Group Meeting was chaired by the Study Committee Chairwoman, *Mercedes Vàsquez*, with *Marta Sacha (PS1)*, *Klemens Reich (PS2)*, *Tor Laneryd (PS3)* as Special Reporters and *Angel Salinas* as SC C3 Secretary. Contributions from the audience were also enabled through use of the *Sparkup* application to allow questions to be asked and responded to on line. The *Sparkup* application and questions were managed by the SC3 Secretary.

The morning session started with a summary by the SC Chair of the scope of the work of SC C3. The chairperson also provided a quick summary of the procedure for running the GDM. The chairperson then introduced the special reporters and the preferential subjects and indicated that the special reporters would provide a brief discussion of each preferential subject prior to the contributor presentations.

3. CONTRIBUTIONS TO PREFERENTIAL SUBJECT 1

The conclusions from the presentation and discussions may be briefly summarized as follows:

- The contributions presentation was divided into 3 sections:
 - 1) Strategies, tools, indicators, and methods that allow for an effective stakeholders' engagement (Methods enabling the consideration of public opinions and conclusions from stakeholders in RES development process and transmission infrastructure development process.
 - 2) Experiences in dealing with public acceptance of new and existing infrastructures (Experiences related to public participation in the hydropower sector + Experiences in dealing with public acceptance during the planning, modernization, and construction of substations and power lines).
 - 3) Role of mitigation, compensation, and offsetting measures - whole life of infrastructures (Specific technical solutions reducing spatial scope of transmission lines impact which can increase public acceptance of the infrastructure + Biodiversity and environment as a sensitive topic for stakeholders)
- Public participation in energy infrastructure is increasingly recognized as a crucial element in the planning, development, and implementation of sustainable energy systems.
- All contributions highlight the various dimensions of public participation in energy infrastructure, including its benefits, challenges, and the strategies that can be employed to facilitate more effective public engagement.
- There are many concerns about the scale of upcoming needs for grid development.
- A very interesting discussion took place after all the contributions were presented. It was a great opportunity to share experiences with public participation in grid development, including examples from India, Montenegro, and Senegal.

4. CONTRIBUTIONS TO PREFERENTIAL SUBJECT 2

The conclusions from the contributions presentations and discussions may be briefly summarized as follows:

- Regarding climate change risks more flexibility in discussion between scientists and stakeholders is needed. Data is also sometimes confidential, which can be a burden. But generally, the public awareness of climate change risks is rising, and risk mitigation measures are more and more on the agenda of responsible entities.
- Risk models deal with different datasets, with different spatial resolution and time frames (eg. climate models mesh of 10 km, with 3h at most) and different complexity and uncertainty. This makes it sometimes difficult to support effective discussion and decision making. The confidence in future projections is increasing sometimes slowly.
- Specific experience in scenario definition shows difficulties in identifying/using climate projections and evaluation of social economic pathways. The different models and results can be evaluated by some indicators, which was helpful in each example.

- Energy system planning incorporating climate change often considers suitable scenarios, but these will be only fulfilled if all projects (wind, PV, ...) are in plan as well as the related grid projects. The electrification will also increase the demand, which is expected to double.
- Integrating scientific and technological results and policies into actions: Need of climate risk analysis, risk are also related to the integration of the models and the integrated simulations with granularity of components. New technologies and tools are needed.
- Response to Natural Disasters at Transmission and Distribution Companies in Japan: Strong winds, like a Typhoon which can have wind speeds ranging to 40 m/s, are a severe risk. For risk mitigation measures based on regional wind projections (including profile of terrain) can result in the replacement of poles of distribution lines by cables. Project examples with such cable projects with shared ducts in cooperation with road administrators and other entities were presented.
- In grid operation the (n-1) criterium might not be enough in the future to deal with climate change risks on energy assets. Several technologies to increase the resilience to wind, fire, floodings, and other climate related risks, are available, and can be realised easily especially when new projects are planned in the design stage. The impact of climate change risks on maintenance protocols, methods, and content to train staff on emergency response, and other processes was mentioned.
- The application of new technologies should be faster, e.g. regarding SF₆ alternatives. This results also in the fact that technology decision processes cannot longer based on very long-term experiences (e.g. some people ask for 10+ years of experience to proof the reliability a specific technology).
- Indirect climate change risks are also an important topic, e.g. an increased risk of avalanches for existing assets in mountainous areas when forests disappear because it became too dry and hot for existing types of trees during summer.

Young Engineer Presentation: A paper from The Netherlands (NL) was presented during the PS2 (paper: 11879) “The impact of climate change on the Dutch transmission grid: Leading risks and adaptation strategies”.

5. CONTRIBUTIONS TO PREFERENTIAL SUBJECT 3

The need to quantify sustainability impact through Life Cycle Assessment (LCA) is getting increasingly recognized within the electric power transmission industry. This was reflected in the Group Discussion of C3 Preferential Subject 3 “Sustainability starting for the Supply Chain” which accepted 27 prepared contributions on eco-design, circular design and sustainable procurement.

Reduction of CO₂ emissions were discussed considering everything from reducing SF₆ leakage by use of alternative insulation gases, balancing losses and material usage, and design optimization based on LCA. Power Transformers were commonly used as an example for the LCA, with GIS and battery energy storage as other examples.

Aside from decarbonization, other sustainability impacts such as sound pollution and water usage were highlighted. LCA was generally considered as an excellent tool but with some gaps. The source of data is considered a big problem especially for small manufacturers and more standardization and digitalization is needed.

6. CONCLUSION

Throughout the document, the conclusions of the GDM have been pointed out.

All the contributions, including spontaneous contributions and suggestions, provided many interesting ideas and useful discussions.