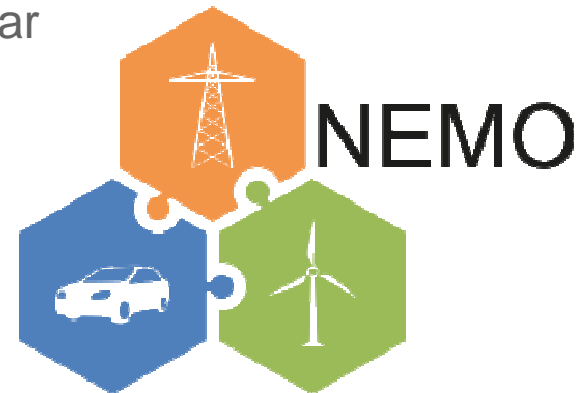




Novel E-Mobility Grid Model (NEMO)

Project outline for EM+ launching seminar

Dr. ir. Martijn Huibers
Paris, September 14, 2012



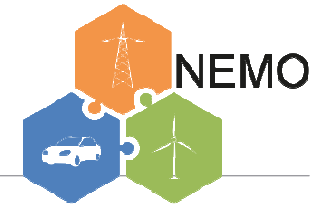
Outline

- NEMO project idea
- Partners
- Objectives & main steps
- NEMO tool suite
- User cases



NEMO team in lively discussion at project kickoff; project started May 1

Issues and key idea



Current developments and issues

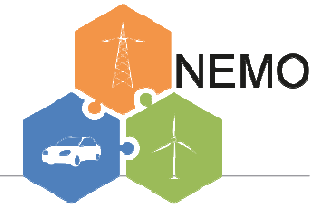
- Growth in electricity demand due to EV introduction
- Installation of charging spots
- Supply of EV electricity by an existing or moderately adapted infrastructure
- Strong growth of renewables

NEMO key ideas and focus

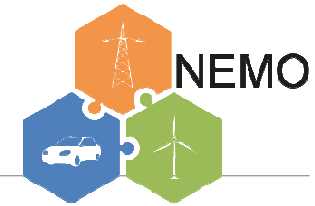
- **Develop tool suite** (integrating 3 models) to assess technical and economical **power grid impacts** of large EV volumes
- **Extension of simulation tools** with missing functionality
- **Strong stakeholder involvement** to ensure practical relevance (*not academic / policy but industrial focus*)



Project partners

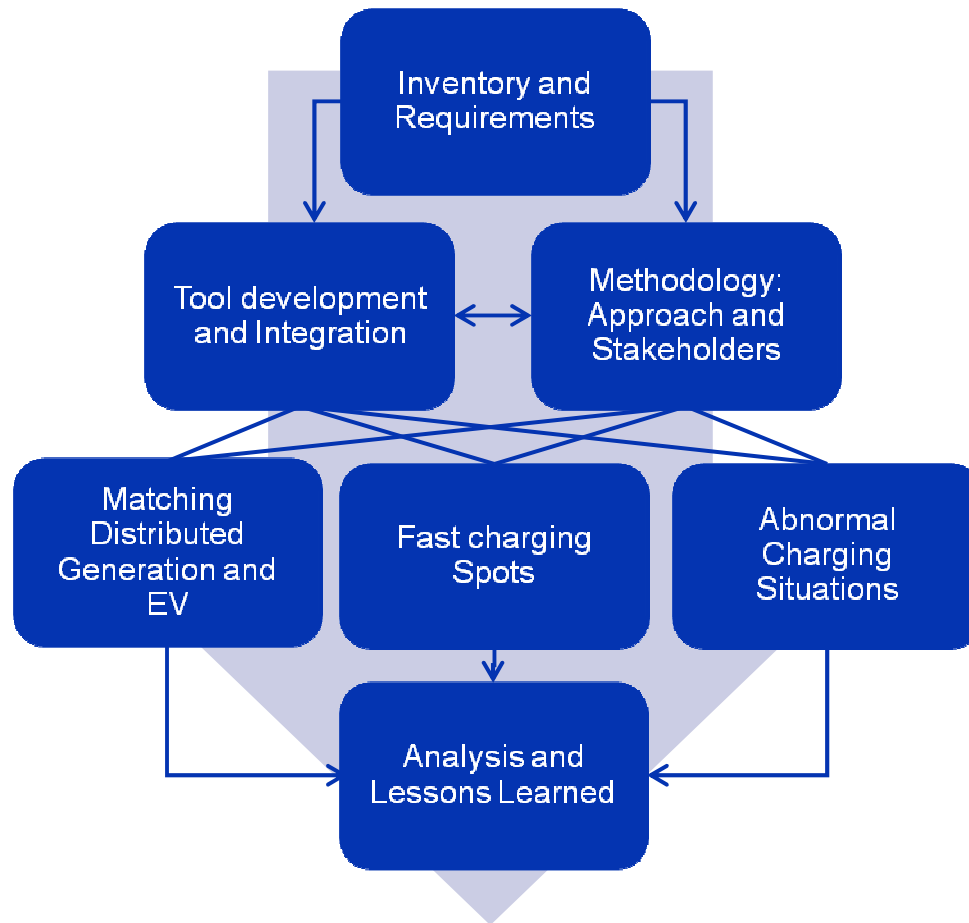
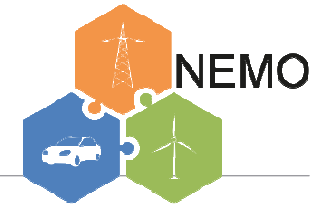


<p>Coordinator</p>	<p>DNV KEMA Energy & Sustainability</p> <p><i>Dr. ir. Martijn Huibers</i> <i>New Energy Technologies Team</i> <i>DNV KEMA Energy & Sustainability</i></p> <p><i>T +31 26 356 2403</i> <i>martijn.huibers@dnvkema.com</i></p>	
<p>Partners</p>	<ul style="list-style-type: none"> ▪ Fraunhofer Institute for Solar Energy Systems ▪ EMD International A/S ▪ Ringkøbing Fjernvarmeværk A.m.b.a. ▪ Ringkøbing-Skjern Forsyning A/S 	
<p>Associated Partners</p>	<p>Überlandwerke Groß-Gerau</p>	



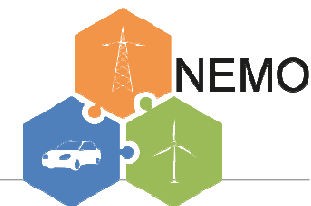
- **Extension of grid simulation tools** PLATOS, SimTOOL and energyPRO
- Design of the **cooperative NEMO framework (tool suite)** to simulate and optimise both network and market aspects of EV deployment
- **Validation** of the NEMO framework and the extended simulation tools with representative case studies
- **Expected results:**
 - EV benefits for distributed generation
 - Grid impact of fast charging spots and mitigation
 - Solutions for abnormal charging situations
- **Market maturity** of the cooperative tool suite

Main steps and work packages



- **Step 1:** state-of-the-art survey, inventory of tools and concepts
- **Step 2:** technical improvement and adaptation of tools; methodology for implementation
- **Step 3:** tool suite application
 - Profound testing
 - Gaining knowledge and scientific results
 - **Direct collaboration with stakeholder committee: workshops, case definition, data, discussion etc.**

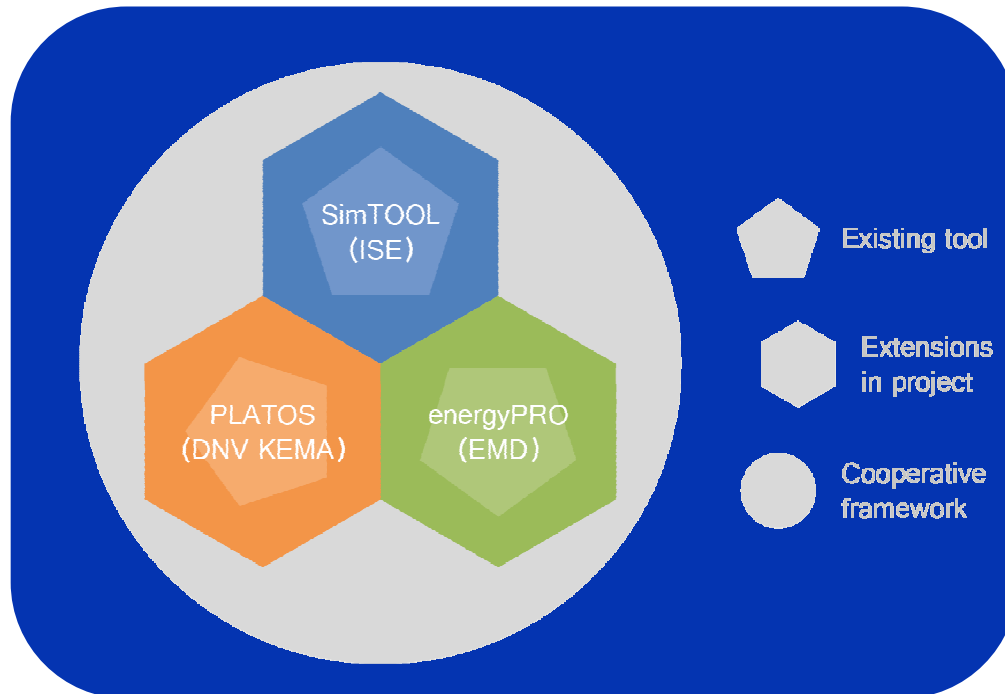
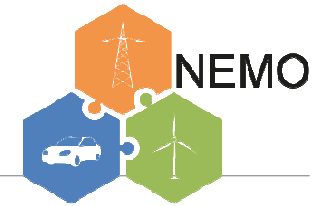
Tools



DNV KEMA, Fraunhofer ISE and EMD possess unique modelling capabilities to evaluate the grid impact of EVs, spanning the entire electricity grid from low voltage to high voltage.

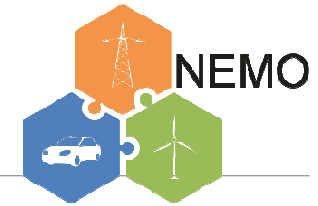
PLATOS	PLATOS is an optimisation tool for determining location, type and size of storage systems in order to avoid voltage or grid overload problems which result from variable distributed generators or loads.
SimTOOL	The focus of SimTOOL is on the evaluation of distributed generation and consumption in distribution grids. In combination with an external optimiser software optimisation of the energy portfolio (electrical/thermal) can be realised, e.g. by taking time variable electricity tariffs into account.
energyPRO	The tool focuses on market based operation of energy plants featuring a combined techno-economic design. The goals are to analyse and optimise local energy plants having large energy storages, primarily modeling plants buying or selling electricity on peak/off peak contracts or in the spot market, and at the same time participating in one or more of the balancing markets.

NEMO framework concept



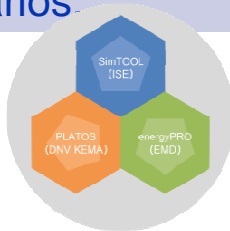
- Coverage of both market and technical aspects
- Independent but complementary tools
- Exchange of simulation data between the tools
- Framework design for facilitating data exchange
- Basis for offering cooperative services covering the entire electricity transport and distribution chain

NEMO framework validation



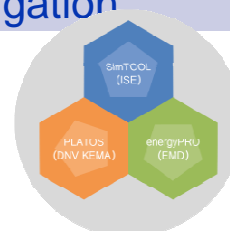
Matching distributed generation and electric vehicles

The NEMO tool suite will be designed to be used by a grid operator or a grid planning service provider in cooperation with DG plant operators to solve the task of matching as much generation as possible from **DG units and EV charging scenarios**.



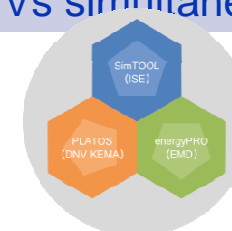
Fast charging spots

The NEMO tool suite will be applied to **fast charging scenarios** and a number of adequate technical solutions. To select the grid infrastructure optimally according to technical and economical criteria will be a main focus of the investigation.

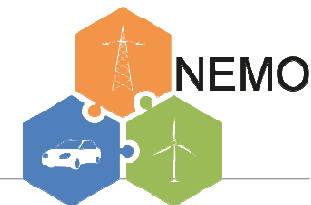


Abnormal charging situations

This user case focuses on the development of approaches how power grid operators could solve problems linked to **“abnormal” charging situations** such as events, where a large crowd is gathering at one spot trying to recharge their EVs simultaneously.



Looking for...



We are looking for:

- EV value chain stakeholders for committee
- Connections to other projects
- (more) partners & ideas for FP7 ENERGY 7.3.1 ('NEMO – the sequel'):
“Planning rules for linking EV to distributed energy resources”



You are looking for:

- More information? See e.g. our flyer or www.nemo-project.eu

www.dnvkema.com

