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Kick-off for MIGRATE: International project investigates requirements for Europe's future electricity grid

The challenge posed by renewables – How much power electronics can the grid cope with?

- The European Union is providing roughly 17 million euros of funding for the research activities
- 25 project partners are investigating the potential, thresholds and preconditions for measures for controlling the grid in future
- The focus is on safeguarding grid stability, changes to control functions, and possible adjustments to grid connection rules

25 consortium partners from 13 European countries, including twelve transmission system operators (TSO), as well as universities and research institutions, jointly launched the MIGRATE project in Brussels on 20 January. The project name is derived from the research topic "Massive InteGRATion of power Electronic devices". The aim is to devise various approaches to solving key technical issues relating to grid stability, supply quality, and control and security of supply that arise owing to the challenge posed by the ever-increasing use of renewable energy feed-in sources. The project, which is designed to run for four years, is receiving funding of roughly 17 million euros from the EU, and it forms part of the EU's "Horizon 2020" framework programme for research and innovation.

"The question that has to be examined is: how much power electronics can the grid cope with?", said Mariana Stantcheva, the European Commission's INEA Project Officer, at the kick-off meeting in Brussels.

This is because, in future, the European integrated network will at certain points in time face new challenges at various locations due to the large amounts of electricity fed into it from wind and solar sources. Both electricity production on the one hand – due to the increasing share of renewable energy – but also consumption on the other hand – owing to the implementation of energy efficiency systems, for example – will increasingly be linked to the electricity grid through power electronics.

These effects are posing technical challenges, particularly for grid operators in relation to grid management. This is due to the fact that a power station generator, for instance, lacks the inertia that is needed to guarantee the necessary frequency stability at 50 Hertz.

In Brussels, MIGRATE project manager Andreas Menze from TenneT TSO presented the main focuses of the investigations which are becoming essential in light of the major CO₂ reductions in the energy system of the future:

- Maximisation of the amount of Renewable Energy Sources installed in the system while keeping the system stable
- Anticipation of future potential problems and challenges
- Clarification of the need of new control/protection schemes and possibly new connection rules to the grid

These issues are broken down into eight work packages and shared out between different workgroups. A key aim is to develop and validate technology-based solutions in the context of a pan-European electricity system, which is subject to a rapid increase in power electronics, both in relation to generation and consumption.

This overarching goal is split into two components combining two time horizons:

In the short to medium term, incremental technology-based solutions are needed to operate the existing electric HVAC system configuration with a growing penetration of PE-connected generation and consumption, based on novel methods and tools.

In the long term, breakthrough technology-based solutions are needed to manage a transition towards an HVAC electric system where all generation and consumption is connected via 100% PE, based on innovative control algorithms together with new grid connection standards.

The workgroups meet regularly to share their work results. The next meeting of the Executive Board, on which all the TSOs involved in the project are represented, will be held in the summer so that the initial results of the investigations can be presented and the next steps to be taken can be agreed.

In the meantime, it is not only the consortium partners who will actively work on their assigned tasks – other transmission system operators and research groups outside the project organisation can provide their input into the subject matter if they wish to do so. A so-called reference group will shortly be set up for this purpose, which is intended as a platform for inputting and sharing ideas. Any parties that are interested in the project can get in touch with the coordinator, TenneT, by sending an email to: migrate@tennet.eu.

MIGRATE overview graphic



Partner list of consortium partners

Participant No.	Participant legal name	Participant short name	Country
1 (Coordinator)	TenneT TSO GmbH	TenneT	Germany
2	Scottish Power Energy Networks	SPEN	UK
3	Réseau de Transport d'Electricité	RTE	France
4	Red Electrica de España	REE	Spain
5	Electricity Transmission System Operator	ELES	Slovenia
6	Amprion GmbH	Amprion	Germany
7	EirGrid	EirGrid	Ireland
8	Elering AS	Elering	Estonia
9	Fingrid Oyj	Fingrid	Finland
10	TERNA S.p.A.	TERNA	Italy
11	Landsnet	Landsnet	Iceland
12	ENERCON GmbH	Enercon	Germany
13	Schneider Electric	Schneider	France
14	University of Hanover	LUH	Germany
15	Delft University of Technology	TU Delft	Netherlands
16	University College of Dublin	UCD	Ireland
17	University of Manchester	UNIMAN	UK
18	Tallinn University of Technology	TUT	Estonia
19	Ecole Nationale Supérieure des Arts et Métiers	ENSAM	France
20	ETH Zurich	ETHZ	Switzerland
21	CIRCE Foundation	CIRCE	Spain
22	University of Ljubljana	UL	Slovenia
23	Technische Universität Berlin	TU Berlin	Germany
24	Electroinštitut Milan Vidmar	EIMV	Slovenia
25	ENSIEL	ENSIEL	Italy

Note to editors: The graphics can be requested in higher resolution in the TenneT press office.

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