



# Press Release

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June 23, 2015  
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## **Fit for the Energy System of the Future**

### **European Project Team Presents Planning Tool for the Distribution Grid**

Due to the rising penetration of photovoltaics, heat pumps and electric vehicles (EV) in the power distribution grid, the requirements for grid flexibility and stability are increasing. Just how existing power grids can be made fit for the future was the topic of a cooperative German, Danish and Dutch project in which the Fraunhofer Institute for Solar Energy Systems ISE was involved. Over a period of three years, the project partners from research and industry took well-proven techno-economic modelling and optimization tools and implemented them into the new NEMO tool suite. This forward-looking tool prepares the distribution grid for the energy system of the future, by predicting the interaction between decentralized suppliers and consumers in realistic future scenarios. After the test phase was successfully completed in all three countries, a workshop was held to present the capabilities and advantages of this new tool to distribution and transmission grid operators as well as associations, grid service providers and system operators.

The amount of energy fed into the grid from intermittent renewable energy sources is rising from year to year. At the same time, electrical consumptions such as heat pumps are increasingly being installed and the number of electric vehicles on the streets is also growing. To date, the growth has been manageable. Between 2020 and 2050, however, the number of electric vehicles in Germany is expected to increase beyond one million, forcing the charging infrastructure to expand. Since the present grid is not designed for the dynamic interplay between large amounts of decentralized suppliers and consumers, local grid congestion and voltage problems will arise if the grid does not adapt to the new situation. Additionally, the penetration

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of photovoltaics, heat pumps and electric vehicles in the power distribution grid varies appreciably depending on the region and the power grid. A central issue addressed in the project "Novel E-Mobility Grid Model" was how to support grid operators, in particular, in the strategic analysis and future planning of their distribution grids.

## **How NEMO supports grid operators and service providers in grid planning**

The project team has worked together for three years to develop the NEMO tool suite, a tool for planning power grids in which renewables are optimally integrated and controllable loads and storage are considered. To develop the software, extreme scenarios were taken into account. The NEMO tool suite is based on existing technical and economic simulation models and was verified by case studies in real distribution grids, e. g. a grid with photovoltaics, wind farms, heat pumps, electric vehicles and co-generation plants (CHP) in the Danish municipality Ringkøbing. "Through the cooperation in the consortium, we had access to existing products and expertise which we were able to synergize in order to develop new products for the market," explains Dr. Bernhard Wille-Hausmann, head of the working group "Energy Management and Grids" at Fraunhofer ISE. The Nemo Show Case Designer is the core module of the tool suite and directs the user through the different processes with a user-friendly format. First, the power grid data is read in, giving consideration to the varying data formats which exist. In parallel, the allocation of production and consumption at precisely the grid connection point is carried out. Finally scenarios are defined and load flow analyses are performed. If a problem is detected in the electricity grid, different solutions are recommended and economically compared. Provided with the result, the user carries on with the implementation of the grid planning.

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## **Collaboration with the project partners culminated in a final stakeholder workshop**

Throughout the entire course of the project, the highest priority was given to the continuous exchange of information with the operators of the distribution and transmission grids, who showed committed support throughout the entire development of NEMO tool suite. With this direct link to the practice, the project team was able to consider the requirements of the grid operators. The highlight of this exchange was a final stakeholder workshop in Mainz, Germany, at which NEMO tool suite and the results of the first test simulations were analyzed. The workshop participants presented the individual challenges they had experienced and the project team demonstrated how the solutions developed in the project could help to improve the planning and operation of the power grid. All participants agreed that the NEMO tool suite provides a quick and simple method for providing grid planning assistance, while considering intelligent grid components at the same time.

## **About NEMO:**

The [“Novel E-Mobility Grid Model \(NEMO\)”](#) is a project within the framework of the ERA NET Plus Program *electromobility+*. Development partners were Fraunhofer ISE, EMD International A/S in Denmark and DNV GL in Holland. The project was supported by the Dutch Ministry of Economic Affairs, the German Federal Ministry for Economic Affairs and Energy (BMWi) through the project sponsor DLR, and the Danish Ministry of Higher Education and Science.

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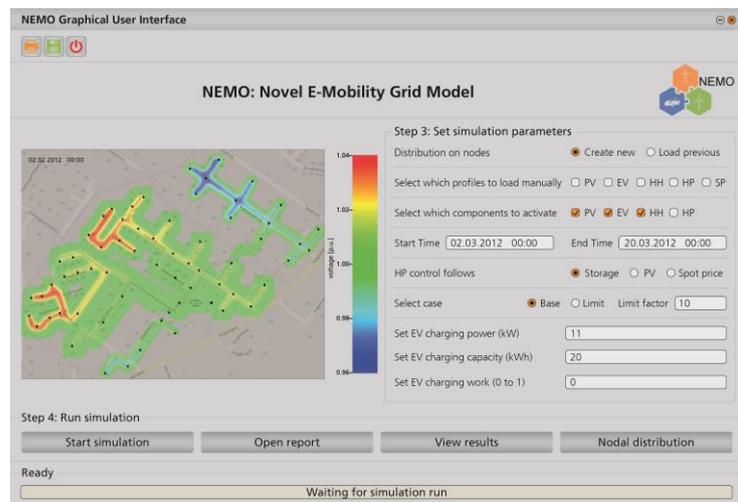
Fit for the Energy System of the Future: In the project »Novel E-Mobility Grid Model (NEMO)« Fraunhofer ISE together with partners developed a planning tool for grid operators to integrate renewable energies into the power distribution grid.  
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User-friendly interface of NEMO Show Case Designer.  
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