

# ***RECENT AND FUTURE DEVELOPMENT OF DEMAND SIDE FLEXIBILITY IN INDUSTRY***

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## **Overview**

Germany's energy transition (Energiewende) poses new challenges for the flexibility of overall power supply and especially on security of supply in general. Especially in the industry sector a secure and affordable energy supply is crucial to keep and improve competitiveness on global markets. With a strongly increased share of renewable energies and higher prices for electricity, energy efficiency becomes one major option to keep electricity costs on a competitive level. Furthermore an increasing need for flexibility in the energy system offers industrial consumers new possibilities to participate and generate additional profits in the energy market with self generation and demand side management.

In the past the potential for industrial demand side flexibility has been analysed in several research studies and first pilots has been implemented. In the last two years commercial activities across Europe have been increased and business models for demand side flexibility diffused often in response to national or EU regulation (e.g. Torriti et al. 2010, European Commission 2011).

In this paper, recent and future development of demand side flexibility in industry is discussed and future expectations for promising business models as well as most relevant barriers are identified.

## **Methods**

Based on literature research, energy statistics and an online-survey among business sites of manufacturing firms in Southern Germany (Klobasa et al. 2013) the potential and future expectations for demand side flexibility in Industry is assessed. Based on the online survey major barriers for diffusion of demand side flexibility are identified and compared to other results of customer engagement in industry across Europe.

Major business models for demand flexibility are identified and their possible profitability are calculated based on typical industrial use cases. These results are used to discuss future outlook and most likely development of demand side flexibility in the industrial sector. Finally policy recommendations are given to improve regulatory framework and market conditions to secure an efficient energy system with a high share of renewable energies.

## **Results**

Results show substantial potential for demand flexibility mainly in energy intensive industries like chemical or metal industry. Additional potential can be found in cross cutting applications that do not belong to the main production process like cooling compressors or ventilation. Main barriers to a stronger diffusion are related to expected impacts on the production process like reduced output or quality. Compared to the EU wide experiences it can be shown that pilot demonstrations and improved regulatory conditions speed-up diffusion process as in France, Ireland or Switzerland.

Business models are related in many cases to system services and emergency programs which fits requirements for demand side flexibility, i.e. limited numbers and duration of activation. If the regulatory framework and market conditions consider demand side participation, considerable potential is available that can provide services at lower costs compared to other options as storage or decentralized small scale generation.

Based on this considerations the role of demand side flexibility will increase in energy systems with high shares of renewable energies in the future. This result is also in line with recent progress of demand response activities in several European countries.

## Conclusions

The results of the study show that demand side flexibility will be more important in energy systems with high shares of renewable energies and can help to secure an efficient and secure energy systems. Pilot demonstrations are necessary to overcome fears of disturbances of productions processes that lead to reduced outputs or quality. For demand side participation the adoption of the regulatory framework as well as the market conditions helps to speed-up diffusion of stronger demand side flexibility. Important aspects are clear market roles and a standardization of processes to reduce transaction costs for demand side aggregators. In this case it will be beneficial for industrial companies to activate their potential of demand side flexibility and reduce overall energy costs.

## References

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