



## Three Projects Supported by the European Commission under the 7<sup>th</sup> Framework Research Programme: UMBRELLA, iTesla and GARPUR

30<sup>th</sup> of June 2015, 10:30-12:30

### UMBRELLA: Innovative tools for the future coordinated and stable operation of the pan-European electricity transmission system

UMBRELLA is developing an innovative toolbox prototype to support the decentralised grid security approach of TSOs, giving the opportunity to increase cooperation when facing the increased complexity in system's operation. A decentralised network security analysis with everyone "on board" looking at the same results and evaluating solutions in a coordinated and optimised way, increases the efficiency of the network operation. Furthermore, umbrella methodologies gives a step forward in the evaluation of uncertainties and their impact in different operational timeframes, the introduction of risk-based assessment and optimisation of remedial actions. This toolbox to be used in different operational timeframes includes:

- Modelling and simulation of uncertainties due to market activities, renewable energy sources on different time scales (RES forecast) and outages
- Optimisation algorithms of remedial actions in reaction to simulated risks on different time scales according to total costs and transmission capacities
- Development of risk based assessment concepts for anticipated system states with and without corrective actions

### iTesla: Innovative Tools for Electrical System Security within Large Areas

The iTesla project aims at improving network operations with a new security assessment tool able to cope with increasingly uncertain operating conditions and take advantage of the growing flexibility of the grid.

The developed toolbox should support the decision making process for network operation from two-days ahead to real time, based on three main features:

- provide a risk-based assessment taking into account the different sources of uncertainties (in particular intermittent power generation), the probabilities of contingencies and the possible failures of corrective actions;
- perform accurate security assessment taking into account the dynamics of the system using time-domain simulations;
- provide operators with relevant proposals of preventive and curative actions to keep the system in a secure state.

The toolbox will allow TSOs to address network simulations of their own system, of coordinated regional systems or of the whole Pan-European system.

**Please see other side for Agenda**



## GARPUR: Generally Accepted Reliability Principle with Uncertainty modelling and through probabilistic Risk assessment

Power system reliability management aims to maintain power system performance at a desired level, while minimizing the socio-economic costs of keeping the power system at that performance level.

Historically in Europe, network reliability management has been lying on the so-called “N-1” criterion: in case of fault of one relevant element (e.g. one transmission system element, one significant generation element or one significant distribution network element), the elements remaining in operation must be capable of accommodating the new operational situation without violating the network’s operational security limits.

Today, the increasing uncertainty of generation due to intermittent energy sources, combined with the opportunities provided e.g. by demand-side management and energy storage, call for imagining new reliability criteria with a better balance between reliability and costs.

The GARPUR project designs, develops, assesses and evaluates such new reliability criteria to be progressively implemented over the next decades at a pan-European level, while maximising social welfare.

### Agenda

<b>10:30 – 10:40</b>	<b>Introduction UMBRELLA Project</b>	H. Paeschke / W. Engl (TTG)
10:40 – 10:55	Uncertainty Margins for Probabilistic AC Security Assessment	L. Roald (ETH)
<b>10:55 – 11:05</b>	<b>Introduction iTesla Project</b>	C. Lemaître (RTE)
11:05 – 11:20	Optimization based method to consolidate European Transmission Data	M. Ruiz, M. Gabay (Artelys), J. Maeght, M. Lefevre, P. Panciatici (RTE)
11:20 – 11:35	Aspects of Power System modelling, Initialization and Simulation using the Modelica Language	G. León, M. Halat, M. Sabaté (AIA), J.B. Heyberger (RTE), F. José Gómez, L. Vanfretti (KTH)
<b>11:35 – 11:50</b>	<b>Introduction GARPUR Project</b>	L. Wehenkel (ULG)
11:50 – 12:00	Impact of Value of Lost Load on Performance of Reliability Criteria and Reliability Management	E. Heylen, G. Deconinck, D. van Hertem
12:00 – 12:15	Modelling of corrective actions in power system reliability analysis	I.B. Sperstad, S.H. Jakobsen
12:15 – 12:30	Vulnerability Analysis related to Extraordinary Events in Power Systems	G.H. Kjølle, O. Gjerde