



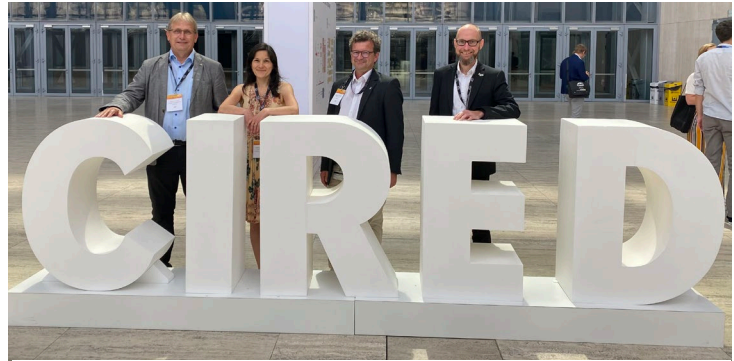
## EXECUTIVE SUMMARY

### Session 3 – OPERATION

#### SUMMARY

Session 3 received 248 abstracts. 41 had been reallocated to other sessions, 43 had been rejected and 164 had been accepted. Finally, we received 147 papers from main authors out of 33 countries and all 5 continents.

We had 24 papers, presented in the main session and 11 presentations we had in the RIF. The main portion of papers are about strategy and management in operation. Two blocks of main session addressed these topics. During the afternoon sessions papers about operation center and new use cases had been presented.



Session 3 – Technical Committee  
Carsten Böse, Maire-Cécile Alvarez-Herault,  
Andreas Abart, Helfried Brunner

#### MAIN SESSION 3 - BLOCK 1 / 2

##### Strategy and Management

From several papers regarding maintenance also focusing on vegetation one from Germany and a second from France presented methods of evaluating pictures from satellites and from UAVs and even vegetation models to optimize the pruning process. Further on a German DSO demonstrated the instantaneous inspection by drones after fault. From Korean DSO an online monitoring system regarding mechanical impacts on poles and from Slovenian manufacturer a sensor unit transmitting real time data from overhead lines wires to monitor thermal load, ice load and swinging of the wires where presented. OE, meaning operational envelopes were suggested from a Canadian contribution to avoid congestions.

The University of Melbourne gave insights into pros and cons of different operating envelope implantations across Australia. A German contribution from TU Darmstadt demonstrated a case study for MV-Grids with minimum voltage levels and balance of reactive power at high infeed, based on optimized power flow. Tackling the topic of e-mobility integration, Siemens Austria presented a C-HIL environment for parameter optimization of grid friendly charging control. Imperial Colleague London compared and analyzed the energy system benefits and implications of distributed flexibility operated under different operational coordination strategies. The EU project ATTEST introduced a scalable tool for the procurement of ancillary services for active distribution systems. A Spanish paper concluded Block 2, with presenting the performance analysis of a state estimator for low voltage grids using different AMI technologies.

#### MAIN SESSION 3 - BLOCK 3

##### Operation Center

Block 3 started with resiliency. From Sweden a dashboard indicating the actual grid status in respect to secure operation and from Austria results from successful black start testing with hydro plants and a combined gas turbine were presented. Thermal rating solutions were represented by a monitoring system regarding temperature, humidity, and wind to estimate possible overloading of transformers in secondary substations. From Belgium a paper presented a solution for real-time calculation of circulating currents in distribution systems followed by extended load and generation forecasting from Norway. Block 3 closed with a suggestion for a rule-based TSO-DSO interaction in respect to flexibility in Switzerland.



## **MAIN SESSION 3 - BLOCK 4**

### **New Use Cases**

Three authors showed how techniques from artificial intelligence could improve both operations and quality of service. Enedis made a focus on CartoLine, a tool that uses supervised machine learning to analyze the events received from the AMI communication infrastructure in order to predict malfunctions on the LV network several days in advance. A Senegalese DSO has equipped some MV/LV substations with smart meters and implemented a neural network-based algorithm to detect and classify voltage quality of service problems. The Austrian company Intelligent Connectivity Group proposed an AI-based algorithm to use telecommunication data for low voltage grid outage detection. Also, Schneider Electric provided some recommendations on the opportunities brought by digital twins. SIEMENS explored operations strategies to mitigate the implications of forecast uncertainty on the optimal renewable energy community operation. Finally, Smarter Grid Solutions presented the return of experience of a real microgrids built in Canada in 2020 after the rail disaster of 2013.

## **ROUND TABLE 15**

### **Digital Solutions for Maintenance**

Round table 15 will discuss the benefits and also highlighted the challenges to implement digital solutions from manufacturer and utility side.

## **ROUND TABLE 17**

### **Storage Technologies as an Opportunity for Distribution Systems**

RT 17 lightly explored the existing technology, the current status of the regulatory framework and debate the technical and business use cases that are being considered by the DSO's around the world when deploying energy storage systems.

## **ROUND TABLE 19**

### **Energy Communities**

Issues related to the optimal operation of ECs versus the optimal operation of the global system as well as the appropriate market design were addressed in this roundtable.

## **RESEARCH & INNOVATION FORUM**

Session 3 Research and Innovation Forum focused on all more scientific papers around distribution system operation. Several Universities as well as Research and Technology Organizations from three continents presented in total 11 papers. This included the paper from Jane Marchand (University Grenoble Alpes), which was awarded with the best young academic paper award. She presented how to use local renewable energy to energize a portion of a LV Grid in islanded mode.

## **POSTER TOURS**

Eight interactive poster tours had been guided by members of the Technical Committee and Session Advisory Group (SAG). Most authors took the opportunity to present their poster in detail and many attendees had the opportunity to discuss the solutions in detail with the presenters.

## **CONCLUSIONS**

Many papers highlighted the integration of generation, storage and flexible loads. The main focus was on the increasing digitalization in operation.