

Mario Ndreko, TenneT (representing ENTSOE)

Expert Group Interaction Studies and Simulation Models (EG ISSM) for PGMs/HVDC

- **Members**
- **Timeline**
- **Tasks**
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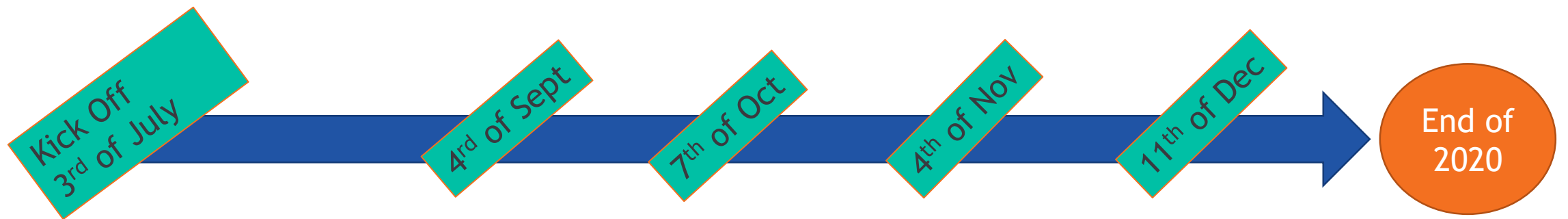
EG-ISSM Members

| | Name | Organisation | Representation at GC ESC |
|----|---------------------------|-------------------|--------------------------|
| 1 | Mario Ndreko | TenneT DE | ENTSO-E |
| 2 | Macarena Martín Almenta | REE | ENTSO-E |
| 3 | Hani SAAD | RTE | ENTSO-E |
| 4 | Tobias Hennig | Amprion | ENTSO-E |
| 5 | Ioannis Theologitis | ENTSO-E | ENTSO-E |
| 6 | Ton Geraerds | RWE | VGB |
| 7 | Eric Dekinderen | VGB | VGB |
| 8 | Jesus Bernal Lopez | Iberdrola | SolarPower Europe |
| 9 | Juan-Carlos Perez Campion | Iberdrola | SolarPower Europe |
| 10 | Daniel Premm | SMA | SolarPower Europe |
| 11 | Musa Shah | Lightsource BP | SolarPower Europe |
| 12 | Naomi Chevillard | SolarPower Europe | SolarPower Europe |
| 13 | Vasiliki Klonari | WindEurope | WindEurope |
| 14 | Patrick Alizon | Vestas | WindEurope |
| 15 | Pascal Gartmann | Enercon | WindEurope |
| 16 | Ranjan Sharma | Siemens Gamesa | WindEurope |
| 17 | Cedric Lehaire | Veolia | COGEN Europe |
| 18 | Luvigi Di Raimondo | Solar Turbines | COGEN Europe |
| 19 | Alexandra Tudoroiu | COGEN Europe | COGEN Europe |
| 20 | Mike Kay | ENA | GEODE |
| 21 | Luca Guenzi | Solar Turbines | EUTurbines |
| 22 | Kevin Chan | GE | EUTurbines |
| 23 | Magdalena Kurz | EUTurbines | EUTurbines |
| 24 | Vincenzo Trovato | ACER | ACER |
| 25 | Adolfo Anta | AIT | EASE |
| 26 | Christian Krieger | Siemens | Orgalime |

Time line of the EG ISSM

Estimated workload

- 5 webinars
- commitment of 25 days per member



ToR – Tasks related to NC-HVDC Articles

Tasks description with regard to NC HVDC:

NC HVDC, Article 54 (1) and Article 70:

- The stakeholders have requested for clarification on the type of model (black box or open source model) as well as clarification on the accuracy of the models and its capability to reflect the adequate real behaviour of the installation

Task of the EG ISSM:

- **The EG shall define** the models needed, the model block layers as well as the relevant signal interfaces between the control layers in the models (black box, open source) in order to **perform accurate, reproducible and validated interaction studies**. Moreover:
 - The model structure shall support NC HVDC Article 70 and the amendment of the model during lifetime and the required modelling accuracy to cover all potential interaction risks

Tasks related to the NC RfG

NC RfG, Article 15 (6, c), 40:

Tasks

- The EG shall provide an overview of different types of dedicated models (black-box, open source, generic), representing the real plant (PGM) behaviour by implementing/embedding in the models the real source code. The latter for PPMs and SPGMs.
- The EG shall recommend use cases for the demonstration of adverse interactions studies for AC and for DC connected PPMs.
- The EG shall define the process for model validation (potentially with field tests) and model layers in black-box models (covering control and physical layers).
- The EG shall propose well defined interfaces in the simulation models for the control and physical layer of PPMs that need to be observable/accessible from stakeholders in grid connection and compliance verification studies.

Tasks related to the DCC

DCC, Article 21 (3):

- The stakeholders have requested to precisely define that the dynamic states of the model shall represent electromechanical phenomena based on root-meansquare (RMS) or positive sequence models. The phrase “including 50 Hz component” is unclear and suggests that the 50 Hz component is one of many components required in this type of dynamic studies. The content and format shall include "structure and block diagrams" is not a clear and coherence sentence.

DCC, Article 21 (4):

- it is not clear, why simulation models do not consider frequency regulation despite the capability of the demand response system frequency control is determined in paragraph 29 or DS connected PGMs.

Task: The EG shall address the above mentioned issues and provide recommendations and legal test proposals.

Structure of the Work – Report Outline

1. Studies

- Define the network environment for the studies (data, network details)

2. Phenomena to be investigated

- Define the list phenomena that are observed in term of interactions studies

3. Models per each phenomena and studies

- phenomena and methodologies of analysis
- Type of models (SPGMs, PPMs, HVDC)
- Model requirements and specifications for high quality models
- Process of the model refurbishment during the lifetime
- Data exchange and interlinks to SOGL

4. Validation of the models (SPGMs, PPMs, HVDC)

- Methodologies / process followed for model validation (Luca, Daniel)
- Type of tests that could be made to ensure compliance and model validation (Luca, Pascal)

5. Recommendation for the CNCs (Mario)

- Legal text amendments in the identified articles
 - NC HVDC
 - RfG
 - DCC

Risks

1. The time line of the work is too short
 - Many tasks to be completed in very short time
2. Engagement of the Stakeholders by providing contribution is important
 - Input is requested from Stakeholders involved in the identified tasks