

Distributed renewable generation and demand response

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Electricity generation from a large number of small renewable energy sources has the potential to be an important element to meet climate protection targets. However, there is an ongoing discussion on how a large-scale deployment of distributed generation may affect grid-wide functions such as frequency control and allocation of reserves and by which means the integration of distributed generation could be supported best. Demand response (consumer-side load management) is to be considered as essential strategy for integrating distributed power sources and maintaining the balance of supply and demand. In this recently finished transdisciplinary research project scenarios for effective demand response were developed and further explored.

Based on previous work and own ideas a set of demand response scenarios showing the range of technically feasible as well as environmentally worthwhile solutions was developed. In a next step the project team selected four promising scenarios for in-depth analysis. The selected scenarios had been described in more detail to enable comprehensive assessments using technical, ecological, economic and social criteria. Among the evaluation methods used had been life-cycle assessment, economic assessments, and stakeholder workshops. The project team as well as intermediary users and relevant stakeholders took part in four scenario assessment workshops.

The project results show that all scenarios evaluated are both economically and environmentally positive. However, to effectively support the integration of distributed generation various scenarios have to be implemented combined with each other. Future research should focus on software standards, economic issues and technical, legal and social aspects of system integration.