



Impact assessment on the proposal for a network code on demand side flexibility

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Executive Summary

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EXECUTIVE SUMMARY OF THE STUDY 'IMPACT ASSESSMENT ON THE PROPOSAL FOR A NETWORK CODE ON DEMAND RESPONSE'

Study conducted on behalf of the European Commission by VITO/EnergyVille, Ramboll and VIS (February 2024)

In the electricity system of the future, renewable intermittent generation, in particular from distributed resources, will play an ever-increasing role. At the same time, an accelerated electrification of end uses, such as in transport, heating and industries, is expected. The Clean Energy Package recognizes this need for increased flexibility and acknowledges the importance of demand response (DR), which consists of load, distributed generation and storage. Today, however, the active participation of consumers in electricity markets is still limited due to the existence of several technical, economic, social and regulatory barriers. To tackle these, ACER submitted a non-binding Framework Guideline on Demand Response (FGDR) which aims to facilitate the participation of demand response in wholesale electricity markets and sets out main principles for a Network Code on Demand Response (NCDR). This study considers the principles and guidelines proposed in the FGDR, checks its completeness, and assesses the impact of different alternative policy options to introduce DR as targeted by the guideline.



Study objectives

This study assessed policy options for introducing rules on demand response, including distributed generation and storage, and investigated the corresponding impact. More specifically, the study:

- (i) identified the regulatory barriers limiting DR participation in EU electricity markets and assessed if the scope of the FGDR, submitted by ACER, was sufficient to address these barriers,
- (ii) developed options for new rules, and
- (iii) assessed their potential technical, economic and social impacts.

In doing so, this study provided evidence to support the European Commission identifying the preferred policy options for implementation and their respective characteristics.

BARRIER IDENTIFICATION

Regulatory barriers were collected from literature and mapped in categories. Insights from literature were complemented with those from stakeholder consultation and interviews.

BARRIER ANALYSIS

For all barriers, it was determined if they require EU action and fall within the general scope of the NCDR. Barriers that complied with both criteria were shortlisted for the next step.

AREAS OF IMPROVEMENT

The shortlisted barriers were organized into nine "areas of improvement".

FORMULATION OF POLICY OBJECTIVES AND OPTIONS

Policy objectives and options were formulated for all improvement areas. This executive summary only addresses the four which are deemed to have the highest impact on FSPs and/or consumers.

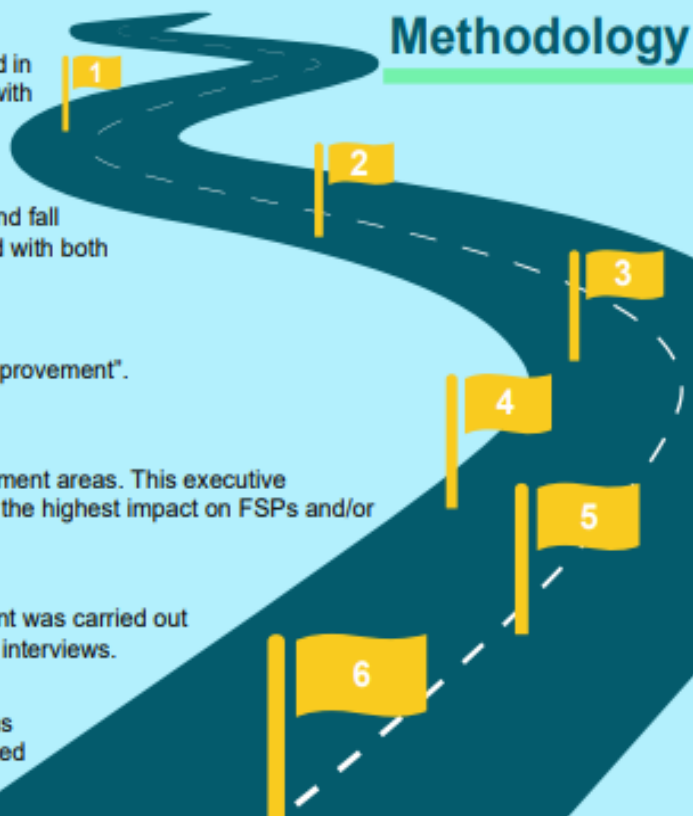
IMPACT ASSESSMENT

For each policy option, a mostly qualitative impact assessment was carried out based on inputs from literature, stakeholder consultation and interviews.

DETERMINATION OF PREFERRED POLICY OPTIONS

Building on the impact assessment, the different policy options were compared based on several qualitative criteria and ranked such that the preferred policy option is visible.

Methodology



Barrier identification and analysis

A total of 74 barriers limiting the participation of DR in EU electricity markets were identified and organized among different barrier categories. Those barrier categories are listed and described below.



Products and services

In order to facilitate the market-driven procurement of flexibility services and enable Flexibility Service Providers (FSPs) to actively participate in these markets, it is crucial to ensure that flexibility products are defined and are readily available and easily accessible to all potential providers.



TSO-DSO coordination

The collaboration between DSOs and TSOs is important to ensure coordinated access to assets such as distributed generation, energy storage, or demand response without creating or aggravating congestions. Despite the emphasis on collaboration in EU regulations, the current level of coordination between TSOs and DSOs is still limited and therefore cannot guarantee the efficient provision of flexibility nor ensure system security over multiple grid levels.



Market access

Non-discriminatory market access of demand response is not always assured in electricity markets across Europe and several barriers still impede the realization of the full (value-stacking) potential of these assets across different markets, including diverging approaches to aggregation across Europe, insufficient access to information and a lack of uniform processes and platforms across markets and countries.



Roles and responsibilities

The lack of clear definitions of roles and responsibilities poses challenges in the effective implementation of demand response in the electricity markets. The emergence of new actors as well as the evolving roles of existing actors calls for the definition of new tasks and the establishment of clear boundaries for their respective responsibilities.



Market and operational processes

This category identifies the regulatory barriers that prevent the full and non-discriminatory participation of DR to the electricity markets according to the different market phases that can be distinguished, i.e., prequalification (PQ), procurement, activation and settlement.



Information and data exchange

The access to sufficient and accurate information and data is pivotal to the success of demand response. There are however a number of barriers still to overcome related to generating, accessing and exchanging this information and data, ranging from technical and economic to regulatory constraints.



Flexibility in network planning

The network development plans of system operators (SOs, implying both DSOs and TSOs) should incorporate the utilization of flexibility, including demand response, as alternatives to expanding the network. However, many SOs, and particularly DSOs, have limited experience in effectively incorporating (new types of) flexibility into their planning process and weighing the use of flexibility against investment in grid capacity.



Newly identified barriers

In addition to the barriers mentioned above, additional barriers have been identified that relate respectively to the remuneration mechanisms of SOs, conflicting signals flexible assets are exposed to, challenges faced by energy sharing activities (such as energy communities) and by conversion technologies due to a lack of coordination between different energy vectors. In addition, the transposition of the Clean Energy Package to European Member States goes slowly.

Barrier overview

The barriers for each category are listed in the figure below and described in more detail in the report.



Areas of improvement

In a next step of the study, the barriers that can be solved with similar policy options have been grouped together in areas of improvement. Based on the list of barriers, we defined nine areas of improvement. For the impact assessment, it has been decided to focus on the areas of improvement which are most relevant to investigate further. This evaluation is based on two criteria, namely, the **impact the area of improvement has on an FSP or consumer** regarding their participation in the electricity markets and the **extent to which the area of improvement is a debated topic**.

Products and services

Baseline

Aggregation

Prequalification

Settlement

Market design for local services

Flexibility versus investment

TSO-DSO coordination

Data exchanges and information

This assessment was discussed together with the European Commission and confirmed by the feedback received during the stakeholder consultation and interviews. It was therefore jointly decided to focus on the following areas of improvement: **baseline, aggregation, prequalification and market design for local services**. Key arguments for this selection are:

- The baseline methodology directly impacts the calculation of the amount of flexibility delivered. Although a variety of more established baseline approaches have been implemented across different markets, additional innovation is needed regarding appropriate baseline methodologies for new types of services and new types of (aggregated) flexible assets.
- Similarly, different aggregation models are being applied across Europe and the revenues of consumers and FSPs are directly impacted by the chosen model and its design choices.
- Current prequalification processes are not well adapted to (aggregated) portfolios, so FSPs and consumers are pushing for a simplification of the prequalification processes.
- Finally, as market for local services are still immature, there are still quite some uncertainties related to the market design.

In the next phases of the study, these areas of improvement are used as a basis to formulate, for the group of barriers they hold, a variety of **policy objectives and ensuing policy options** to remove the barriers for DSF.

Overview of policy objectives and impacts

For each of the four selected areas of improvement, policy objectives were formulated. Their impacts were assessed through literature, stakeholder consultation and interviews. Based on the results of that analysis, different impacts were identified for each area of improvement.



BASLINE



AGGREGATION



PREQUALIFICATION



MARKET DESIGN FOR LOCAL SERVICES

POLICY OBJECTIVES

- Clarify the role of the baseline, what a baseline methodology should consider and how appropriate methodologies can be selected
- Clarify what an aggregation model should entail and develop such models
- Simplify the prequalification process and make it fit for small assets and DR
- Create a framework for local markets and clarify what their design should entail

IMPACTS OF


- Increased harmonization in baseline methodology
- Chosen baseline methodology
- Baseline methodologies adapted to FSPs' portfolios
- Increased harmonization in aggregation models
- Chosen aggregation model
- Increased harmonization in prequalification
- Measures to simplify the prequalification process
- Ex-post product verification versus ex-ante prequalification
- Increased harmonization of local market design
- Increased coordination between markets


Impact assessment


The identified impacts differ between the types of stakeholders involved, i.e., the flexibility service provider/consumer, the system operator and society overall, resulting in risks and/or opportunities. The assessment for each stakeholder is explained below.

Increased harmonization in baseline methodology




 Increased harmonization in baseline methodologies leads to cost savings and more predictable earnings for **FSPs and their consumers**. Yet, it might also lead to decreased market access for certain types of flexibility and limitations in innovation potential. Moreover, the harmonized baseline may not deliver the desired accuracy in different situations.


 For the **system operator**, increased harmonization can lead to cost savings but the potential risk of decreased accuracy can also negatively impact the quality of the service delivered.


 Overall, for **society**, increased harmonization of baselines can lead to more robust and rigorous baseline methodologies and hence decreased system costs.

Baseline methodologies adapted to portfolios of FSPs



 Baselines that are adapted to the portfolios of **FSPs** allow a fairer revenue from flexibility and an increased willingness to participate in the market.

 For the **system operator**, processes become more complex which can result in an increase in costs. There could be a higher risk of strategic behavior and gaming, but with the chance of having access to more diversified flexibility and increased market liquidity.

 Overall, for **society**, baseline methodologies adapted to FSP portfolios have the potential to decrease system costs as increased access to new (lower cost) flexibility can be realized.


Chosen baseline methodology





There is no 'one size fits all' baseline methodology. The suitability of baseline methodologies is determined by different factors such as the type of need and product, the type of metering, the type of assets, etc.

Increased harmonization in aggregation models



 For **FSPs**, increased harmonization in aggregation models results in an increased replication potential of FSPs' business models. They also benefit from decreased market entry costs and increased financial certainty. However, a too strict standardization can impose limits on FSPs.

 For the **system operator**, increased harmonization allows for more uniform data approaches and increased market liquidity and lower prices.

 Overall, for **society**, increased harmonization in aggregation models can therefore decrease system costs thanks to cost savings in IT and data infrastructure and increased availability of flexibility.

Chosen aggregation model



Stakeholders experience different effects based on the chosen aggregation model and its design characteristics (perimeter correction, financial compensation). The impacts are dependent on a complex combination of factors, including:

- the type of flexibility needs,
- the direction of flexibility needs (upward or downward),
- the direction of imbalances (negative or positive),
- the market prices and resulting retail price.

Increased harmonization in prequalification



For **FSPs**, increased harmonization in prequalification results in an increased replication potential of their business case and decreased market entry costs. It increases the potential of value stacking and hence revenue streams.



For **system operators**, increased harmonization in prequalification increases the replication potential, reduces costs and increases market liquidity.



Overall, for **society**, the cost savings linked to increased harmonization in prequalification for different stakeholders can lead to decreased overall system costs.

Measures to simplify the prequalification process



For **FSPs**, a simplified prequalification process results in cost savings, more dynamic portfolios and easier shifts in assets.



For **system operators**, a simplified process results in cost savings provided these simplifications do not create additional risks to system security.



Overall, for **society**, a simplified prequalification process might result in higher FSP switching rate and enhanced social welfare.

Ex-post product verification versus ex-ante product qualification



The suitability of ex-post product verification or ex-ante product qualification should be examined by considering the characteristics of the product to be provided, the liquidity of the market, and the characteristics of FSPs. **Ex-post verification** is typically suited for products with a longer response time and fewer activations, in situations with many FSPs in the market and rather small assets. On the other hand, **ex-ante product prequalification** is typically suited for real- or close-to-real-time products with many activations, in situations with fewer FSPs in the market and relatively large assets.

Increased harmonization of local market design



For **FSPs**, increased harmonization in local market design reduces market entry costs and ensures more predictable earnings for FSPs and their consumers.



For the **system operator**, increased harmonization allows for lower market development costs and increased market liquidity. However, the harmonized market design might not be fit for purpose and might lower innovation potential.



Overall, for **society**, increased harmonization in local market design can decrease system costs.

Increased coordination between markets



For **FSPs**, increased market coordination results in improved market access and increased revenues and facilitates value stacking.



For the **system operator**, increased coordination increases liquidity in the markets and reduces competition for flexibility.



Overall, for **society**, increased coordination between markets prevents the lock-in of flexibility, decreases system costs and increases transparency and market integrity.

Assessment and comparison of policy options

As mentioned before, for each selected area of improvement, specific policy objectives were defined. For each of those objectives, an array of policy options was identified. These options were then assessed and compared by means of relevant criteria including legal and technical feasibility, coherence with overall EU policy objectives and the Framework Guideline on Demand Response, relevance, effectiveness, efficiency, and proportionality. This step was done in consultation with the European Commission and considering the ongoing work by ENTSO-E and/or the EU DSO entity for the preparation of a proposal for a network code on demand response.

		Legal feasibility	Technical feasibility	Coherence with EU objectives	Coherence with FGDs	Relevance	Effectiveness	Efficiency	Proportionality
Specific policy objective		Policy option							
Baselining	Select an appropriate baseline calculation methodology	No intervention at EU level							
		EU requires definition of requirements at MS level							
		EU guidelines							★
		Exhaustive EU list of baseline methodologies							
		Standard baseline methodologies defined at EU level							
Aggregation	Develop suitable aggregation models	No intervention at EU level							
		EU guidelines and high-level principles							★
		Exhaustive EU list of aggregation models							★
		Standard aggregation models defined at EU level							
Prequalification	Improve the prequalification process	No intervention at EU level							
		EU-level requirements							★
		EU standardized prequalification processes for specific products and services							
		A single EU standardized prequalification process							
	Simplify product prequalification by allowing ex-post verification	No intervention at EU level							
		Ex-post product verification is the default option							★
		EU process to be followed							★
	Simplify prequalification for small assets/assets of the same type	No intervention at EU level							
		High-level principles developed at EU level							★
		Definition of conditions at EU level							
Market design for local services	Improve local market design	No intervention at EU level							
		Local markets designed at national level according to high-level EU-principles							★
		Harmonized local market design at EU level							
		Standardized market design for local services at EU level							
	Improve coordination between electricity markets (incl. local markets)	No intervention at EU level							
		High-level principles at EU level for coordination							★
		Fixed rules for market coordination, decided at EU level							

High

Medium

Low

Blue text = currently present in NCOR

★ Preferred option

Conclusions on policy options

Based on the assessment and comparison of policy options for the different areas of improvement, preferred policy options were selected. A summary of the preferred options and the reasoning behind the choice for a particular option is provided below.

Baseline

Our analysis showed that defining **EU guidelines and principles to select appropriate baseline methodologies** currently seems to be the most suitable option. Baseline methodologies should be selected according to national circumstances but there is also a need to define a minimum set of European requirements to come to robust methodologies and avoid gaming. Moreover, building an open library for baseline methodologies at EU level is advisable and supported by different stakeholders. Then, several elements require further analysis and consultation, namely (i) a process for further harmonization of baseline methodologies in the future, (ii) roles and responsibilities concerning the definition and calculation of baselines, (iii) research on how mutual cross-country recognition of baseline methodologies can be realized, (iv) a better understanding of which approach(es) can be used to avoid gaming and market abuse, (v) the benefits and costs of near-real-time nominations provided by FSPs and used as a baseline and (vi) the impact of other baseline methodologies proposed by FSPs tailored to their portfolios, so called self-proposed baseline methodologies. It should also be noted that the level of harmonization in the short-term can be higher for more established services.

Aggregation

Our analysis supports **the proposal of having an exhaustive list of aggregation models at EU level, with implementation at national level, and with sufficient guidance provided in the form of EU guidelines and high-level principles or criteria**. Stakeholders are impacted differently depending on the chosen model and their implementation. The impact of increasing harmonization across Europe is therefore closely tied to the design choices and their implementation. Moreover, different aggregation models might be needed for different products. The main challenge is to select and define the specific model(s) that will serve as a harmonized choice. Stakeholders prefer a harmonized variety of options over converging on a singular model. In addition, there should be **a process in place to propose new or amend aggregator models** based on new developments and insights.

Prequalification

Our analysis showed that, while product qualification processes can be harmonized at EU-level concerning steps and procedures and data exchange interfaces, harmonizing technical requirements for product prequalification might be difficult as SOs operate their systems in different ways. It would however be beneficial to formulate a **set of requirements at EU level**. Our analysis supports the simplification of prequalification for small assets, the conditions for which should be defined at EU level. Moreover, a standardization system that certifies small assets as 'demand response ready' might be beneficial. Finally, the ability to make portfolio changes with little to no additional process, under certain conditions, is expected to increase market liquidity and optimises the end costs for consumers. The **criteria for this reassessment would preferably be set at EU-level**.

Markets for local services

Our analysis revealed that there are many benefits to harmonize markets for local services (e.g., congestion management and voltage control) but currently the development of these markets is still at an early stage which makes it difficult to decide on a specific and preferred design. Moreover, while increased coordination is a key strategy to facilitate the development and well-functioning of local markets for congestion management and voltage control, diverging market contexts in Europe currently limit possibilities for EU-level market coordination in the short and medium term. It would however be beneficial to (i) set **high level principles at EU level** regarding the design of local markets and their coordination with other markets and (ii) **require member states to decide on a national framework** clarifying, amongst other, the roles and responsibilities, the procurement and supporting market processes and market coordination aspects.

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