Power Alliance

From local peak shaving to regional load shaping, a transnational demonstative initiative.

> *This project integrates local flexible loads to support the distribution grid.*

Vision and Premises

The decarbonisation of energy supply entails a significant extension of electrical grids on all voltage levels. Until recently mainly power generation was in the focus for the CO2 emission reduction, but more and more it becomes clear that the necessary targets can only be met when also the heating and transport sectors will be decarbonised and hence electrified.

Renewable energy supply with its low energy density requires large land ressources in order to meet the energy demand of cities and the industry. The spatial separation of generation and consumption will hence always require a strong grid with significant capacity, irrespective of any attempts for local autarchy.

However, the degree for necessary grid upgrades highly depends on the availability of flexibilities for supporting the grid. Particularly the electrification of the heating sector with power to heat/ gas technologies as well as the transport sector with triggering mobile and stationary battery applications offer a tremendous future flexibility potential to be exploited to support the grid.

Today the flexibility potential based on interruptible loads and auto-generation in the industryl and the commercial sector is mostly used to limit tariff relevant peak demand ("peak shaving"). The physical scarcity grid situation is actually not taken into account neither on a local nor on a regional level to determine stimulating tariffs for grid stability.

Project Focus

The selected approach is a method that generates market based scarcity signals of grid capacity by taking into account local and regional restrictions while at the same time obeying "unbundling" requirements.

This highly innovative approach allows the grid customer to pay for security of supply according to his individual needs.

Dynamic price signals from both the power market and the grid can now be used to generate an optimal schedule ("load shaping"), where both the customer and the DSO equally profit and hence a macroeconomic optimum is reached.

Project Duration

07.04.2016 - 31.03.2019

Project Budget

Total Budget: € 5,702,658.-
Funding: € 3,330,096.-

Project Coordinator

Alpiq AG (CH)

Project Partners

- Stadtwerke Crailsheim (D)
- EBM Netz AG (CH)
- Aski Industrie-Elektronik GmbH (AT)
- ZHAW (CH)
- HSLU (CH)
- FHNW (CH)
- Xamax AG (CH)

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ERA-Net Smart Grids Plus | From local trials towards a European Knowledge Community

This project has received funding in the framework of the joint programming initiative ERA-Net Smart Grids Plus, with support from the European Union's Horizon 2020 research and innovation programme.

Gefördert durch:

Bundesministerium für Wirtschaft und Energie

aufgrund eines Beschlusses des Deutschen Bundestages

Main Objectives

The goal of this project is to develop a method which allows current and future available flexibilities to be used more efficiently.

While the traditional purposes of flexibility use (i.e. increase of own consumption, energy price arbitrage and peak capacity tariff optimisation) are still obeyed, the new method will additionally incentivise grid friendly behaviour such that excessive grid upgrades can be prevented. The new method is partially adopting ideas from the more general "grid traffic light" concept initially published in 2012 from BDEW.

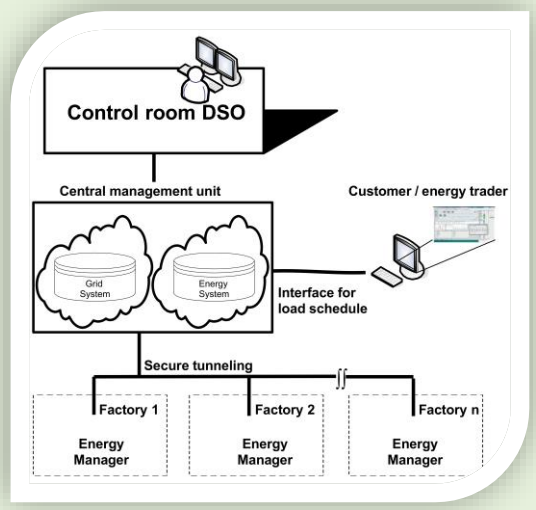
A proof of concept in pilot regions in Germany and Switzerland is planned. The increase of useful grid capacity through activation of flexibilities to trigger market-based grid friendly behaviour under real life conditions shall be demonstrated in an exemplary 20 kV grid.

Main Results

Actual and future flexible loads have been evaluated concerning their grid support ability and simulation options. Resulting from a survey, the preferences of the stakeholders for the use and provision of flexible loads have been assessed.

The system set-up in terms of business model, stakeholder incentives, hard-/software/platform and processes for the customer, the DSO and the project operators is ready to be tested with pilot customers. In order to allow and even foster further R&D without any disturbance of the important business processes, the system and the data will be mirrored constantly.

Results of the proof of concept in the pilot regions are supplemented soon.



The IGC high-level system architecture

Bagemihl, J., Boesner, F., Riesinger, J. et al.
Comput Sci Res Dev, Springer (2017)

From Local Trials towards a European Knowledge Community

http://www.eranet-smartgridsplus.eu

Stadtwerke Crailsheim

IEBM

ASKI i-energy

zh aw School of Engineering

Lucerne University of Applied Sciences and Arts

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nw Fachhochschule Nordwestschweiz

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ALPIQ

This project is part of the 1st Joint Call for transnational RDD projects of the ERA-Net Smart Grids Plus initiative. More than EUR 31 million of funding have been made available to 21 projects from 19 regions/countries.

ERA-Net Smart Grids Plus