

# New toolbox to help boost and secure European electricity networks

January 29 2016

---



EU researchers have created an innovative toolbox in order to ensure the safety and continued security of European electricity networks, and to help facilitate a greater shift towards renewable energy sources.

The EU-funded UMBRELLA project has unveiled its key successes and deliverables during a one-day workshop in Brussels on 26 January 2016. This included the creation of a toolbox prototype for Transmission System Operators (TSOs) to guarantee secure grid operation in future electricity networks with a high penetration of intermittent [renewable energy sources](#) (RES).

The toolbox enables TSOs to act in a coordinated European target system where regional strategies converge to ensure the best possible use

of the European electricity infrastructure.

There is a growing contribution of less predictable and more variable RES, which is taking place alongside the gradual integration of national markets into one common European electrical energy market. Market mechanisms are increasingly not being able to cover certain aspects of system security, leading to high deviations between scheduled and physical flows in terms of time, direction and volume.

As a consequence, meteorological forecasting errors may lead to unforeseen violations of operating limits and trigger cascading outages in stressed-system situations.

This results in the need for more complex operational planning and transmission operation, taking the network closer to its operational limits.

## **The UMBRELLA toolbox**

The UMBRELLA toolbox includes a deterministic and probabilistic optimisation framework for corrective actions to cope with simulated risks on different timescales and increasing system complexity. The overall aim of this is to reduce the total cost of uncertainty whilst also increasing system security and transmission capacity.

Individual software tools have been extensively tested using IEEE test systems based on the historical datasets of nine TSOs' target area through a decentralised approach. They were also applied to historical case studies, such as the European cold snap on 8 February 2012 and the stressed-grid situation that arose on 22 August 2012.

The tests conducted showed that overall the UMBRELLA toolbox is able to calculate remedial actions to ensure the safe and reliable operation of

the transmission network, as well as gives the operator additional information about the range of uncertainty to be expected.

'This gives the operators and operational planners the necessary time to prepare the actual implementation of the proposed remedies,' commented project coordinator Helmut Paeschke.

Useful for TSOs, the UMBRELLA tools offer users the flexibility of applying either individual modules or the complete set of functionalities.

## Next steps

Further development of the toolbox and a parallel dry run are currently being prepared. The UMBRELLA toolbox will be embedded in established information systems and consequently, the extension of data exchanges will be crucial. To make the rollout of the toolbox as smooth as possible, the project recommends a stepwise approach for its implementation by TSOs and other relevant stakeholders.

Finally, the project has provided a series of key recommendations to regulators, policy makers and TSOs in fostering the necessary harmonisation of the legal, regulatory and operational framework to allow for full data exchange for the application of the new software tools.

**More information:** For more information please see the UMBRELLA project website: [cordis.europa.eu/news/rcn/124739\\_en.html](https://cordis.europa.eu/news/rcn/124739_en.html)

Provided by CORDIS

Citation: New toolbox to help boost and secure European electricity networks (2016, January 29)  
retrieved 8 May 2024 from

<https://phys.org/news/2016-01-toolbox-boost-european-electricity-networks.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.