LESSONS LEARNED FROM EUROPEAN PILOT PROJECTS – RECOMMENDATIONS ON MARKET ACCESS REQUIREMENTS FOR ELECTRICITY CONSUMERS

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Motivation

System flexibility is needed to utilize and efficiently integrate high shares of renewable energy technologies. In order to achieve this, electricity market design have to be revisited and re-designed with new market players.

This paper deals with the question of which kind of market access requirements need to be provided to electricity consumers in order to attract them accessing the energy market. It focuses on residential consumers (households) and analyses pilot projects applying the concept of load aggregation.

Methodology

'Good practice' examples of Demand Response (DR) operator models on their way to commercialization are identified in the pilot projects (e.g. pooling, aggregators, virtual power plants) and their applicability to the Austrian situation are discussed.

Pilot projects and interviews

From screening of reports and public deliverables together with experts interviews recommendations are drawn (Figure 1). Among various other projects, the following pilot projects have been selected and studied in more detail:

- The Dutch demonstration project Power Matching City
- The FP7 R&D ADDRESS with pilot sites in France and Spain
- The German E-Energy project RegModHarz
- The German E-Energy project E-DeMa

Analytical framework

An analytical framework is developed which assesses pilot projects along a set of indicators grouped in four categories:

- Participation and acceptance of consumers (e.g. user activation, access to information, data security & privacy)
- Institutional and regulatory framework (e.g. definition of roles and responsibilities of market players, formalisation of interactions between different parties)
- Economic and financial aspects (e.g. business models, profitability)
- Technical aspects (e.g. data communication standards, enabling technologies, interoperability)

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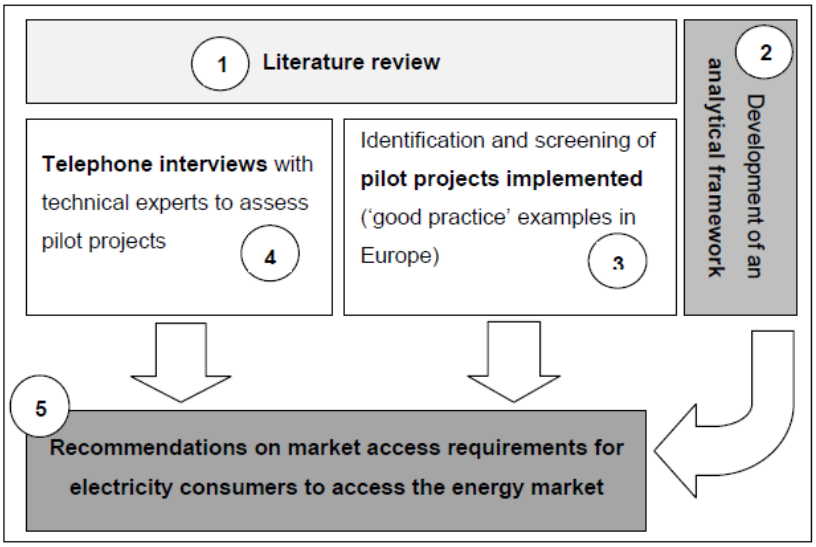

Figure 1: Methodological approach.

Recommendations

The following recommendations are drawn from the analysis and are presented in the work:

- Community creation supports user activation as the sense of belonging to a community influences the engagement and participation
- Variable tariff models need to offer an added value for an acceptable price to attract consumers
- Based on the visualised electricity consumption data consumers can be incentivised with premiums and other rewards to participate in DR programs
- Data protection, privacy & security aspects need to be considered when ICT infrastructures and systems are designed and participation agreements with consumers concluded
- The institutional and regulatory transformation of the energy market requires the introduction of new market players that develop services attractive for consumers
- Detailed cost-benefit-analyses are crucial for defining the added value of business models; financial advantages for consumers are quite low. Thus, aggregators respectively companies, who offer aggregation services, need to concentrate on key messages on a broader level in order to attract consumers
- Standardisation and interoperability of technologies proved to be a basic condition for interaction of technical appliances and enabling technologies

Conclusions

In the pilot projects DSM operator models were developed supported by different software solutions connected to hardware devices following the concept of a virtual power plant (VPP). In Austria a few VPP operators are currently active but which only commercialise flexibilities of industrial and commercial companies. The sector of residential consumers is still untapped. Although Austria has advanced its regulatory conditions the economic analyses in the pilot projects have proved that load aggregation in the residential sector does not offer a viable business model. Economic advantages for residential consumers are limited as well. Thus, other aspects as saving money or financial rewards need to attract or convince users to participate in DR programs.

Nevertheless, it can be expected that the market for DR in the residential sector will develop in the upcoming years (under the condition that technical requirements as a smart meter roll-out has been carried out and the interoperability of home energy management systems improved).