Abstract

Due to actual energy related framework conditions within the EC (Directives) the penetration of Distributed Generation (DG) increases continuously and it can be expected that this increase will even grow in the future.

As a result of the increasing density of distributed electricity generation, basic questions related to the bidirectional power flow as e. g. reliability aspects (power quality and continuity of electricity supply), stability aspects, network capacity, network-, energy- and load management are massively arising.

The actual strategy to see the electricity production as a negative load and the resulting „fit & forget" philosophy is not a sustainable and applicable solution for the future. Under such conditions, a significant rise of the share of DG would only be possible with a very cost intensive extension of network capacity. On the other hand research on active integration of DG in distribution networks is ongoing already for a while, but mainly stays at the point of theoretical aspects.

Therefore the main goals of this **"*DG DemoNetz – Konzept*"** project are:

i.) to choose representative parts of networks in Austria (e.g.: typical Austrian network topology and demand and supply structure) for practical realisation of demonstration networks with a high penetration of DG and

ii.) to analyse within these low and/or medium voltage network parts, the possibilities for implementing different model systems (Pyramid model "DG Integration") and project the technical, organisational and economical realisation.

At the end of the project, following results will be available in detail:

- Comprehensive documentation of international demonstration projects and relevant theoretical research projects within a database. A summary of existing practical experiences with distribution network hosting a large amount of DG will be prepared, and potential innovative ideas for future integration of high share of DG thoughtfully analysed.
- Summary of the analysed and evaluated projects of the database and of the existing practical experiences of the distribution network operators. Out of these results, model systems for the active network operation will be derived and presented within a pyramid model "DG-Integration", which presents a rise of complexity of the system
- Technical, organisational and economical realisation concepts for the implementation. Summary of the major parts of the realisation concepts in an overall guide (of potential interest for all relevant Austrian DG related actors) and a project specific list of requirements for related parts of networks and actors.
- Ranking of parts of distribution networks, which could be relevant and considered for a implementation of the model systems. Selected parts of distribution networks, which are considered for the realisation of the demonstration project will be analysed and classified.
- Technical, organisational and economical realisation concepts for the chosen parts of distribution network
- Letter of intent from for the implementation and realisation relevant players and finance partners

Through the ***DG DemoNetz – Konzept*** project, requirements and effects on network and generator operator to achieve the integration of a significant amount of DG into the grid with the least additional investment costs will be made available. The realisation of the demonstration project will therefore be a "best practice" example and a first step for the implementation of high density of integrated DG and reduce existing barriers.

The practical demonstration and analysis of an active network operation, with a high share of DG density, will allow Austria to become one of the European leader in questions of the integration of DG in existing distribution networks and the resulting necessary adaptation of distribution networks. Therefore a leadership in DG technology aspects for Austrian companies and related national net productivity will be strengthened.