

EXECUTIVE SUMMARY

Session 3 – OPERATION, CONTROL AND PROTECTION

SUMMARY

The record number of 468 abstracts has been received for Session 3; 150 of them were called to submit a full paper, while finally 141 full papers have been accepted. About 130 authors took the opportunity to present a poster during CIRED 2015, 24 of them did additionally present their paper in the Main Session and nine papers were allocated to the Research and Innovation Forum (RIF). Beside the classic subjects of Session 3 – like crisis management, SCADA-Systems and earth fault location – new topics are rising in the field of operation, control and protection: The automation of low-voltage grids, islanding operation on distribution level and fault ride through capability of renewable generation units are getting more and more important all over the world.

Additionally to the paper selection and presentation two Round Tables with the hot topics “responsibility of distribution grid operators for system services” and “protection systems in networks with low level of short-circuit capacity” have been organized within Session 3.

MAIN SESSION 3 - BLOCK 1

Operation

Maintenance and condition assessment has been established in this block. Once again a lot of papers have been submitted for this topic since it is not solved sufficiently, yet. Nevertheless it is a major problem because most maintenance and renewal strategies are fundamentally based on a correct assessment of the component condition. Distribution Management is a big part of operation and many developments and studies and even practical experiences are shown in this block. The topic blackout prevention and the management of crisis is an established part in this block, due to the increasing responsibility of distribution network operators in case of emergence.

MAIN SESSION 3 - BLOCK 2

Control I

The topic Control has been presented within block 2 and 3 of the main session and focused the topics Islanding, SCADA&Communication and PMUs. Due to the increasing number of decentralized generators the questions around islanding grids becomes more and more important. Block 2 had a strong focus on this topic with three papers starting from the identification of islanded grids and ended in the operation of these networks. There is still a discussion about the methods to identify islanding and modern intelligent electric devices (IED) as well as well known devices can be used. As already discussed during the RT “protection systems in networks with low level of short-circuit capacity”, the question of controlling an islanded grid has to be answered. With the increasing number of IEDs the solution for communication as well as visualization need to be discussed and were part of block 2, too.

MAIN SESSION 3 - BLOCK 3

Control II

Block 3 focused on the distribution Automation divided into Low- and Medium Voltage Automation. From all Control papers these two topics represented the majority of all papers. Generally it can be seen that more and more pilot project for distribution automation (DA) are in their final stage and first results show the methods, rules and benefits for distribution grids. DA is also looking for open platforms to connect the IEDs and control applications. The major aspect for Automation functions is still the voltage stability due to voltage increase caused by high wind- and PV infeed and low load. In this field the open point is still a centralized versus a decentralized control strategy for the grid.

MAIN SESSION 3- BLOCK 4

Protection

In the protection block we have once again the traditional issues fault location and neutral grounding, applications of established protection concepts, new algorithms and simulations and the new sub

block fault ride through. Actually we see a wide field of developments, theoretical studies and practical experiments in the protection block. More and more upcoming is the topic “Fault Ride Through” and system services in the MV and LV grid. According to the European standards different strategies are discussed to keep the distribution grid stable. New algorithms to detect high impedance earth faults in compensated grids have been presented.

ROUND TABLE 8

Responsibility of distribution grid operators for system services

Since sooner or later the massive number of generation units on distribution level have to contribute to the system services, this calls for more responsibility of distribution grids and according grid operators for the overall power system. In this context three DSO representatives – Adolf Schweer (Mitnetz Strom; Germany), Olivier Huet (ERDF, France) and Robert Schmaranz (Kärnten Netz, Austria) – and one speaker from a TSO – Michael Kranhold (50Hertz Transmission, Germany) – discussed the important questions in this context: Is there a new role of the DSOs upcoming concerning system service? How is the demarcation between TSOs and DSOs? Is a “shared” responsibility possible? How can a “shared” system work? Does the current technical and regulatory framework fit for the new challenges? About 120 participants attended this Round Table, many of them did intensively contribute to the discussion using the new established on-line system.

ROUND TABLE 10

Protection Systems in Networks with Low Level of Short-Circuit Capacity

The integration of renewable generation leads to a reduction of short-circuit currents in distribution grids. Round Table 10 (chairman Wolfgang Gawlik (TU Vienna, Austria) experts: Thomas Bopp (Siemens AG, Germany), Alexandre Oudalov (ABB Switzerland, Switzerland), Ignaz Huebl (Kärnten Netz, Austria), Miguel Louro (EDP DISTRIBUIÇÃO, Portugal)) discussed the challenges of this trend as well as the needs to secure power system operation under these new conditions. The representatives of the manufactures showed their approaches in products as well as in planning tools to secure the protection of human life. The need for controlled islanding of grids was one main and still open question of Round Table 10.

RESEARCH & INNOVATION FORUM SESSION 3

Nine scientific papers covering all main topics of Session 3 have been presented in the RIF. With three contributions the LV- and – as actually new topic – the HV-fault ride through capability of renewable generation units was as a central subject of the RIF.

POSTER TOURS

The overall eight poster tours covered all topics from Session 3 (operation, control and protection) and were organized in two parallel tours guided by the session advisory members (SAG 3). All tours were well attended and about 10 to 20 highly interested delegates had a lot of discussions.

CONCLUSIONS

During the last years a massive and ongoing change in Europe's power systems can be observed from large scale power plants to more and more small decentralized mainly renewable generation units. This leads to several problems in operation, control and protection of distribution grids and calls for new solutions, which as upcoming topics have been discussed in Session 3 – beside the “evergreen” subjects in this field. But the question to answer above all is:

What is the (new) role of Distribution Grids and DSOs in future power systems?