



The BestRES methodology

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Introduction

Within the BestRES project we develop innovative business models for integration of renewable energy sources by aggregation.

We defined “Aggregator” as:

“legal entities that aggregate the load or generation of various demand and/or generation/production units and aim at optimizing energy supply and consumption either technically or economically”

The BestRES project partners



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The BestRES project: objectives and progress

Investigate the current barriers for aggregation and improve the role of energy aggregators in future electricity market design:

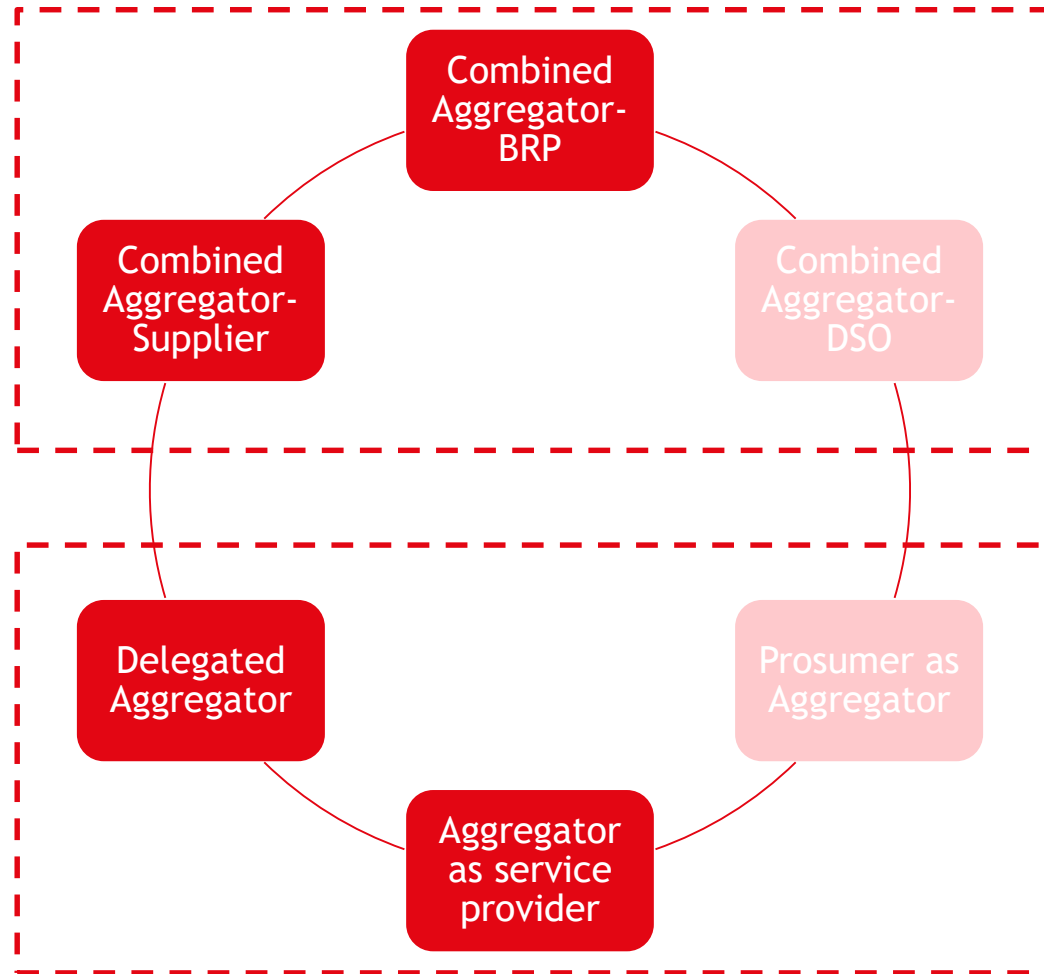
- First stage: identify existing European aggregation BMs and related benefits and barriers  2016 (finished)
- Second stage: develop improved BMs and decide if BMs are ready for implementation  2017 (finished)
- Third stage: test and implement BMs including development of recommendations  2018 (ongoing)

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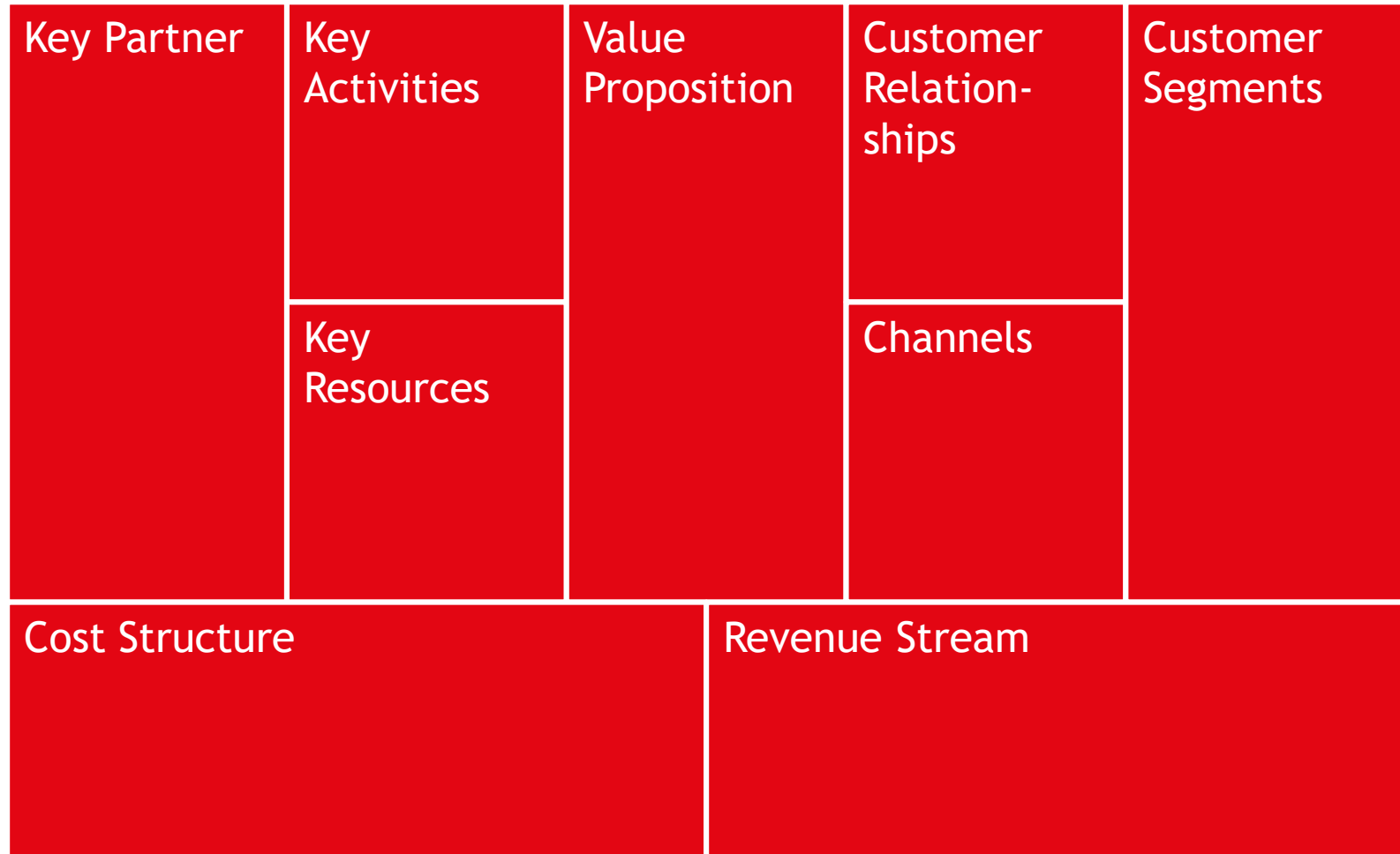
Business models within the consortium



Aggregators
with a combined
role




Aggregators
with an
independent
role

Business model canvas



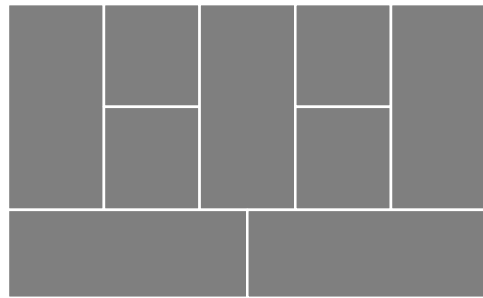
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Improvement of business model for technical benefits and market options

Current business model of aggregator X



Possible business models improvements for aggregator X

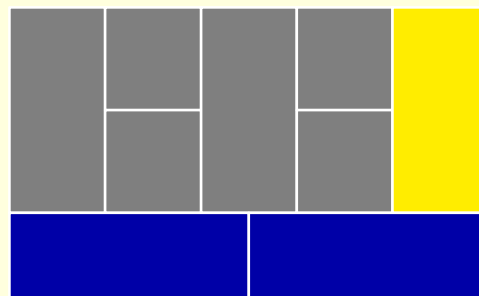
(a)



(b)



(c)



Analysis



Improved business models for aggregator X

(b)



Current and Improved Aggregator Business models within the BestRES project

	Combined Aggregator- BRP	Combined Aggregator- Supplier	Delegated Aggregator	Aggregator as Service Provider
NKW Germany	X	X	X	
NKW France	X		X	
NKW Italy	X		X	
NKW Belgium	X	X	X	
Good Energy		X	X	X
Oekostrom	X	X	X	X
EDP Portugal		X	X	
EDP Spain		X	X	
FOSS			X	X

X ... Current Business Model

X ... Improved Business Model

(*) NKW ... Next Kraftwerke (**) EDP ... Energias de Portugal

Marketing renewable production on multiple markets

- **Next Kraftwerke Belgium (BE):** Trading wind and PV power
Trades energy from renewables on short term markets and makes use of portfolio effects.
- **Next Kraftwerke Germany (DE):** Dispatching flexible generation under changing market design on multiple markets
Impact of the change from weekly to four-hourly reserve market products on the operation of flexible generation (biogas power plant).
- **Next Kraftwerke Germany (FR):** Providing decentralised units access to balancing markets
Distributed generators benefit from portfolio effects.
- **Next Kraftwerke Germany (IT):** Market renewables on multiple marketplaces
Uses live data and portfolio affects to increase forecasting quality. Valorise renewable generation at dispatch and balancing markets.

Optimal dispatch of load

- **Next Kraftwerke Germany (DE):** Supplying mid-scale customers with time variable tariffs including grid charge optimization
Helps customers to benefit from market signals through time variable tariffs but also takes into account peak-load-pricing of grid charges.
- **EDP (PT & ES):** Activation and marketing of end user flexibility (Portugal and Spain)
Activates and uses flexibility of customers on energy markets or to reduce imbalances.

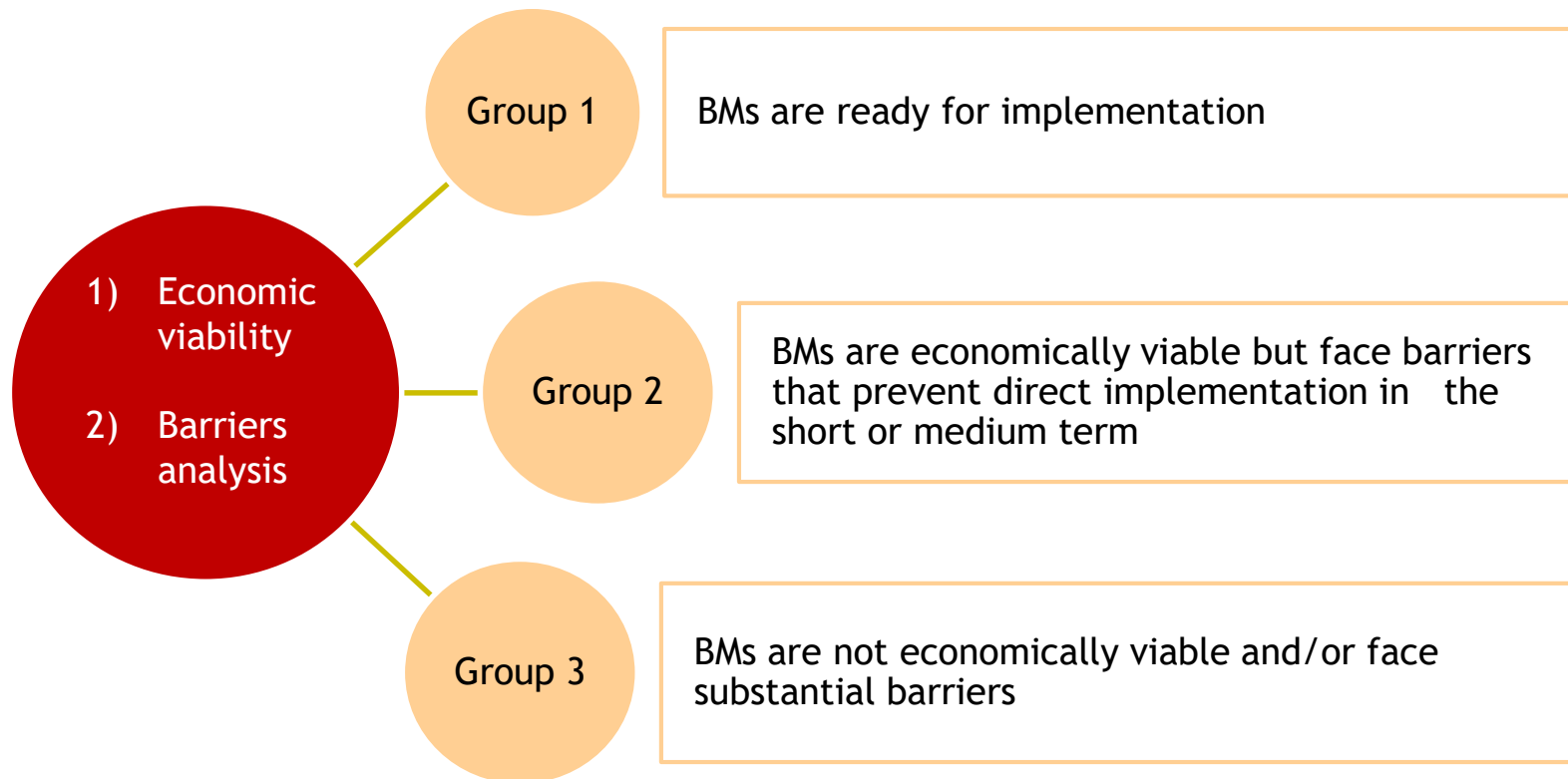
Household flexibility

- **Good Energy (UK): Automation and Control**
Uses innovative smart home technology to offer domestic customers insights of their energy usage and benefits through real time pricing.
- **Oekostrom (AT): Demand side flexibilisation of small customers**
Activates the flexibility potential of residential customers with time variable tariffs.

Peer-to-peer and local energy matching



- **FOSS (CY):** Pooling flexibility for local balancing market and energy service provision
Uses aggregation to provide DSO services (Cypriot markets are not open and unbundled yet).
- **Good Energy (UK):** Peer-to-peer (local) energy matching
Brings customers and generators together locally and creates value for both. Allows customers to visualize the origin of consumed electricity and actively procure electricity from specific plants.
- **Oekostrom (AT):** Investing in and marketing distributed generation by customers in apartments
Market integration of solar generation from customers in apartments.



How to decide if improved BMs are ready for implementation?





1) Economic viability



Negative economic assessment



 * BM "Activation and marketing of end user's flexibility" (BM12) 



 * BM "Pooling flexibility for local balancing market and energy service provision" (BM13) 



Positive economic assessment



 * BM "Automation and control" (BM1)
* BM "Peer-to-peer" energy matching" (BM2) 



 * BM "Dispatch flexible generation on multiple market places under changing market design" (BM3)
* BM "Supplying "mid-scale" customers with time variable tariffs" (BM4) 

 * BM "Providing decentralized units access to aFRR" (BM5) 

 * BM "Market renewables on multiple markets" (BM6) 

 * BM "Trading PV and wind power" (BM7)
* BM "Using flexibility of customers as third party" (BM8) 

 * BM "Demand Side flexibilization of small customers" (BM9)
* BM "Invest and market distributed generation of customers in apartment houses" (BM10) 

 * BM "Activation and marketing of end user's flexibility" (BM11) 

2) Barriers analysis

- For 8 out of 13 BMs, aggregators face barriers that can directly be addressed and overcome.

Aggregator: BM	Principal challenges
Good Energy (UK): BM1	*Unstable regulatory environment
Next Kraftwerke Germany (Germany):BM4	*Grid tariffs currently incentivise a steady consumption instead of flexibility *BM is quite complex
Next Kraftwerke Germany (Italy):BM6	*Pooling is restricted to certain areas but modifications are being discussed
Next Kraftwerke (Belgium):BM7 and BM8	*Volume of renewable generators looking for a contract could be limited *Regional certificate systems are complex
Oekostrom AG (Austria): BM9	*Limited number of interested clients with smart meters (5-10% of all metering points)
EDP (Portugal and Spain):BM11 and BM12	*Limited number of interested clients

2) Barriers analysis

- For 5 out of 13 BMs, aggregators face barriers that cannot be directly addressed and overcome in the short or medium term.

Barriers that prevent direct implementation in the short to medium term:













Aggregator	Principal barriers group 2
Next Kraftwerke Germany (Germany): BM3	*No clear how exactly prequalifications for aFRR will change until 2018
Oekostrom AG (Austria): BM10	*The current legal situation does not allow auto-consumption by multiple parties in apartment blocks

Substantial barriers that can not be overcome:

Aggregator	Principal barriers group 3
Good Energy (UK): BM2	*No mechanisms that allow for the local settlement of generation and demand portfolios
Next Kraftwerke Germany (France): BM5	*Market power of conventional power plants operators who are obliged to participate on aFRR
FOSS (Cyprus): BM13	*No existing framework for aggregation or for offering grid services. Such a framework will not be available before 2019

3) Allocation of BMs

BMs ready for implementation (group 1)

	* BM "Automation and control" (BM1)	
	* BM "Supplying "mid-scale" customers with time variable tariffs including grid charges optimization" (BM4)	
	* BM "Market renewables on multiple markets" (BM6)	
	* BM "Trading PV and wind power" (BM7) * BM "Using flexibility of customers as third party" (BM8)	
	* BM "Demand Side flexibilization of small customers" (BM9)	
	* BM "Activation and marketing of end user's flexibility" (BM11)	

3) Allocation of BMs

BMs not ready for implementation (group 2 and 3)

Improved BMs economically viable but with barriers that prevent direct implementation (group 2)

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* BM "Dispatch flexible generation on multiple market places under changing market design" (BM3)



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* BM "Invest and market distributed generation of customers in apartment houses" (BM10)



Improved business models that are not economic or face substantial barriers (group 3)

Good Energy

* BM "'Peer-to-peer' energy matching" (BM2)



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* BM "Providing decentralized units access to aFRR" (BM5)



FOSS
Research Centre for Sustainable Energy

* BM "Pooling flexibility for local balancing market and energy service provision" (BM13)



edp

* BM "Activation and marketing of end user's flexibility" (BM12)



Conclusions: group 1 BMs

- Aggregators with BMs ready for implementation (group 1) generate revenues in multiple ways

Aggregator	Improved business model
Good Energy (UK)	Aggregator manages to decrease sourcing costs and costs to customer
Next Kraftwerke Germany (Germany)	Aggregator optimizes wholesale and network tariffs
Next Kraftwerke Germany (Italy)	Aggregator generates revenues from activation fees on reserve power markets
Next Kraftwerke (Belgium)	Aggregator generates revenues from capacity and activation fees on reserve power markets and on intraday and day-ahead markets
Oekostrom AG (Austria)	Aggregator manages to decrease sourcing costs and costs to customer
EDP (Portugal)	Aggregator decreases imbalance penalties own portfolio

Conclusions: group 1 BMs

- A wide variety of BMs ready for implementation (group 1) is to be found in the BestRES project
- Almost all BMs that have no significant barriers for implementation are ready for implementation
- Major challenges for aggregators with BMs ready for implementation:
 - Acquisition of sufficient number of interested clients/providers of flexibility (that have smart meters)
 - Regulatory changes and unclarities
 - Unfavorable/unstable price evolutions

Conclusions: group 2 & 3 BMs

- EDP can currently not implement the BM in Spain because of low imbalance tariffs
- For all other BMs that are not yet ready for implementation, the main hurdles are related to regulation:
 - Regulatory barriers in the short to medium term: group 2
 - Regulatory barriers in the long run: group 3

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Thank you!

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