



Aggregators as enablers of prosumers participation in the energy market

Legal & Policy overview

A System Perspective from the Netherlands

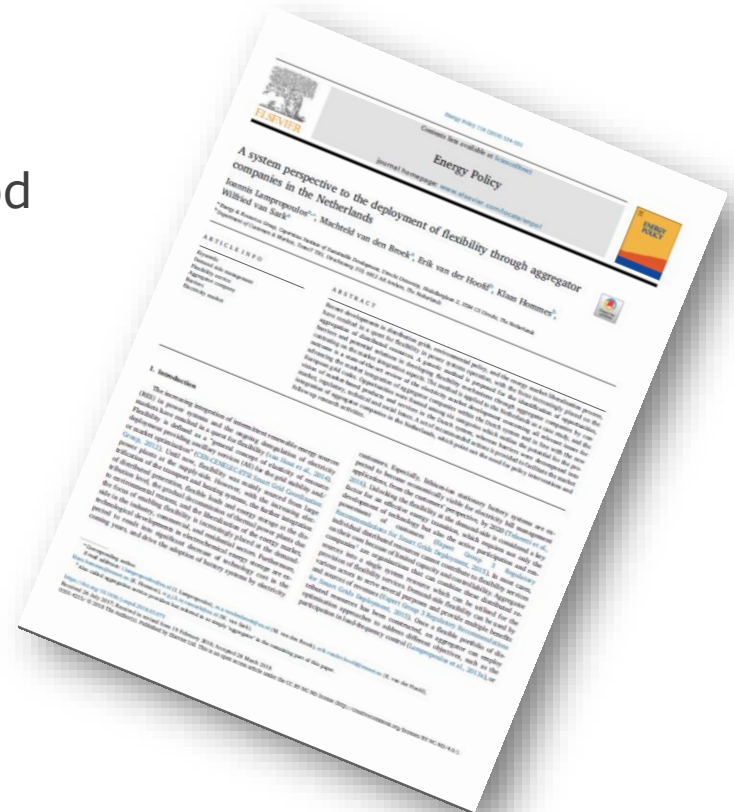
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Layout

- ❑ **Prologue**
 - Research goals and method
- ❑ **Project results**
 - Identified barriers
 - Prioritised issues
- ❑ **Epilogue**
 - Follow-up projects



Reference: I. Lampropoulos, M. van den Broek, W. van Sark, E. van der Hoofd and K. Hommes, A System Perspective to the Deployment of Flexibility through Aggregator Companies in the Netherlands, Energy Policy, Volume 118, 2018, pg. 534-551. Available online: [Link](#).

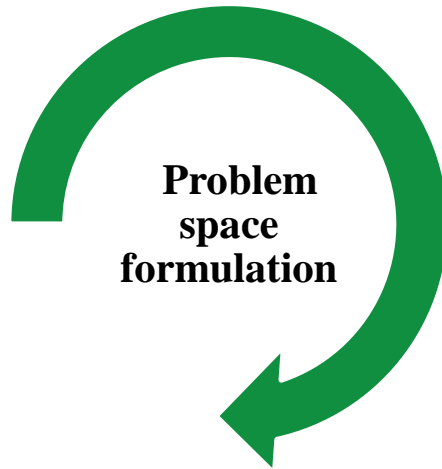


Project goals

- ❑ A study prior to possible research and development (R&D) projects
- ❑ Identify **opportunities, barriers** and potential **solutions** for enabling flexibility through aggregators in the Netherlands
- ❑ Identify actions for the Dutch TSO and/or the regulator might take to promote the proposed solutions (**recommendations**)
- ❑ Determine the importance of the identified barriers, and proposed solutions (**priority level**)



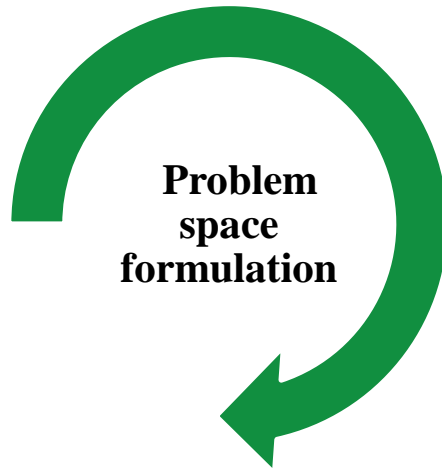
The developed research method



- **Identification of opportunities, barriers and potential solutions**
 - Review of the relevant literature and documentation
 - Interviews with experts and relevant stakeholders



The developed research method

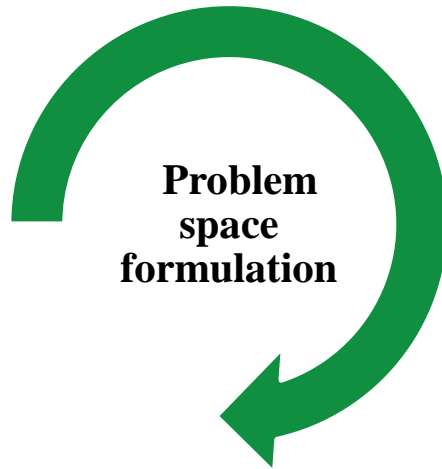


**Problem
space
formulation**

- **Identification of opportunities, barriers and potential solutions**
 - Review of the relevant literature and documentation
 - Interviews with experts and relevant stakeholders
- **The interviewees included experts from:**
 - TenneT TSO (departments of system management, system operations, Ancillary Services procurement, customers and markets),
 - Representatives of commercial parties (Balance Responsible Parties (BRPs), suppliers, aggregators),
 - The Universal Smart Energy Framework (USEF) foundation



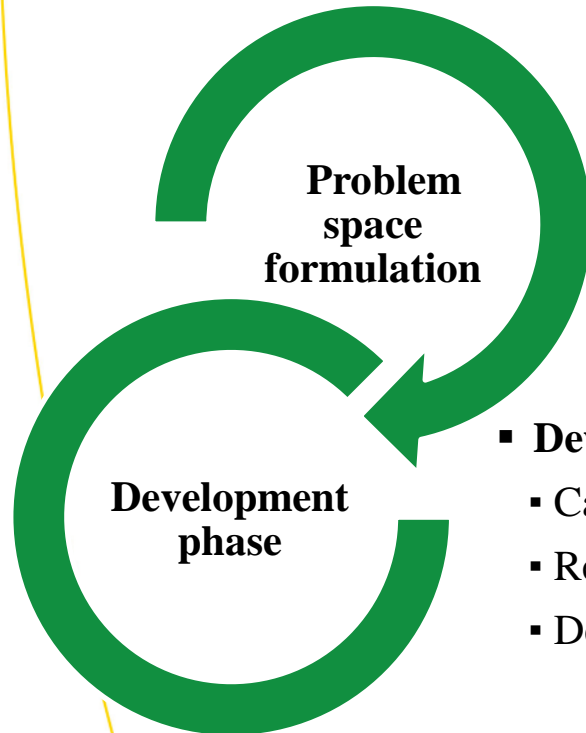
The developed research method



- **Identification of opportunities, barriers and potential solutions**
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 - Interviews with experts and relevant stakeholders
 - Compliance of solutions with country-specific preconditions



The developed research method



- **Identification of opportunities, barriers and potential solutions**
 - Review of the relevant literature and documentation
 - Interviews with experts and relevant stakeholders
 - Compliance of solutions with country-specific preconditions
- **Development of a plan with prioritised actions**
 - Categorisation and decomposition of barriers
 - Reiterations with the interviewees
 - Determination of prioritised actions based on pre-defined criteria



Determination of opportunities

- ❑ Opportunities were determined in terms of participation within the various segments of the electricity market:
 - Wholesale trade in spot markets
 - Ancillary Services markets
 - Over-the-counter trade of flexibility services
 - Retail markets
 - Other miscellaneous issues related to the provision of data services such as the roll-out status of smart metering systems and access to metered data



Ancillary Services markets

- Overview of ancillary services that are currently traded in the Netherlands:

	Frequency Containment Reserves (FCR)	automatic Frequency Restoration Reserves (aFRR)		manual Frequency Restoration Reserve (mFRR)			
Name (Name in Dutch)	Primary reserve (Primaire reservevermogen)	Regulating power / aFRR directly activated (Regelvermogen)		Incident Reserve / Emergency power / mFRR directly activated (Noodvermogen)	TSO – TSO mFRR direct activated	Reserve power / mFRR schedule activated (Reservevermogen Balanshandhaven)	Passive contribution (Passieve Bijdrage)
Type	Contracted	Contracted	Non-contracted	Contracted	Contracted	Non-contracted	N/A

Name (Name in Dutch)	Black start capability (Herstel-voorziening)	Reactive power (Blindvermogen)	Network losses (Netverliezen)
Type	Contracted	Contracted	Contracted



Categorisation of barriers

- ❑ Development of a conceptual framework for the categorisation of barriers
- ❑ Barriers are decomposed into three levels

Main categories of barriers	Types of barriers	Elements of barriers
Market	Design barriers	e.g. Length of lead time for automatic FRR
	Entry thresholds	e.g. Min. bid size for FRR
	Lack of transparency	e.g. Non-visibility of mFRRda in the FRR merit order
	Process related barriers	e.g. Requirement for symmetric bids for aFRR
Regulatory	Lack of standards	e.g. Determination of transfer of energy for mFRRda
	Market imperfections and distortions	e.g. Activation characteristics for mFRRda
Technical	Metering and data exchange barriers	e.g. Requirements for aFRR
	Data access barriers	e.g. Delay in smart meter data accessibility
Social	Lack of consumer acceptance	e.g. Low acceptance of smart meters systems



Categorisation of barriers

- ❑ Barriers are framed among the areas with **determined opportunities** for the provision of flexibility services
- ❑ In total, there were thirty-one (31) **identified elements of barriers**

	1.Market	2.Regulatory	3.Technical	4.Social
Opportunities for the provision of flexibility services	Types of barriers (9)			
	Elements of barriers (31)			



Priorities for overcoming barriers

- **Priorities** were determined through the interviews with the experts and relevant stakeholders in terms of **system impact** and **ease of implementation**

Rank	Barrier element	Identifier	Priority level
1	Regulatory – Lack of standards: Determination of transfer of energy for mFRRda	2.1.2	Urgent
2	Market – Lack of transparency: Non-visibility of mFRRda in the FRR merit order list	1.3.2	Urgent
3	Regulatory – Lack of standards: Metering, allocation, billing, reconciliation and data exchange	2.1.1	Urgent / Semi-urgent
4	Market – Design: Length of lead time for aFRR	1.1.3	Urgent / Semi-urgent
5	Regulatory – Lack of standards: Solution for smart meter data access	2.1.8	Semi-urgent



Priorities for overcoming barriers

- ❑ **Regulatory barrier – Lack of standards:** Determination of transfer of energy for mFRRda (2.1.2) - Urgent
 - Lack of standards for settling energy imbalances between the customers (or their aggregator) and their suppliers



Priorities for overcoming barriers

- ❑ **Regulatory barrier – Lack of standards:** Determination of transfer of energy for mFRRda (2.1.2) - Urgent
 - Lack of standards for settling energy imbalances between the customers (or their aggregator) and their suppliers

- ❑ **Market barrier – Design:** Length of lead time for aFRR (1.1.3) - Urgent / Semi-urgent
 - The time period between bidding and activation of a bid for aFRR is between 4 and 7 ISPs (imbalance settlement periods)



Priorities for overcoming barriers

- ❑ **Regulatory barrier – Lack of standards:** Determination of transfer of energy for mFRRda (2.1.2) - Urgent
 - Lack of standards for settling energy imbalances between the customers (or their aggregator) and their suppliers

- ❑ **Market barrier – Design:** Length of lead time for aFRR (1.1.3) - Urgent / Semi-urgent
 - The time period between bidding and activation of a bid for aFRR is between 4 and 7 ISPs (imbalance settlement periods)

- ❑ **Regulatory barrier – Lack of standards:** Solution for smart meter data access (2.1.8) – Semi-urgent
 - There is a need for official solutions for smart meter data access, so that market parties and customers can define their business cases



Priorities for overcoming barriers

- ❑ **Priorities** were determined through the interviews with the experts and relevant stakeholders in terms of **system impact** and **ease of implementation**

Rank	Barrier element	Identifier	Priority level
6	Regulatory – Lack of standards: Register of connections	2.1.9	Semi-urgent
7	Regulatory – Lack of standards: Sub-metering to support settlement processes	2.1.6	Semi-urgent
8	Market – Process: Separate provision of upwards and downwards mFRRda	1.4.4	Semi-urgent / Nice to have
9	Market – Design: Length of settlement period	1.1.1	Semi-urgent / Nice to have
10	Technical – Metering and data exchange: Requirements for FCR	3.1.1	Semi-urgent / Nice to have



Priorities for overcoming barriers

- ❑ **Market barrier** – Design: Length of settlement period (1.1.1) - Semi-urgent / Nice to have
 - In the spot markets of the European Power Exchange (EPEX), members can trade hourly instruments, which can be seen as a relatively long time period for exchanging flexibility options



Priorities for overcoming barriers

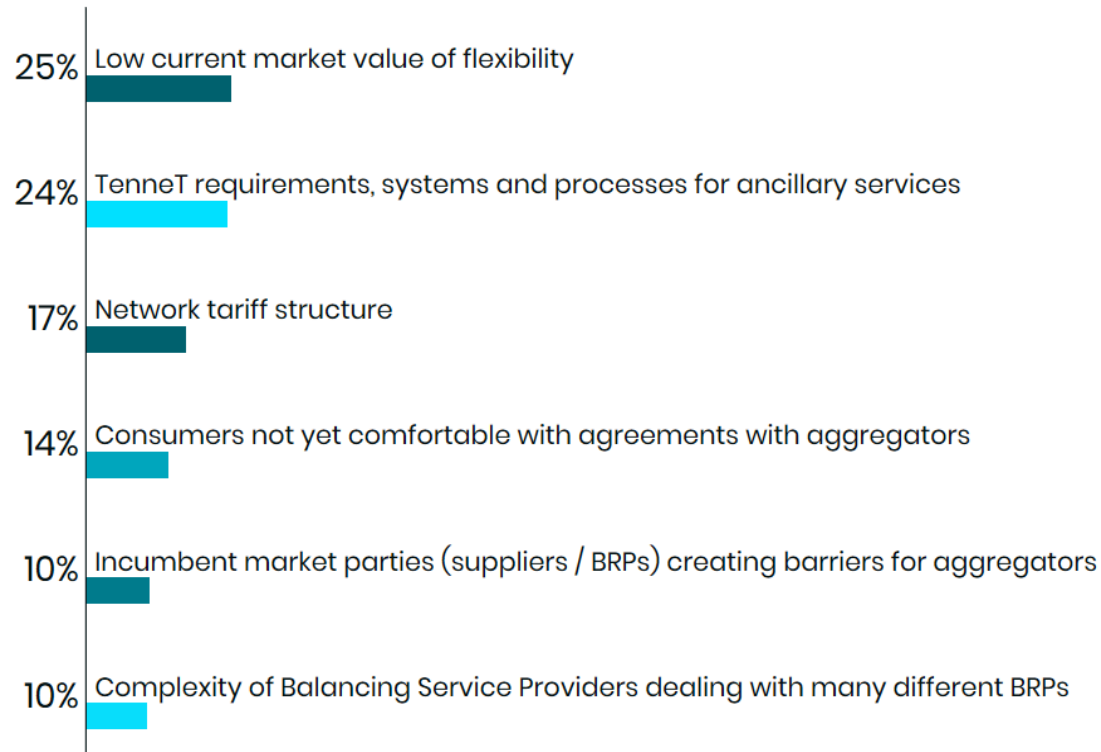
- ❑ **Market barrier** – Design: Length of settlement period (1.1.1) - Semi-urgent / Nice to have
 - In the spot markets of the European Power Exchange (EPEX), members can trade hourly instruments, which can be seen as a relatively long time period for exchanging flexibility options

- ❑ **Technical barrier** – Metering and data exchange: Requirements for FCR (3.1.1) - Semi-urgent / Nice to have
 - The provision of FCR is characterised by relatively high requirements for metering and data exchange
 - The involvement of TenneT in pilot projects supports the identification of new solutions for the provision of FCR (but also for FRR)



Epilogue

- Which of these are the most important barriers to further grow the business of aggregators



Source: Data from FlexTag symposium organised by TenneT on April 13, 2018



Epilogue

Follow-up projects

- ❑ The research outcome provided a basis for **follow-up pilot projects** between TenneT TSO, and aggregators
- ❑ To examine whether it is possible to provide **Ancillary Services** with new technologies and/or (aggregation of) smaller assets
- ❑ To provide a **level playing field** for different technologies and reduce barriers for new market entrants



Epilogue

Follow-up projects

- ❑ **FCR pilot** (Jun '16 – Jun '18): five participants
 - ❑ Aggregated assets can technically deliver FCR
 - ❑ Main barriers:
 - ❑ Data connection (real-time measurements via leased line)
 - ❑ FCR specifications (requirements on aggregation)
 - ❑ Product information (FCR manual for market participants)



Epilogue

Follow-up projects

- ❑ **aFRR pilot** (Jan '19 – Jan '21)
- ❑ Assess the technical feasibility of aFRR delivery with new technologies (demand response, renewable energy generators, aggregation of small assets)
- ❑ Setup and timeline:
 - ❑ 2017: aFRR blockchain implementation
 - ❑ 2018: evaluation phase & invitation of other pilot partners
 - ❑ 2019: start aFRR provision with 7 pilot partners



Epilogue

Follow-up projects

- ❑ Continuation of **aFRR pilots** includes also alignment with:
 - ❑ DSOs
 - ❑ BRPs
 - ❑ European legislation:
 - ❑ Electricity Balancing Guideline (EB GL)
 - ❑ Guideline on electricity transmission system operation (SO GL)



Epilogue

- ❑ Market, regulatory, technical, and social barriers exist
- ❑ There is a need for new rules, as an enabling policy, and to remove regulatory obstacles
- ❑ Policy adaptations are required for the provision of operating reserves, i.e. ensuring that energy imbalance volumes can be established beyond doubt is crucial
- ❑ Smart meter data must be easily accessible to support the business models of aggregators



Discussion

