

The OPTIMATE model - agent-based integration of wind power in energy systems models

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The OPTIMATE model – agent-based integration of wind power in energy systems models

Event: EWEA 2012 Conference, Copenhagen

Outline

- The OPTIMATE project
 - background
 - consortium
 - structure of the model
 - geographic coverage
- Preliminary results
 - Learning-by-Doing
 - Curtailment
- Conclusions

Background on OPTIMATE

- An **O**pen simulation **P**latform to **T**est **I**ntegration in **MAR**ket design of massive intermittent **E**nergy
- Brings several TSOs and Academics sharing common views about European electricity market rules & future market designs
 - To specify and build a market design simulator
 - To demonstrate its uses to address several electricity market issues at EU level
 - To disseminate the results towards the TSO community
 - To make recommendations towards regulatory bodies
- 3 year RD&D project, launched on October 1st 2009
 - First version of the simulation platform used by internal testers since late 2011
 - Successive versions due over year 2012 (including agent-based techniques to mimic market player behaviours)
- Total budget of 4.2 Mio. € (60% EU funding by DG Energy)

OPTIMATE Consortium

- Coordinator

- TECHNOFI (France)



- 5 Transmission System Operators

- RTE (France), (Technical Director)



- TransnetBW GmbH (Germany)



- REE (Spain)



- ELIA (Belgium)



- 50 Hertz Transmission (Germany)



- 6 Research centers

- ARMINES - Ecoles des Mines de Paris (France)



- University of Leuven (Belgium)



- DTU Management Engineering (Denmark)



- University of Madrid-Comillas (Spain)



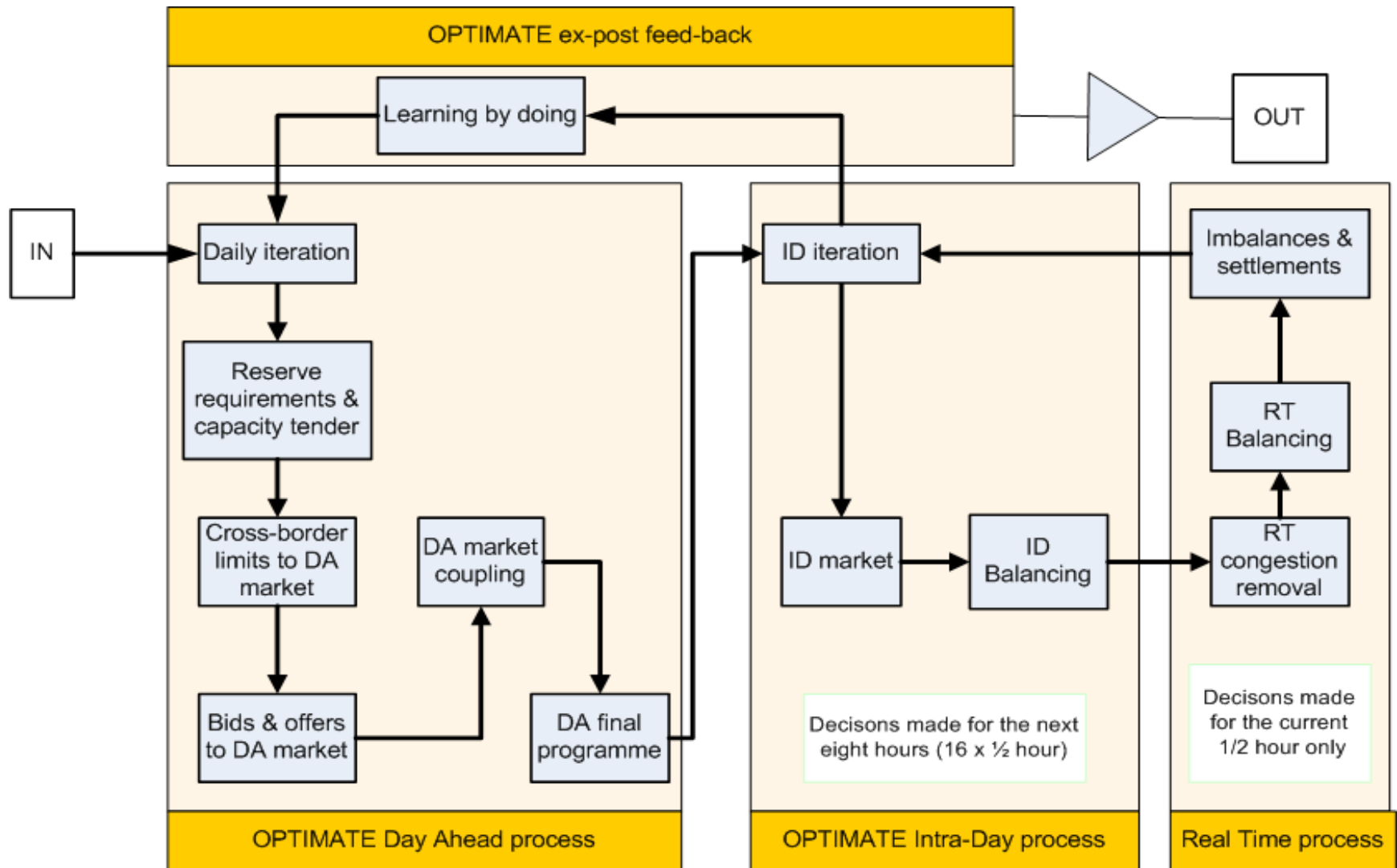
- EUI / Florence School of Regulation (Italy)



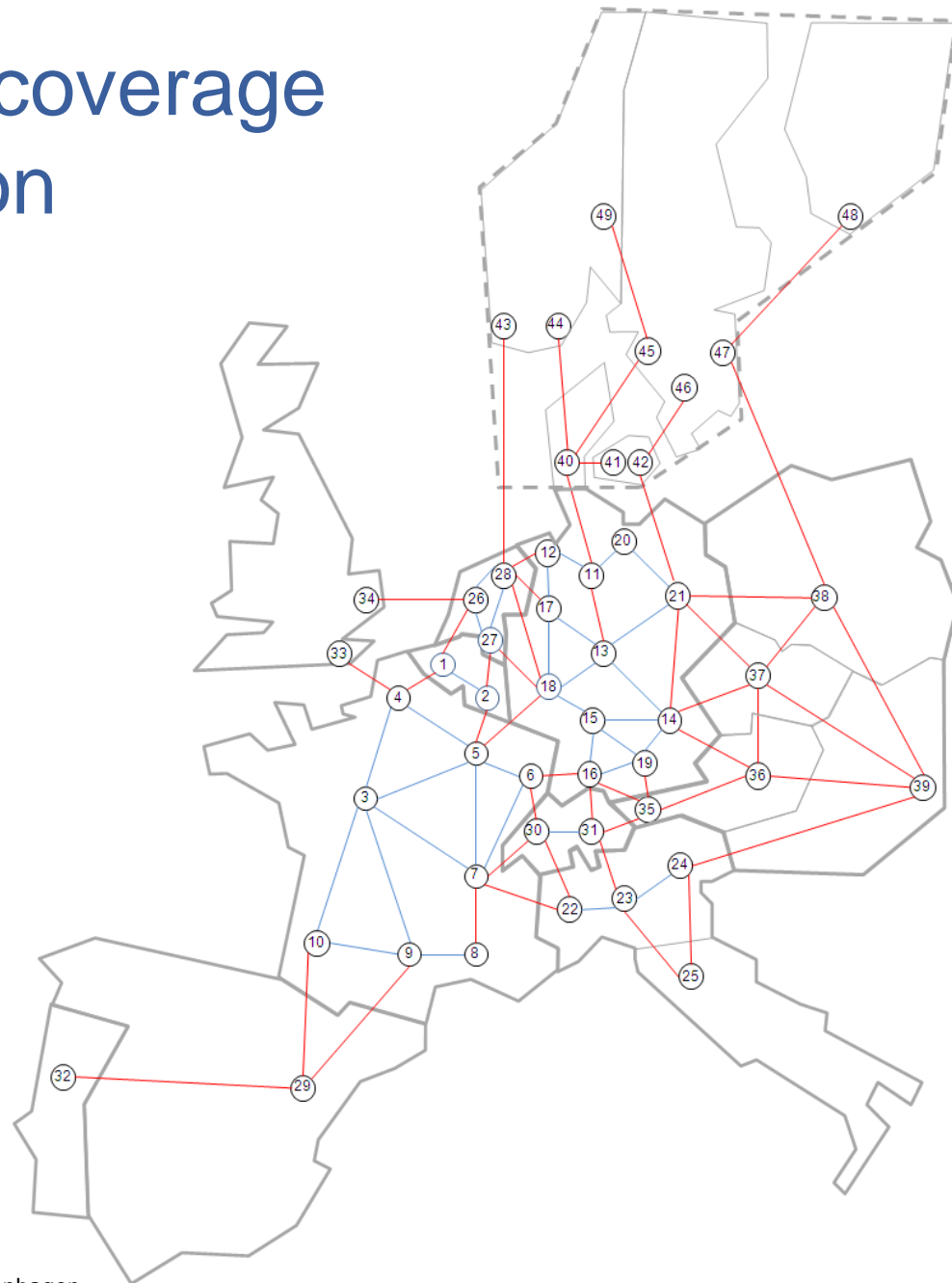
- University of Manchester (United Kingdom)



OPTIMATE: the model structure



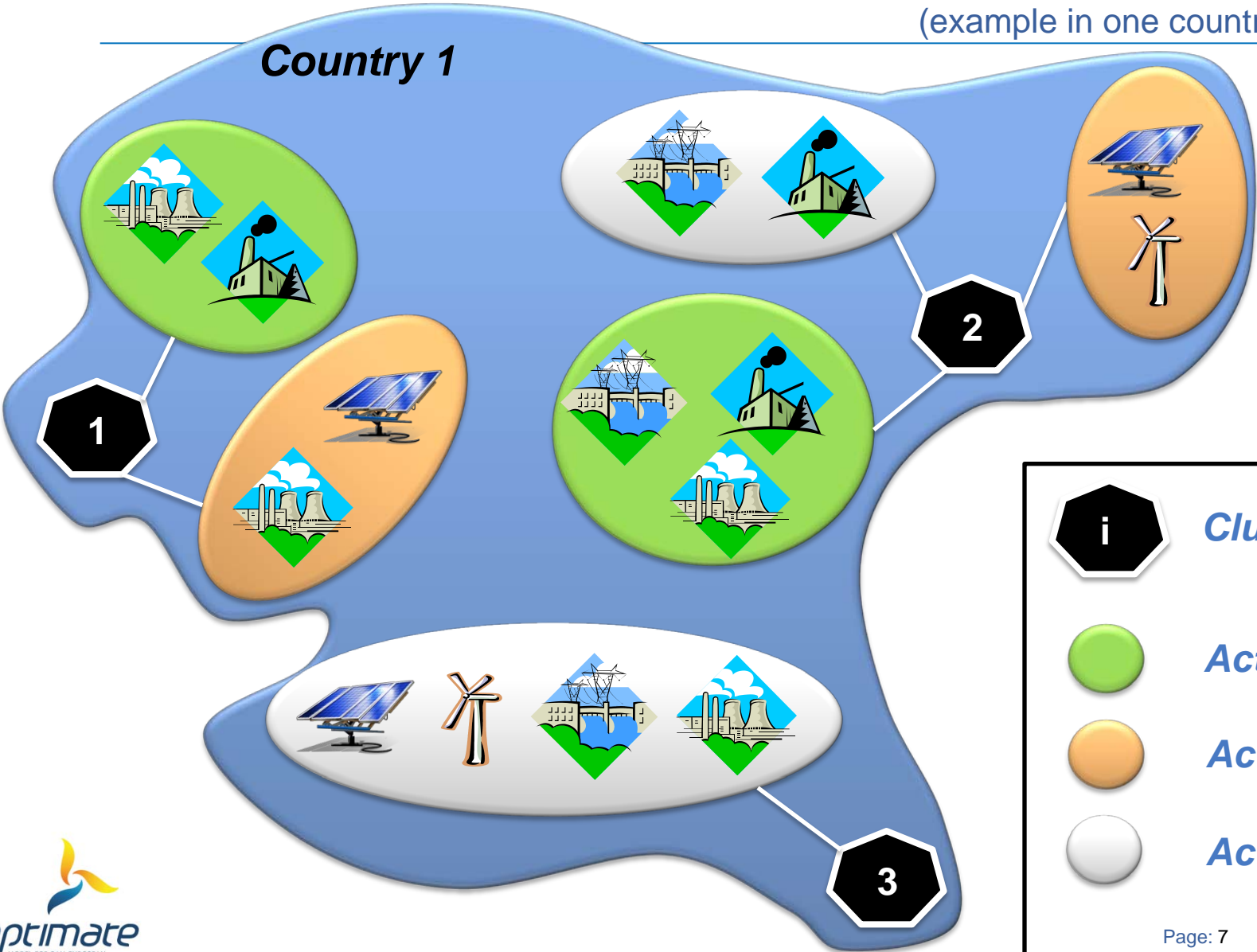
Geographic coverage and resolution



Portfolio structures

(example in one country)

Country 1



	Cluster
	Actor A
	Actor B
	Actor C

Outline

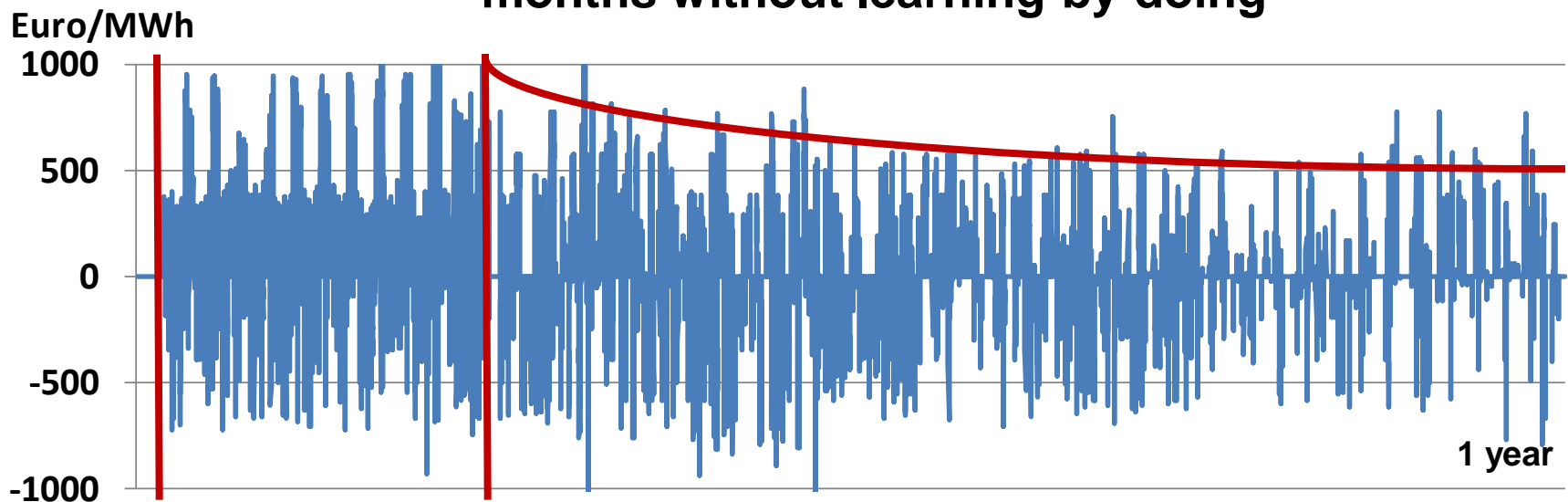
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Preliminary results: Learning-By-Doing

Actors expect a day-ahead market price based on historic experience

modulated: time span without learning: 1 week or 3 months

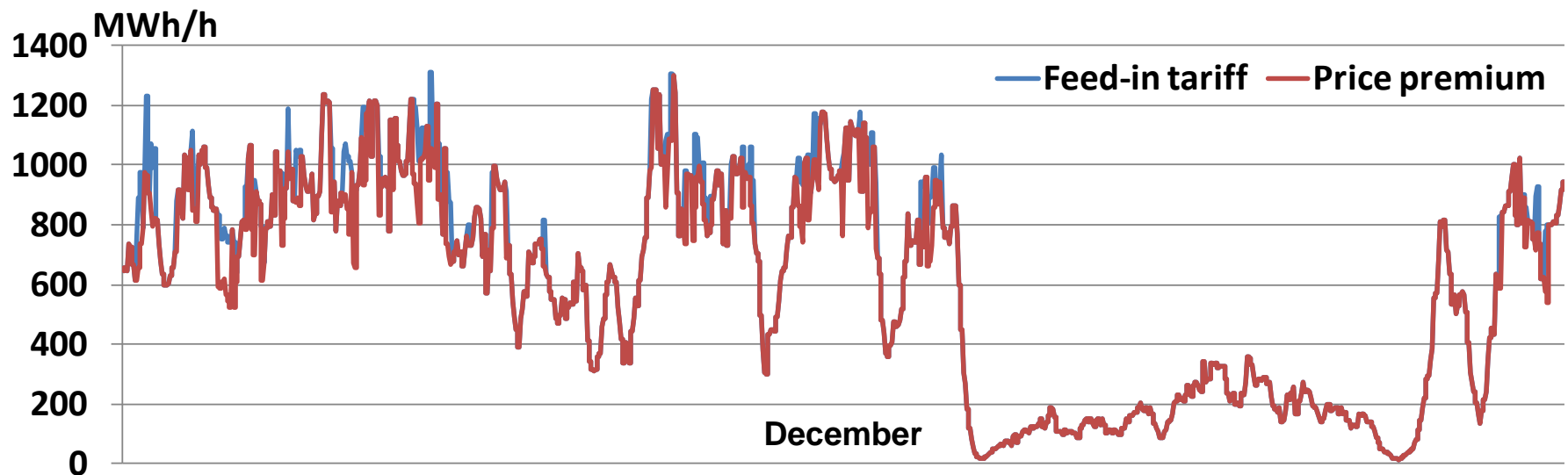
Expected day-ahead price difference between 1 week and 3 months without learning-by-doing



Preliminary results: Wind curtailment

Example setup: Belgium, high wind+PV penetration, single unit bidding, learning-by-doing activated

Wind generation under different support schemes:



Curtailment: approx. 3.5% more under price premium

reason: ramping constraints of thermal units

Ongoing case studies

1. Renewable support schemes (DTU Management Engineering + COMILLAS University)



2. Day-ahead, intraday and balancing designs (TransnetBW GmbH + Red Eléctrica de España)



3. Cross-border capacity management (European University Institute)



First results early June 2012

Conclusions

- OPTIMATE presents a novel, agent-based approach to electricity market modelling
- detailed market features, e.g. pricing mechanisms of regulating power, intraday market liquidity, TSO cross-border calculations, ...
- full version due in autumn 2012
- stakeholder workshop on case study by invitation, aside CIGRE meeting, in Paris end of August 2012
- OPTIMATE website : www.optimize-platform.eu

Thank you for your attention!

www.optimize-platform.eu

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