Current and Improved Business Models of Aggregators in European Target Countries

Daniel SCHWABENEDER[(1)], Andreas FLEISCHHACKER[(1)], Georg LETTNER [(1)]
[(1)] TU Wien, Energy Economics Group (EEG)

Motivation and Central Question

The main objective of the BestRES project[1] is to investigate current barriers for Energy Aggregators and to and to improve their role in future electricity market designs. In the first stage, the project is focusing on existing European aggregator business models (BM) taking into account technical, economic, environmental and social benefits. In the second stage, improved business models will be developed considering different market designs in various European countries with a focus on competitiveness. These improved business models will then be implemented or virtually implemented with real data and monitored in the following target countries: *United Kingdom*, *Belgium*, *Germany*, *France*, *Austria*, *Italy*, *Cyprus*, *Spain* and *Portugal*.

Methodology

The role of an aggregator can be taken on by a variety of stakeholders, like e.g. an incumbent energy supplier offering aggregation services, a service provider specialized in aggregation services collaborating with a supplier or by an independent market actor. Independent means in that case that the aggregator is able to act independent from the (usual) supplier and the supplier's balance responsible parties (BRP). Within the BestRES project six business models for aggregators have been defined[2]:

- *Combined aggregator – supplier*: Supply and aggregation are offered as a package and there will be one BRP per connection point.
- *Combined aggregator – BRP*: There are two BRPs on the same connection point, the BRP (independent aggregator) and the BRP (supplier). The supplier is compensated for imbalances.
- *Combined aggregator – DSO*: NOT tackled, because regulated and unregulated roles should not be combined.
- *Independent aggregator as a service provider*: The aggregator is a service provider for one of the other market actors but does not sell at own risk to potential buyers.
- *Independent delegated aggregator*: The aggregator sells at own risk to potential buyers such as the transmission system operator (TSO), the BRP and the wholesale electricity markets.
- *Prosumer as aggregator*: Large-scale prosumers choose to adopt the role of aggregator for their own portfolios.

In the second stage of the BestRES project improved business models will be developed with respect to competitiveness, but also taking into account environmental and social benefits. For this purpose Canvas Models [3] for the business models of six types of aggregators have been developed, as illustrated in Figure 1.

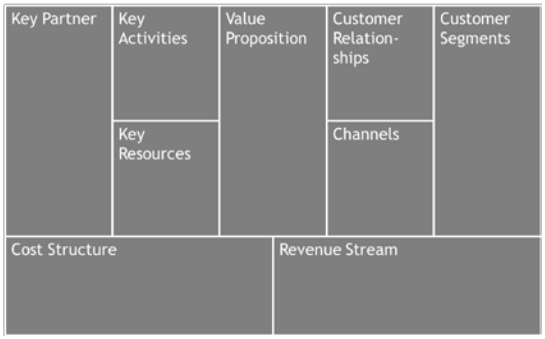

Figure 1: Graphical representation of Business Modelling via Canvas adapted from [3]

[1] TU Wien, Energy Economics Group (EEG), Gußhausstraße 25-29/E370-3, A-1040 Wien, Tel.: +43-(0)1-58801-370375 , schwabeneder@eeg.tuwien.ac.at, www.eeg.tuwien.ac.at

BM improvements are achieved by adding or removing new elements into the Canvas BM (as shown in Figure 2), e.g. by adding new technologies to the aggregator's portfolio or new markets offer and sell energy services and flexibilities.

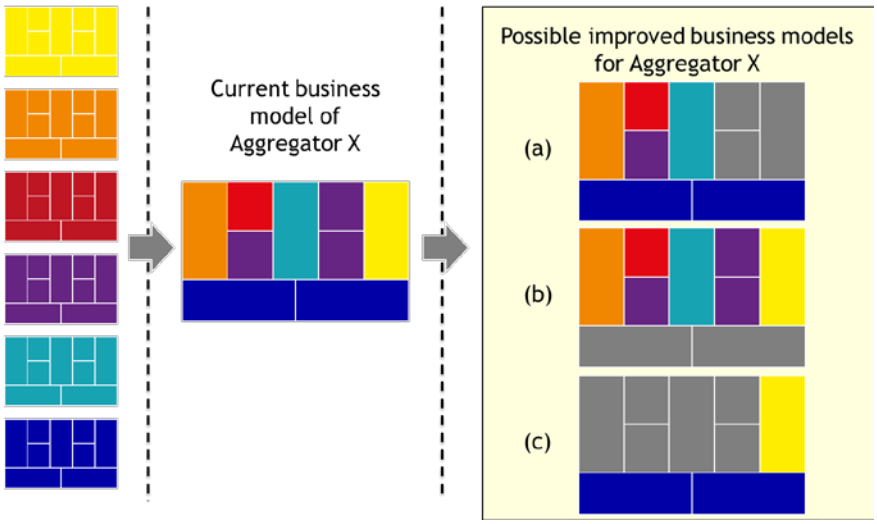

Figure 2: Possible improved business models via Canvas

Due to the multitude of possible business model designs, the economic efficiency and other key performance indicators for improved business models are evaluated with a newly developed market simulation model framework that can flexibly incorporate different energy market types (energy reserve markets, day-ahead and intraday wholesale markets) as well as various technologies (energy storages, power-to-heat, etc.) and flexibility options (interruptible or shiftable loads). The model iteratively solves optimization problems maximizing the aggregators' expected revenue on different time frames and then simulates stochastic events like activations on reserve markets.

Results and Conclusions

The BestRES project is in an early stage and the presented work is work in progress. Hence, currently only preliminary and qualitative results are available. First conclusions are that the business models of aggregators as well as revenue streams and cost components within the consortium and among European countries vary a lot. BM improvements mainly are expected by implementing new technologies in the aggregator's portfolio or by participating on new markets.

Literature

[1] Best practices and implementation of innovative business models for Renewable Energy Aggregators, http://bestres.eu.

[2] Verhaegen, R.; Dierckxsens, C.; Lettner, G.; Fleischhacker, A. „*Define and classify existing European aggregation business models (BMs) within and outside the consortium*“, 2016. http://bestres.eu/wp-content/uploads/2016/08/BestRES_Existing-business-models-for-RE-aggregators.pdf.

[3] Osterwalder, A. and Pigneur, Y. „*Business Model Generation*“, Hoboken, New Jersey: John Wiley & Sons, 2010. ISBN 978-0470-87641-1