4th PAC Modellers' Exchange Workshop

Protocol

Date: Thursday 29. October, 2020 9:00 to 13:00 Location: Zoom conference

Summary
The 4th Modellers' Exchange Workshop was dedicated to the question of how the future behaviour of distribution networks can be better integrated into European infrastructure planning. To get an insight into the future visions of distribution network operators and service providers, the workshop started with three keynote speeches. Afterwards, 21 participants from network operation, research, service and society discussed in small working groups what the first steps towards a stronger consideration of the distribution network in transmission system planning might look like.

1`sth Impulse lecture given by Dr. Enno Wieben (EWE)

Title- Energy Transition on MV-Level Dr.Enno Wieben
Head of Development Energy Systems, EWE

"EWE Netz is years ahead of the time. In 2018, 92% of the electricity in our grid was generated from renewable energy sources, in some months 100%." This is how you could summarize how Dr. Wieben began his presentation, showing why EWE is a showcase for the future. He explained the changes this means for the network operation and the technical adjustments that are necessary to convert a network designed for maximum load in such a way that as much RES electricity as possible can be absorbed. Afterwards he explained which further changes EWE expects due to the sector coupling and which are already being incorporated into network management and long-term network planning. However, the heating sector in particular remains a major area of uncertainty as it is not clear what role gases will play in future heat supply. An extensive switch to electricity would significantly increase the demands on the electricity grid.
Solutions which can reduce the expansion of the grid are above all flexibility options, redispach and reactive power management. In conclusion, Dr. Wieben emphasised the important role that digitalisation of the supply system will play and that the key to future control of a large number of smaller plants and consumers will be smart meters.

2`th Impulse lecture given by- Jonas Danzeise - Venios

Title- Real-time Grid Operation System

Mr. Danzeisen started with a short presentation of his company and shortly introduced projects within Europe and abroad that already use their software solution. He emphasised that non-European markets are particularly important for the development of the product, as they are less restricted by legal requirements, which makes it easier to implement new ideas. He then went into detail on the V. Energie platform developed by his company, which is characterised in particular by its interfaces to a large number of common software and hardware solutions and can thus be easily linked to existing systems. In addition, the product is self-learning, so that it is possible to start network optimisation with a small database. The system then starts to collect and analyse data, which makes the network control more and more extensive. The automation runs through different levels and at the end a fully automated network operation management is to be provided, which can independently call up existing flexibility options. In addition, there is a comprehensive concept to protect the application against attacks.

3`th Impulse lecture given by- Anne van der Molen – Netbeheer Nederland

Title - Integrated Infrastructure (outlook for) 2030 and 2050

Mr. van der Molen explained the need for the operators of the Dutch gas and electricity transport network to prepare an infrastructure outlook in the context of the implementation of the Paris Agreement. The two national transmission system operators had decided to work closely with the distribution system operators and to launch project II3050. The II3050 project also works closely together with government, industry and associations on harmonized energy scenarios, flexibility scenarios, infrastructure impact and network development planning. He highlighted the benefits of providing decision-makers with background information on the consequences of decisions in the development of the future climate-neutral energy system and the links between the following parts of the energy system.
- Interdependence between supply, demand and transport capacity.
- Interdependence between electricity, gas, hydrogen and heating.
- Interdependence between national, regional and local grids.
- Interdependence between sectors: industry, built environment, mobility and agriculture.
This will allow stakeholders, including network operators and infrastructure companies, to prepare themselves for (future) decisions.
He then went on to address stakeholder participation and explained the procedure for scenario development. At the end of his presentation he went into more detail about the influence of flexibility and the interaction of gas and electricity infrastructure.

After a short break the participations were send to one of three break-out sessions.

Results of the break out sessions:

Session 1

Due to the lack of expertise, group one decided to change the key question and to limit itself to discussing the heat sector.

Findings:

- Maps that show heat sources and heat sinks in small sections have a great added value both for the planning of a local heat supply and for the planning of the electricity network.
- As long as no decision has been made on how a future heat supply is to take place, a robust long-term planning of the distribution network expansion is not possible.
- - The use of hydrogen in private households will have a negative impact on energy demand, climate impact and costs compared to heat pumps, as a study by the FhG IEE shows. The use of both short-term and seasonal heat storage facilities could significantly relieve the gas and electricity infrastructure.
- Population density and energy efficiency of buildings have a main impact of the optimal heating solution.

Session 2

How can distribution networks be clustered?

Findings:

- Nowadays computing power relieves the need for clustering, in parallel modeling suits it allows to use real data for nearly everything.
- However, something like an overall European, cross-sectoral energy model as used in the TYNDP, which is also supposed to reflect the distribution network level, goes beyond this framework. In order to achieve acceptable model run times, simplification must be achieved, e.g. in the form of cluster information.
- The concrete solution to define clustering strongly depends on the question that should be modeled.
- Comprehensive European, sector wide optimization over decades is too complex for bottom-up optimization. Here clustering is definitely needed. Simulation and optimisation as well as bottom-up and top-down modelling are opposed to each other; the clustering should be done explicitly for the respective case. In the future, it will become more important to define interfaces for the exchange of data between DSOs and TSOs but also with the different sectors.

There was also an exchange about local optimization and artificial intelligence that can have an impact on modelling, but this discussion could not be concluded.

As take away from session 2 it could be said that it is crucial to describe very precisely the question to be modelled, which generally leads to the answer to the question how the clustering should be done by itself.

Session 3

What could distribution networks ideally contribute to relieving the transmission grid?

Findings:

- A regular and precise exchange of information between DSO and TSO would help to improve the scenarios.
- A governmental structure for cooperation in scenario building would be very helpful for both sides.
- Unbureaucratic dissemination of relevant information at the working level should be promoted.

After a short conclusion the Workshop ended at 13:00