DAME

Development, validation and application of an agent Based modelling approach for optimal integration of electromobility in electricity distribution grids

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>> Electromobility integration in a new Network planning tool <<

Project Data

Funding/€	Total cost/€	Duration
625.171	625.171	36 months
Partners	Enexis B.V., NL Eindhoven University of Technology, NL RWTH Aachen University, DE	

Main Results

- A set of models that automatically generate load patterns for households, photovoltaics and electric vehicles based on location and time.
- An algorithm for controlled charging of electric vehicles considering market, grid, and renewable resource oriented strategies.
- A tool to assess the impact of different charging strategies on the medium voltage distribution grid.
- An economic dispatch model for optimal integration of wind power and electric vehicles.

Project conclusion

Developments in the field of electromobility and renewable energy resources in the Netherlands have increased significantly. As the traditional way of network planning based on a steady growth of needed capacity is not appropriate, future scenarios with penetration levels of distributed energy resources should be dynamically altered by network planners.
Regarding the massive deployment of electric vehicles, the choice of a certain charging strategy has a significant impact on the distribution network: Evaluations of the uncontrolled charging strategy show a strongly varying influence of electromobility among different transformers. This results in significant voltage drops at some transformers during the day.
A controlled charging strategy considering market control reserves shows the ability of electromobility to support the balance of the power system. The developed economic dispatch model, reveals potential flexibility of the vehicles to lower the costs of wind power integration.
A grid-oriented charging strategy enables significantly higher penetration rates of electric vehicles and better network utilisation. The available capacity of network assets for charging electric vehicles is essential for network oriented controlled charging. However, transformer load patterns differ significantly per area and standard load patterns may not be sufficient.
An everyday user friendly scenario platform should be fast, which can be challenging. Attention should be given to affection of results when algorithms are in this process simplified to reduce the computational burden.

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