Report on the third GRIFOn Meeting

D12.4

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About OneNet

The project OneNet (One Network for Europe) will provide a seamless integration of all the actors in the electricity network across Europe to create the conditions for a synergistic operation that optimizes the overall energy system while creating an open and fair market structure.

OneNet is funded through the EU's eighth Framework Programme Horizon 2020, "TSO – DSO Consumer: Large-scale demonstrations of innovative grid services through demand response, storage and small-scale (RES) generation" and responds to the call "Building a low-carbon, climate resilient future (LC)".

As the electrical grid moves from being a fully centralized to a highly decentralized system, grid operators have to adapt to this changing environment and adjust their current business model to accommodate faster reactions and adaptive flexibility. This is an unprecedented challenge requiring an unprecedented solution. The project brings together a consortium of over seventy partners, including key IT players, leading research institutions and the two most relevant associations for grid operators.

The key elements of the project are:

1. Definition of a common market design for Europe: this means standardized products and key parameters for grid services which aim at the coordination of all actors, from grid operators to customers;
2. Definition of a Common IT Architecture and Common IT Interfaces: this means not trying to create a single IT platform for all the products but enabling an open architecture of interactions among several platforms so that anybody can join any market across Europe; and
3. Large-scale demonstrators to implement and showcase the scalable solutions developed throughout the project. These demonstrators are organized in four clusters coming to include countries in every region of Europe and testing innovative use cases never validated before.

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List of Abbreviations and Acronyms

Acronym	Meaning
API	Application Programming Interface
DER	Distributed Energy Resources
DF	Distributed Flexibility
DSO	Distribution System Operator
EU	European Union
FSP	Flexibility Service Provider
GRIFOn	Grid Forum
ICT	Information and Communications Technology
IDSA	International Data Spaces Association
IoT	Internet of Things
IT	Information Technology
LFE	Linux Foundation Energy
NRA	National Regulatory Agencies
R&D	Research and Development
RES	Renewable Energy Sources
SO	System Operator
SRA	Scalability and Replicability Analysis
TSO	Transmission System Operator
WP	Work Package

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Executive Summary

The Grid Forum (GRIFOn) is an innovative approach to generating European-wide consensus about OneNet's proposed solutions by integrating external stakeholders in developing key solutions. GRIFOn was implemented via workshops on specific project-related topics. Although Deliverable 12.4 is titled the Report on the Third GRIFOn Workshop, as three workshops were foreseen at the start of the project, five workshops were actually held, which enabled the project partners to get the needed feedback from stakeholders on the preliminary results of their work and enabled consensus to be achieved with stakeholders on the results. The workshops centred on the following topics:

- 3rd workshop: EU-wide implementation of coordinated market schemes and interoperable platforms for standardised system products.
- 4th workshop: OneNet Reference Architecture, designed as a common IT framework to ensure extended interoperability within the European electricity system.
- 5th workshop: OneNet roadmap.

The third and fifth workshops were online webinars, while the fourth was a live event during the Enlit Europe conference.

Some of the key outcomes of the events mentioned above were:

- Validation of the general conclusions from the Scalability and Replicability Analysis.
- The feedback received will be incorporated into the following work by providing the OneNet Framework under the Linux Foundation Energy (LFE).
- Receiving feedback and building consensus on the OneNet Roadmap.

Feedback from stakeholders received during the GRIFOn webinars was used in various work packages and helped achieve key project results.

Obtaining the stakeholders' feedback is continuous work that requires close cooperation with the project's communication and dissemination teams. During planning and implementing those workshops, we learned that much attention should be paid to selecting interactive approaches, with the help of which we want to obtain the best possible feedback from event participants. In the workshops, where the organising teams invested a lot of time and energy in preparing and designing relevant questions and choosing promising interactive approaches for providing feedback from the participants, we also got the most helpful feedback for the questions/topics discussed. As for the organisation and implementation of the presentations and discussions at the hubs within the exhibition spaces of the conferences, special attention should be paid to the timing of the presentation and to ensure that it does not coincide with the social events of the exhibitors.

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1 Introduction

The Grid Forum (GRIFOn) is an initiative launched by OneNet to promote and facilitate the creation of a community of stakeholders interested in collaborating and actively tackling the most pressing issues regarding the future European electricity markets. It has three main objectives:

1. Co-determination of OneNet's project results through the participation of all relevant stakeholders.
2. Europe-wide knowledge sharing on how to shape an integrated European energy market.
3. Consolidation of a shared vision of the European energy markets and systems by building consensus of OneNet proposed solutions among project- and non-project parties

The OneNet consortium concluded that interactive/engaging workshop formats are the most suitable for knowledge exchange between the project consortium and external stakeholders in the framework of the GRIFOn. For this purpose, the structured process of GRIFOn approach was designed.

1.1 The GRIFOn Approach

The OneNet consortium identified early that a structured process is necessary to manage an activity like GRIFOn. Therefore, a method for implementing a GRIFOn activity/workshop that follows a 6-step approach was designed:

1. **Identify topic:** Identify concrete OneNet-related outcomes/deliverables that can benefit from external feedback (what, by when is the input required).
2. **Identify stakeholders:** Identify the type of stakeholder and the individual stakeholders/associations from whom feedback can be valuable.
3. **Preliminary planning:** Decide on the form in which this feedback is ideally received (I.e. survey, workshop, track-changes review of deliverables, or a mixture of these).
4. **Detailed planning:** Define responsible OneNet partner and organise stakeholder engagement action with GRIFOn lead.
5. **Implementation and promotion:** Carry out stakeholder engagement action.
6. **Feedback:** Feed the outcome of the stakeholder engagement action into the relevant living document.

Alternative ways of knowledge exchange, like surveys and open consultations, were also used to support the workshop format. The third, fourth and fifth workshops were also planned and conducted following the GRIFOn approach.

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1.2 Target Audience

During the dedicated GRIFOn Stakeholder Task Force meetings project partners discussed from which stakeholder groups the feedback on OneNet's activities/proposals/findings is needed. Project partners identified seven relevant stakeholder groups: Transmission and distribution system operators, regulators, aggregators, market operators, industrial and residential consumer organisations, energy producers' associations, and ICT/IoT providers/platforms. Each stakeholder group was further segmented and a detailed list of individual stakeholders within each relevant stakeholder group was made. The list was the basis on which GRIFOn workshop organisers determined from which stakeholders' feedback was needed.

GRIFOn primarily addressed and encouraged TSOs, DSOs, regulators, aggregators, ICT and IoT companies, market operators, energy suppliers, energy communities, and consumer organisations to engage with GRIFOn. Depending on the topics covered in the workshops, relevant groups of stakeholders were invited to participate and give feedback. The feedback received allowed us to upgrade our project results if necessary. In addition, GRIFOn maintained a constant dialogue with the BRIDGE and ETIP SNET initiatives.

1.3 Outcomes

In the context of the OneNet project, GRIFOn's primary outcome are two whitepapers published at the end of the project. The first document is titled Interoperability Strategy for OneNet, and the second is Market Design for OneNet. Both papers are part of the Deliverable 11.7 (EU wide implementation of market schemes and interoperable platforms) and summarise some of the key results of the OneNet project.

1. **Interoperability Strategy for OneNet:** Interoperability between its stakeholders and their systems is an essential aspect of an integrated European electricity system that considers the regional differences of the Member States. The document will outline the path towards an interoperable and federalised European electricity market following the system-of-system approach.
2. **Market design for OneNet:** GRIFOn will foster the development of a fragmented electricity market landscape towards an integrated pan-European one. This document will provide a comprehensive overview of the current situation and outline the next steps for a unified European electricity market design.

In line with the GRIFOn approach, this report describes the third, fourth and fifth GRIFOn workshops, which took place in the last 18 months. During this period, the project partners stressed that obtaining stakeholder feedback would benefit their work. As a result, WP12 (External Interactions for Large Impact of OneNet) concluded that GRIFOn should organise three workshops focusing on:

- EU-wide implementation of coordinated market schemes and interoperable platforms for standardised system products.

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- Overcoming digital silos by enabling seamless data exchange between energy stakeholders through an IDSA-based reference architecture.
- OneNet solutions and the enablers and barriers for EU-wide implementation of these solutions.

This report consists of five chapters. Chapter one introduces the document's content and chapters two, three, and four report on the results of the GRIFOn workshops. Chapter five summarises the GRIFOn activities and lessons learned.

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2 The Third GRIFOn Workshop

The third GRIFOn Workshop, "EU-wide implementation of coordinated market schemes and interoperable platforms for standardised system products," was organised by WP 11 (*From OneNet demonstrators to EU-wide implementation of coordinated market schemes and interoperable platforms for standardized system products*). It took place online via Zoom on 4 October 2023. Ninety-seven people registered for the event, and eighty of them attended.

2.1 Step 1: Identify the topic

During the GRIFOn Task Force meeting discussions on how to proceed with activities in the last 18 months of the project, the WP 11 project partners stressed that their work would benefit from obtaining stakeholder feedback. As a result, WP12, in cooperation with WP 11, concluded that GRIFOn should organise the third workshop, which will focus on "EU-wide implementation of coordinated market schemes and interoperable platforms for standardised system products." The WP 11 topics selected were the ones that had preliminary results and were not covered in other GRIFOn workshops.

2.2 Step 2: Identify stakeholders

The WP 11 project partners identified the following stakeholder groups from which they wanted to obtain feedback: Transmission System Operators, Distribution System Operators, Market Operators, Flexible Service Providers, Aggregators, Regulators and Academia.

2.3 Steps 3 and 4: Planning the third GRIFOn event

The third GRIFOn Workshop was organised as an online webinar via the Zoom platform. The workshop intended to collect inputs from different stakeholders on preliminary results and conclusions of the topics studied in WP 11:

- Market designs for system services.
- Interoperable platforms and data architecture to support TSO-DSO-customers coordination.
- Scalability and Replicability Analysis of the proposed standardised products, market schemes, and platforms for the EU-wide implementation.
- Business models analysis for OneNet solutions.

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It was foreseen that the participants could post questions during the presentations in chat, and after each presentation, speakers would provide the answers. At the end of the webinar, there was a timeslot for the discussion and closing remarks. The agenda of the third GRIFOn workshop is presented in Table 2.1.

Table 2.1 - Agenda of the third GRIFOn workshop

Topic	Presenter
Introduction	**Antonello Monti, RWTH Aachen University**
Presentation of WP 11	**José Pablo Chaves Ávila, Comillas**
Market Designs Techno-economic assessment of proposed market schemes for standardised products	**Matteo Troncia, Comillas**
ICT Interoperability Recommendation of interoperability platforms and data exchange for TSO-DSO-customer coordination	**Ivelina Stoyanova, RWTH Aachen University**
Scaling Up and Replication Scalability and replicability analysis for market schemes and platforms	**Rafael Cossent Arin, Comillas**
Business Models Analysis of OneNet solutions: new and traditional stakeholders, roles, and regulations	**Luis Olmos Camacho, Comillas**
Discussion and closing remarks	

2.4 Step 5: Implementation and promotion

The project partners tried to attract targeted stakeholders to participate in the workshop. Therefore, they disseminated information about the workshop. A dedicated page on the OneNet project website[1], where the invitation to participate in the event, agenda and registration link were published. Furthermore, news about the workshop was published on OneNet's web page, social media channels and Florence School of Regulation's newsletters. Also, all project partners were asked to share information about the workshop on their digital communication channels and among their connections from the pre-defined stakeholder groups.

A recording of the event and presentations are available online: https://onenet-project.eu/grifon/ and at https://youtu.be/MqthUgr9rBE.

[1] 3rd GRIFOn Workshop - OneNet Project (onenet-project.eu)

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2.5 Step 6: Feedback

During the webinar, general conclusions from the Scalability and Replicability Analysis (SRA) were validated. There was particular interest in the estimations of the price of flexibility. A benchmark was conducted during the SRA to obtain a reference price for flexibility services using data from the Piclo flex flexibility market in the UK. This benchmark was complemented with a questionnaire to project partners, assessing their price expectations and the price they perceived as attractive. Based on this preliminary analysis, flexibility price is not expected to be a significant issue now. Still, flexibility markets are at an early stage of development, and their evolution should be continuously monitored.

The WP11 partners also decided to try to get feedback from the participants after the event. They prepared the online survey that was distributed to all the participants. The results of the survey are presented in the following chapter.

This GRIFOn workshop helped to present the results obtained in the WP 11, receive feedback, and adapt the tasks based on the feedback received.

2.5.1 Survey results

After the event, the participants were asked to complete a survey on the common prequalification procedure among DSOs and TSOs and the common prequalification procedure across products. Unfortunately, only four participants responded, but luckily, they were all from different stakeholder groups: academia, TSO, Flexible Service Providers and Market Operators.

On the common prequalification procedure among DSOs and TSOs, they responded as follows:

- The most important argument in favour was Reduced Barriers for Market Participants: One common procedure would simplify entry into the market, encouraging more participants and fostering competition.
- The most important arguments against were equally Complexity: Reaching consensus on standards that cater to the unique needs of both DSOs and TSOs could be challenging and Potential for Conflicts: DSOs and TSOs have different operational objectives and responsibilities, which could lead to conflicts in determining shared standards and in operating the jointly qualified resources.
- As the most important requirement, they marked Stakeholder Engagement: Involvement of all relevant stakeholders, including DSOs, TSOs, regulators, and service providers, in the decision-making process.
- As the most important enablers, they stated Regulatory Support: Clear mandates and guidelines from regulatory authorities can act as a significant enabler. A framework that allows for adaptability as technology and market dynamics evolve but still ensures system security and reliability.

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- As the most important barrier, the Operational Inertia (or Path Dependency): Established operational protocols might resist change, was identified.

On the common prequalification procedure across products, they responded as follows:

- The most important argument in favour was Value Staking for Providers: Providers might find it easier to pivot between different system services, based on market needs and price signals, if they have already been prequalified for a range of products.
- The most important argument against was different for each stakeholder. Academia representative marked as the most important argument Complexity: Merging various criteria for different products into a unified prequalification process can result in a more complex and confusing procedure rather than simplifying it. TSO representative marked Barriers to Specialization: Some providers specialize in specific system services. By combining prequalification, these specialists might face challenges if the combined criteria don't align with their strengths. Flexible Service Provider chose Potential for Lowered Standards: One size does not always fit all. A shared procedure might not adequately address the unique requirements of each product, leading to reliability issues. The market Operator decided on the Risk of Stifling Innovation: Unique prequalification procedures for different products allow for innovative solutions tailored to specific service needs. A unified procedure might inadvertently hinder these specialised innovations.
- They marked the Unified Regulatory Framework as the most important requirement: A unified regulatory framework and guidelines for all system services can smoothen the transition towards shared prequalification (i.e., Table of Equivalence).
- As the most important enablers, they stated equally, “Transparent and Uniform Procedures: Procedures that are transparent and uniform across services can simplify the prequalification process and make it more accessible. A common procedure should ideally simplify the documentation process, making it easier for providers to understand and comply with the requirements.” and “Clear Economic Incentives: Clear economic benefits, such as cost savings, increased efficiency, or better resource allocation, make shared prequalification more attractive. If all the stakeholders, including service providers, regulators, and consumers, see the benefits are onboard with shared prequalification, it can be smoothly implemented.”
- As the most critical barrier, respondents recognised different barriers: Academia (Ambiguous Economic Outcomes: If the economic benefits of shared prequalification are unclear or unevenly distributed, there might be resistance to its adoption.), TSO (Divergent Technical Needs: If the technical requirements for different system services and different products are too varied, shared prequalification might introduce inefficiencies.), Flexible Service Provider (Conflicting Regulatory Mandates: If regulation for different system services have conflicting requirements or standards, shared prequalification becomes challenging.), and Market Operator (Lack of Stakeholder Consensus: Resistance from any key stakeholder can halt the progress towards shared prequalification.).

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The respondents didn't recognise any risks that would present a high hazard. The following risks were identified as mid-hazard:

- Sharing information between entities might raise data privacy and security concerns, leading to risks for cybersecurity and legacy systems and data management requirements. (TSO, Market Operator, Flexible Service Provider)
- A unified prequalification adds significant implementation complexity and requires high costs. (Academia, TSO, Market Operator)
- Potential for Service Disruption: If there's a risk that shared prequalification might disrupt the provision or quality of system services, it can be a significant deterrent. (TSO, Flexible Service Provider)
- A unified prequalification adds potential for conflicts between TSOs and DSOs, lowering reliability. (TSO)
- Risk for economic inefficiency and lack of reliability: technical requirements for different system services and products are too varied and shared prequalification might introduce inefficiencies. (Flexible Service Provider)

The respondents recognised two risks with a high probability of occurrence: A unified prequalification adds potential for conflicts between TSOs and DSOs, lowering reliability, and Sharing information between entities might raise data privacy and security concerns, leading to cybersecurity and legacy systems and data management requirements risks. For risks were recognised as risks with mid probability of occurrence:

- A unified prequalification adds significant implementation complexity and requires high costs.
- Risk for economic inefficiency and lack of reliability: The technical requirements for different system services and products are too varied and shared prequalification might introduce inefficiencies.
- Potential for Lowered Product Standards: A shared procedure might not adequately address the unique requirements of each product, leading to reliability issues.
- Potential for Service Disruption: If there's a risk that shared prequalification might disrupt the provision or quality of system services, it can be a significant deterrent.

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3 The Fourth GRIFOn Workshop

The fourth GRIFOn Workshop, "OneNet(work) for Europe: overcoming digital silos by enabling seamless data exchange between energy stakeholders through an IDSA-based reference architecture," was organised by WP 5 (*Open IT Architecture for OneNet*) and WP 6 (*Reference IT Implementation for OneNet*). It was a live event which used the opportunity to reach energy experts meeting live at the Enlit conference on 28-30 November 2023 in Paris, France, where OneNet Project also had a booth at the EU Projects Zone. Therefore, project partners organised on 29. November 2023, a live session in the EU Projects Zone (Theatre 2: 15.30–17.00). Because of the setup at Enlit, where multiple parallel workshops take place and participants listen on headsets, so that they may not be physically visible as listening to a particular session, an exact estimate of the number of participants is not possible. However, at least 25 interested event participants were visibly in the audience of the workshop.

3.1 Step 1: Identify the topic

After the third GRIFOn workshop, the GRIFOn Task Force discussed the following activities in the framework of GRIFOn. During the discussion on possible topics, they agreed to organise two additional workshops before the end of the project, as important project results needed validation from the stakeholders. For the fourth workshop, WP 5 and WP 6 project partners proposed to present the OneNet Reference Architecture, designed as a common IT framework to ensure extended interoperability within the European electricity system.

3.2 Step 2: Identify stakeholders

The WP 5 and WP 6 project partners identified the following stakeholder groups from which they want to obtain feedback: TSOs, DSOs, Researchers and Developers of interoperable systems within the energy domain.

3.3 Steps 3 and 4: Planning the fourth GRIFOn event

The fourth GRIFOn Workshop was not an online webinar via the Zoom platform but a live event at Enlit Europe, where representatives from utilities, network operators, vendors, consultants, start-ups and system integrators covering the entire smart energy value chain met. The event was organised at the Theatre 2 of the EU Project's Zone.

The event's goal was to present the OneNet Reference Architecture, OneNet Cross Platform Services, and OneNet Connector and get feedback from the participants. The agenda of the fourth GRIFOn workshop is presented in Table 3.1.

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Table 3.1 - Agenda of the fourth GRIFOn workshop

Topic	Presenter
Introduction: The OneNet Project, Challenges and Achievements	**Antonello Monti, RWTH Aachen University**
The OneNet Reference Architecture	**Ferdinando Bosco, Engineering**
Designing the "Common Language"-Cross-Platform Services and Business Objects and the OneNet Connector – An IDSA-based implementation and GUI	**Kapetanios Apostolos, European Dynamics**
Panel discussion: Lessons learnt from piloting in the OneNet project	**Magda Foti, Ubitech** **Vincenzo Croce, Engineering** **Vassilis Sakas, European Dynamics** **Carlos Damas Silva, E-REDES**

3.4 Step 5: Implementation and promotion

The project partners and the organisers of the Enlit Europe disseminated information about the workshop. Dedicated pages were made on the OneNet project website[2] and the Enlit Europe conference webpage, where the invitation to participate in the event and the agenda were published. Furthermore, news about the workshop was published on the OneNet web page, the Enlit Europe web page, and their social media channels. The information about the event was also spread to the community via the Florence School of Regulation's newsletters. Also, all project partners were asked to share information about the workshop on their digital communication channels and among their connections from the pre-defined stakeholder groups.

3.5 Step 6: Feedback

After the presentations and the panel discussion, essential remarks and feedback from the audience were related to:

- lessons learned during the OneNet project,
- the easiness of deploying the technical implementation,
- the interoperability with existing and legacy systems,
- the security aspect of using and providing open-source Software Tools.

Even if attendance during the panel was lower than expected (the organisers expected approximately 50 participants) due to social events that started earlier than anticipated in the exhibition area, the context of the Enlit Europe conference (OneNet booth, participation at other panels, social networking) allowed project

[2] OneNet goes to ENLIT 2023 - OneNet Project (onenet-project.eu)

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partners to have many contacts and discussions with interested stakeholders strictly connected with the fourth GRIFOn workshop.

Project partners incorporated the feedback received during discussions at the Enlit Europe event into their following work by making the OneNet Framework available as open-source software and applying for it to be accepted as a Linux Foundation for Energy project. This ensured that it would be further developed after the end of the OneNet project and that there would be a developer community.

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4 The Fifth GRIFOn Workshop

The fifth GRIFOn Workshop, "Presentation of the preliminary results of the OneNet roadmap," was organised as a joint initiative between the OneNet GRIFOn platform (WP 11) and the BRIDGE initiative. It took place online via Zoom on 29 February 2024. The workshop's goal was to present the preliminary results of the OneNet roadmap and gather broad stakeholder input and feedback on these results. More specifically, the preliminary results entail the key OneNet solutions, the enablers and barriers for EU-wide implementation of these solutions and the overall recommendations. Stakeholders were able to provide input in an interactive way and the organisers aimed to have interesting and animated discussions. Sixty-four people registered for the event, and fifty-four of them attended.

4.1 Step 1: Identify the topic

As the OneNet roadmap is the concluding document for the OneNet project, where the project partners brought together the conclusions from the different OneNet deliverables, the GRIFOn Task Force agreed with the WP 11 project partners to dedicate the final GRIFOn workshop to gathering feedback on this critical document.

4.2 Step 2: Identify stakeholders

The WP 11 project partners identified the following stakeholder groups from which they want to obtain feedback: TSOs, DSOs, Market Operators, Flexible Service Providers and Consumers.

4.3 Steps 3 and 4: Planning the fifth GRIFOn event

The fifth GRIFOn workshop was organised as an online webinar via the Zoom platform. It was a joint initiative between the OneNet GRIFOn platform and the BRIDGE initiative. It was designed as an interactive session to present the preliminary results of the OneNet roadmap and gather broad stakeholder input and feedback. Therefore, the event was a mix of presentations from WP 11 partners who were actively preparing the OneNet roadmap and an interactive involvement of the participants via Mentimeter and Office forms.

The participants initially participated in the joint session, where an overview of the OneNet pillars for market design and interoperability was presented. The participants were also asked to give feedback on a few introductory questions via Mentimeter. After the introductory presentation, the participants were asked to split into two working groups. The first working group addressed Interoperability, and the second breakout room addressed Market Design. Both breakout rooms were as well organised as a mix of presentations and active involvement of the participants via feedback gathering through different survey tools. The agenda of the fifth GRIFOn workshop is presented in Table 4.1.

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Table 4.1 - Agenda of the fifth GRIFOn workshop

Topic	Presenter
Introduction: Overview of roadmap solutions and enablers/barriers	**Helena Gerard, Jacob Mason, Janka Vanschoenwinkel (Vito)** **Carlos Damas Silva, Madalena Lacerda (E-REDES)**
Breakout discussions ➢ **Interoperability** ➢ **Market Design**	**Carlos Damas Silva, Madalena Lacerda (E-REDES)** **Helena Gerard, Jacob Mason, Janka Vanschoenwinkel (Vito)**

4.4 Step 5: Implementation and promotion

The project partners disseminated information about the workshop in the same way as it was done for the previous workshops. A dedicated page on the OneNet project website[3], where the invitation to participate in the event, agenda and registration link were published. Furthermore, news about the workshop was published on OneNet's web page, social media channels and Fraunhofer's newsletters. Also, all project partners were asked to share information about the workshop on their digital communication channels and among their connections from the pre-defined stakeholder groups.

A recording of the event and presentations are available online: https://onenet-project.eu/grifon/ and at https://youtu.be/xa-CSbT1IDs.

4.5 Step 6: Feedback

After the introduction, the participants split into two breakout rooms. In the first breakout room, the participants discussed the interoperability and market design topics in the second. Their feedback is presented in the following subchapters.

4.5.1 Joint session

The joint session participants gave their feedback via Office forms and Mentimeter polls. Their answers are presented below.

According to you, what are the most prominent barriers to market design?

- Data sharing / data quality / data / data management / Interoperability of data / lack of data
- Missing harmonisation / Lack of pan-EU harmonisation/ lack of harmonisation / harmonisation / harmonisation across EU
- Lack of network codes

[3] 5th GRIFOn Workshop - OneNet Project (onenet-project.eu)

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- Regulatory barriers / lack of legislation / legislation / lack of well-prepared legislation and conservative regulatory environment / regulatory framework and incentives / regulatory barriers connected to lack of transposition of EU legislation / regulation / lack of regulation
- NRA approval
- Consumer awareness
- DSO observability
- Roles and responsibilities definitions
- Lack of diverse implementation
- Low value of flex today
- Risk aversion
- Security
- High access cost
- Liquidity
- Insufficient necessity
- Facilitating individual DER to participate in flexibility
- No clear business use case / no business case
- Lack needs
- Community and peer to peer energy sharing integration
- Overlapping of a private and regulated sector / Different business perspectives
- Many stakeholders
- Market power of big tech
- Technology
- Lack of open standards
- Missing incentives to drive it
- Missing demand
- Costs of interoperability

The participants identified three main groups of barriers to market design: barriers related to consumers, a lack of clear and stable regulatory framework (some of the participants even mentioned the lack of network codes), and technical aspects of data such as data quality, data operability, data structure and business models.

What are, according to you, the most prominent barriers to interoperability?

- Lack of API standards / Lack of data standards in technologies / Lack of standards / Standards / Lack of standard information models for DER participants / delay in getting a standard
- Interoperability vs facilitating innovation
- Data management
- Missing incentives to develop interoperability / Incentives

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- Harmonization is not always feasible (technically) / Lack of harmonisation between countries
- Communication protocols
- Technological adaptations at FSP side
- Regulatory issues / Regulation
- Automation
- Different needs of stakeholders
- Lack of compelling business models
- Conflict of interests

The participants identified the lack of standards, harmonisation and regulatory issues as the most significant barriers.

From the responses to the questions regarding barriers to market design and interoperability, it was clear that although market design and interoperability are two distinct elements, they have much in common. What happens on one side will impact the other side. That's why the OneNet project considered both elements a priority in the roadmap design and why OneNet did this webinar as a joint initiative with BRIDGE, as the regulatory aspects are relevant for market design and interoperability.

According to you, in which topic is the most innovation needed and which topic should be prioritised?

As can be seen in Figure 4.1, the most important topics were highlighted as TSO-DSO Coordination Schemes, followed closely by Market Participation & Consumer Engagement and Roles & Responsibilities. This indicated that issues related to market participation factors (from the perspectives of consumers and market operators) were considered to have a larger impact than topics related to market operation (such as prequalification and procurement procedures).

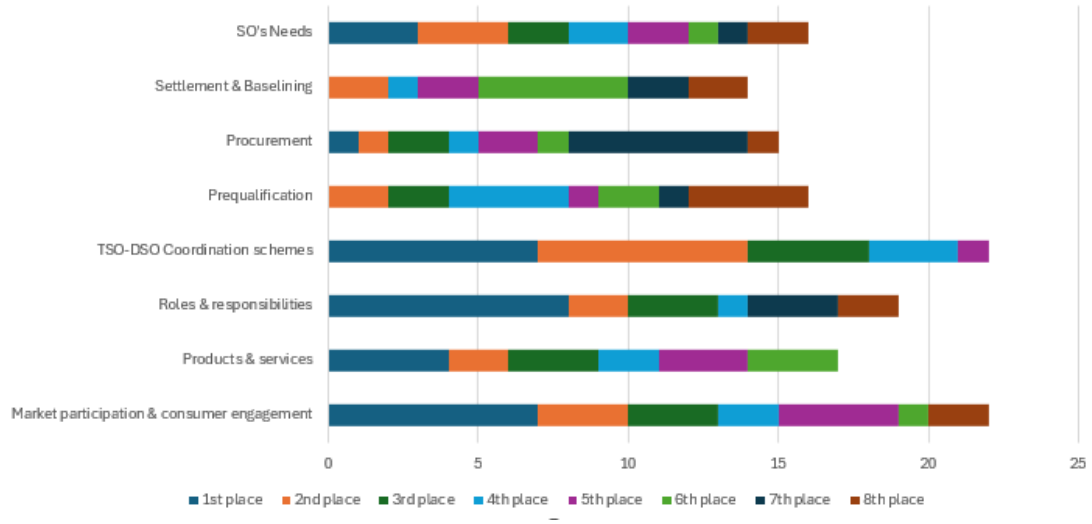

Figure 4.1 - In which topic is the most innovation needed and which topic should be prioritised

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What is the topic where most innovation is needed and what should receive the highest priority?

Figure 4.2 shows that interoperability and standards and data management and governance should receive the highest priority.

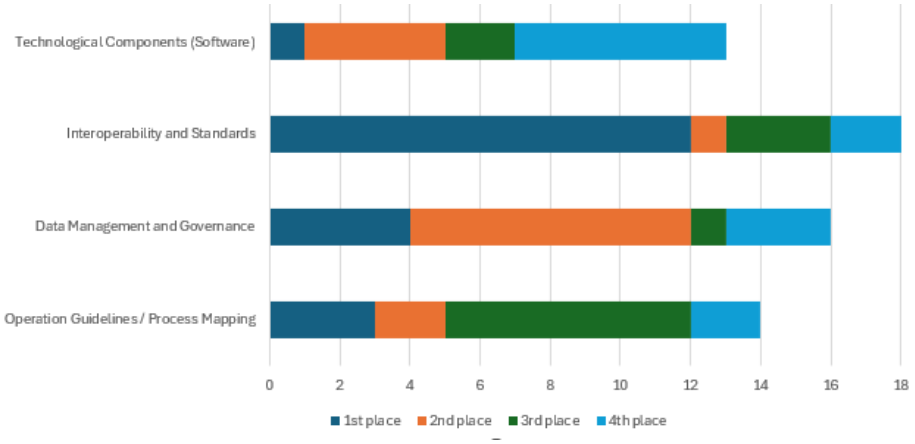

Figure 4.2: What is the topic where most innovation is needed and what should receive the highest priority?

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4.5.2 Interoperability Session

The participants in the interoperability session gave their feedback via Office Forms. Their answers are presented below.

4.5.2.1 Process standardisation

In assessing the importance of **enablers of process standardisation** (Figure 4.3), participants viewed all as relevant, particularly technical ones, which they agreed are critical. The need for standard interfaces and data models was evident, as was the necessity for solutions that participants could quickly adopt and that could handle with an increasing scale. Economically, the fair splitting of costs and direct investment support emerged as key. On the regulatory side, the focus was on the need for innovative and flexible regulation that can adapt to new performance metrics, offer support, and allow for experimental approaches.

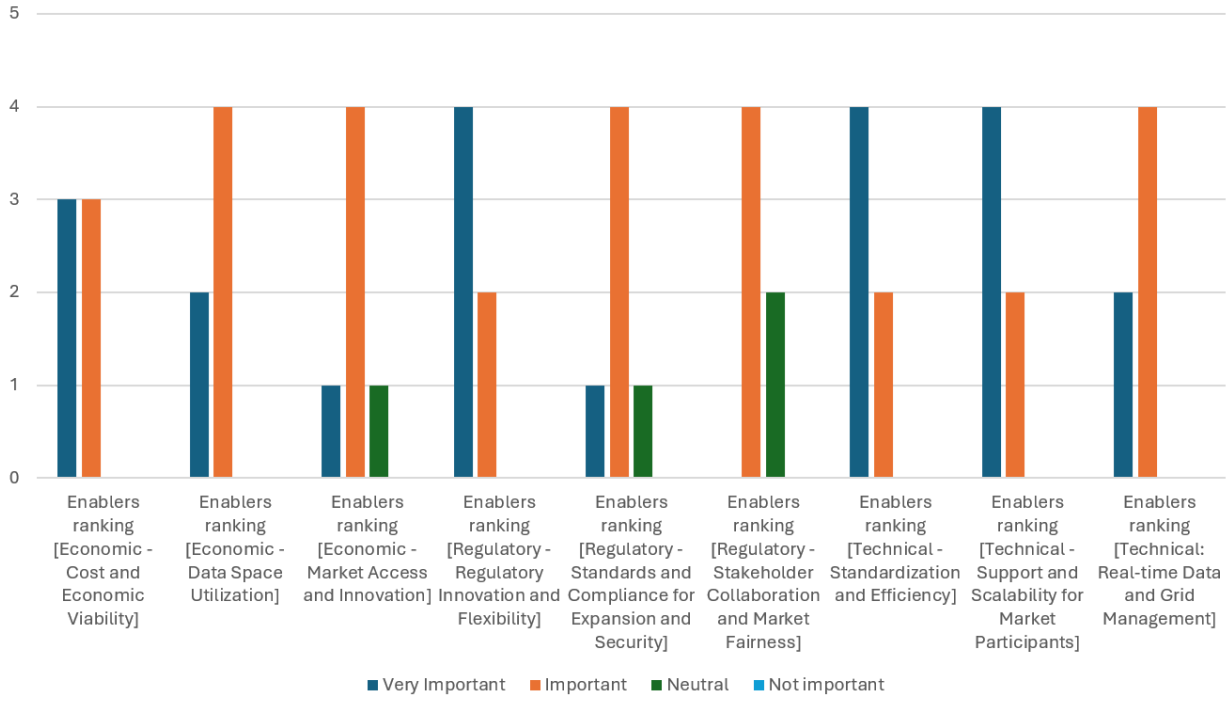

Figure 4.3 –Enablers of process standardisation

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In analysing **barriers to process standardisation** (Figure 4.4), all identified factors contribute to the challenges faced, yet some stand out due to their systemic impact. Technical barriers are more notable, with the lack of governance for pan-European data exchange, absent submetering regulation, inaccessible standards due to cost, and missing governance models presenting significant hurdles. These issues might impede the seamless integration and management of data exchange across Europe.

On the economic side, implementing proprietary solutions restricts interoperability, and shifting to interoperable solutions often necessitates substantial changes to internal processes, tools, and systems. Additionally, the need for interoperability between standards for specific operations and the complexity of existing standards further complicate the landscape. Regulatory barriers also play a role, with technical and budget constraints posing challenges, particularly for smaller entities like low-voltage DSOs. The high costs associated with adapting existing systems, which are difficult to recoup through tariffs, and the complicated issue of dividing the costs of connecting transnational systems present financial and operational difficulties.

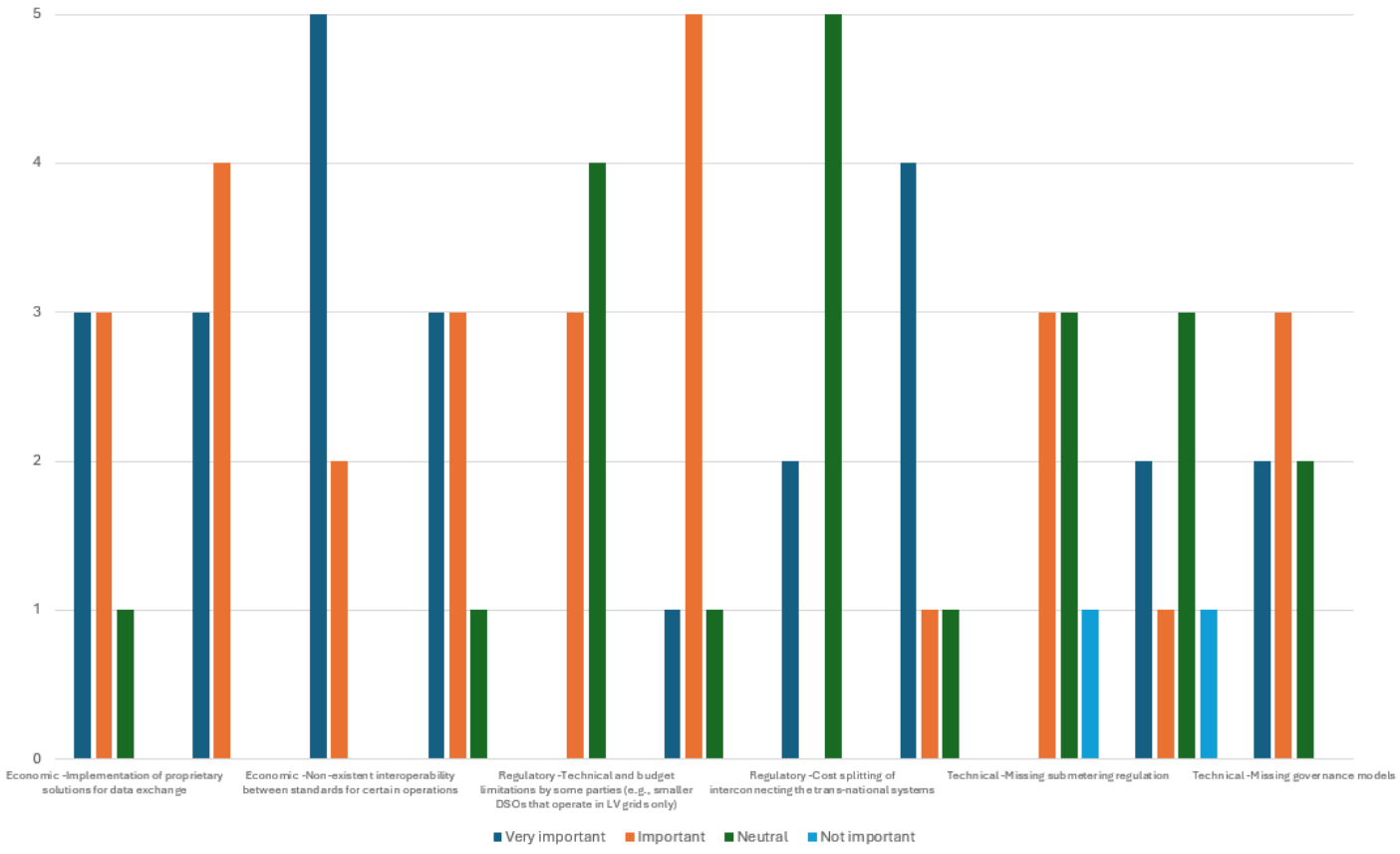

Figure 4.4 –Barriers to process standardisation

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The dataset in Figure 4.5 presents responses to various **recommendations on process standardisation**, which we can rank based on the level of agreement. The 'Integration with data spaces like OneNet Framework' and 'Standardize workflows and data exchange information models' received a strong consensus, indicating a universal acknowledgement of their importance. Similarly, 'Define data standards/data models' and 'Participate in relevant standardisation bodies' are also widely supported, emphasising the need for consistency in data handling and active involvement in shaping interoperability standards.

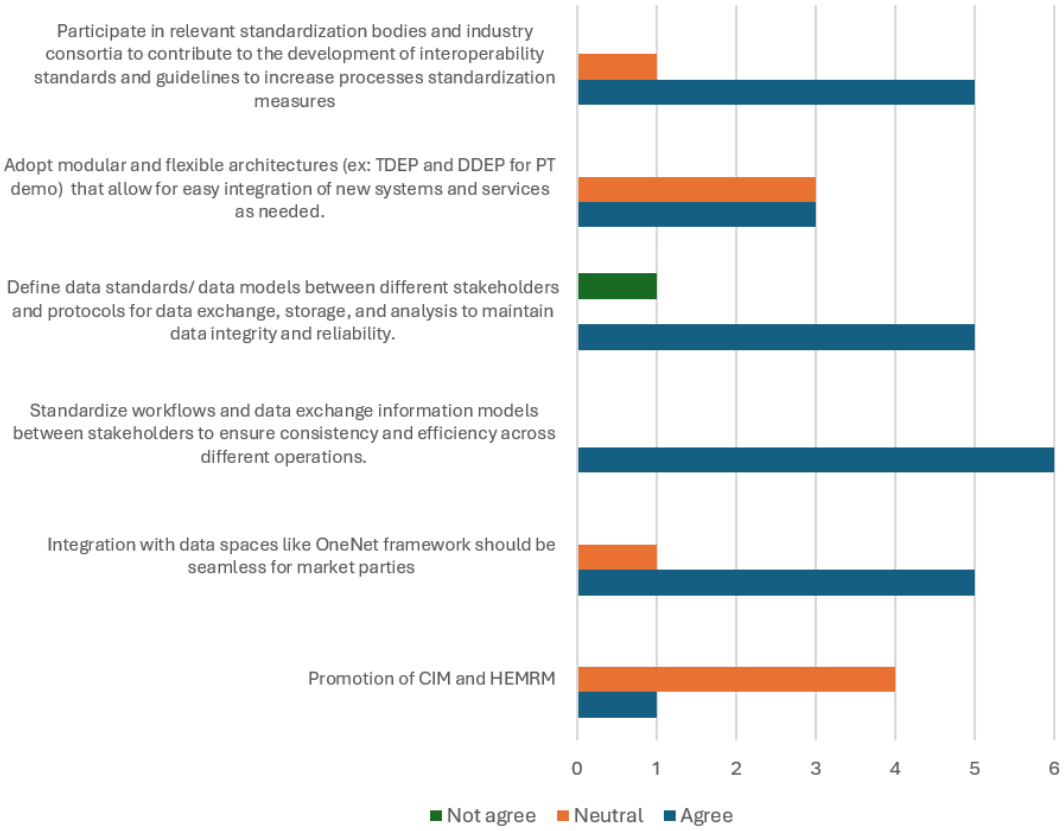

Figure 4.5 - Recommendations on process standardisation

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4.5.2.2 Technological enablement & exploitation

Figure 4.6 shows the **enablers of the technological enablement and exploitation**. None of the enablers identified were considered " unimportant" to the participants. The most alignment was seen in the technical enablers, with all the enablers deemed to be either important or very important, emphasising the need to establish the technical foundations to support interoperable solutions, especially concerning the existence of standardised interfaces and data models of plug-and-play solutions for easy adoption and the support for market participants and the scalability of the solutions.

From the economic perspective, the clear and attributable division of costs and targeted funding and grants were considered some of the most important enablers. As for the regulatory perspective, emphasis was given to regulatory innovation and flexibility, namely related to performance-based regulation, regulatory support, and regulatory experimentation.

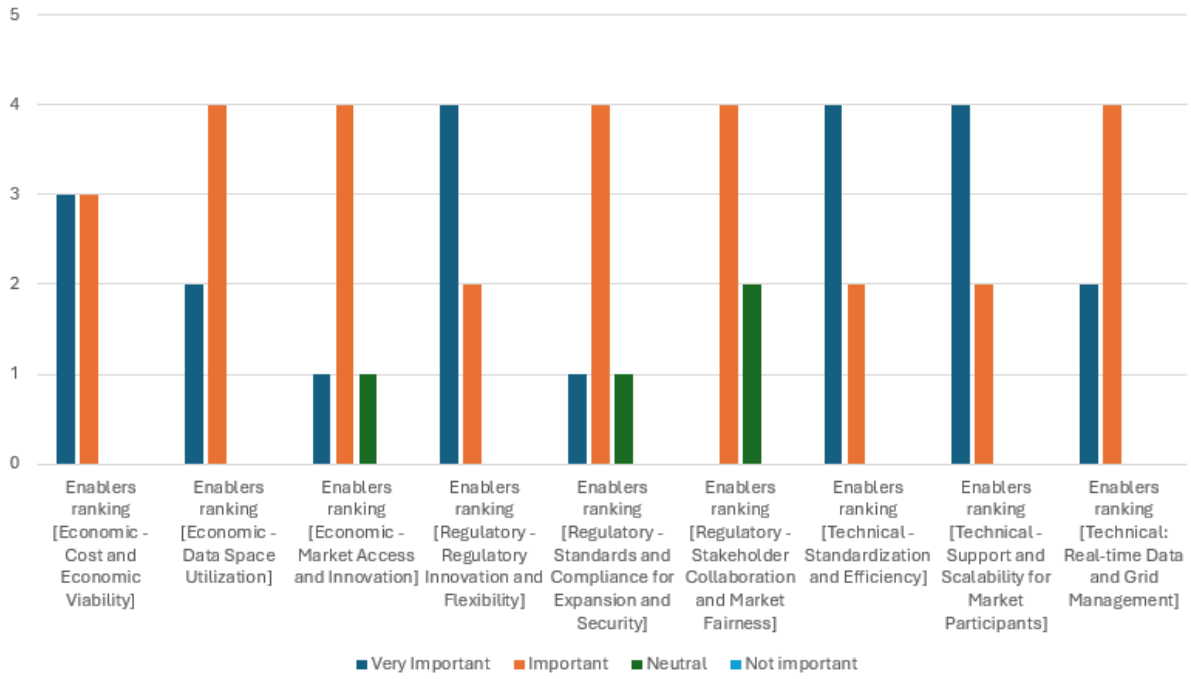

Figure 4.6 – Enablers of the Technological enablement & exploitation

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Figure 4.7 shows the **barriers of the technological enablement and exploitation**. None of the barriers identified were considered "not important" to the participants. As opposed to the enablers, no specific category stood out in terms of alignment compared to the others. However, from the economic perspective, the cost and financial viability of the business models, including existing complexities in quantifying benefits and cost implications, were generally considered important or very important.

From the regulatory perspective, all the participants considered the lack of regulatory knowledge and framework limitations an important barrier. In contrast, the complexity of the standards and the lack of understanding or awareness by consumers were split in importance. Lastly, from the technical point of view, system scalability and integration, related to the integration with legacy systems and the development of universally compatible and scalable solutions, were perceived as important or very important.

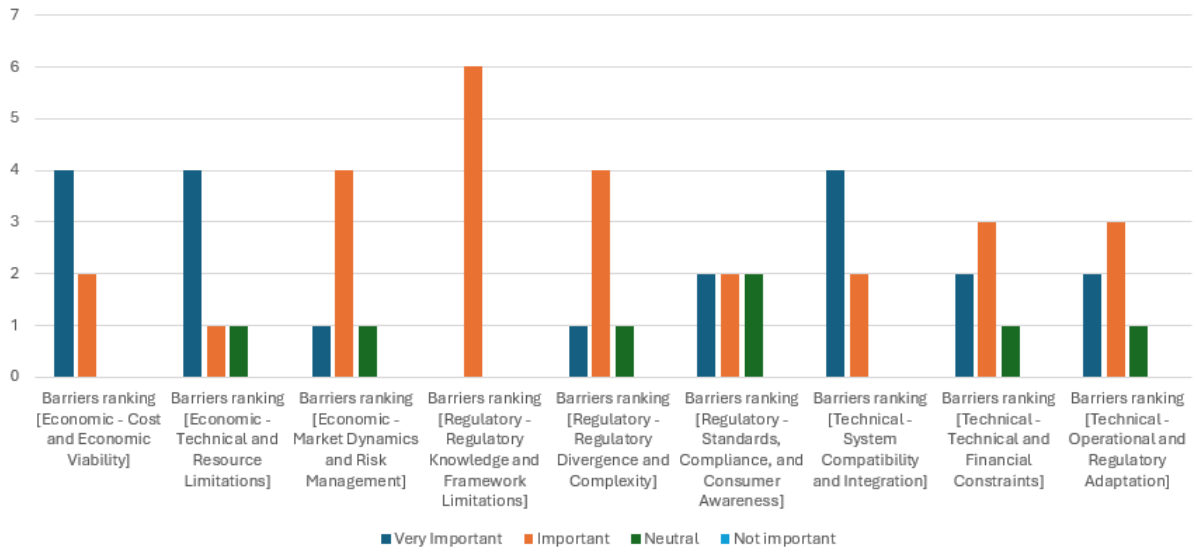

Figure 4.7 – Barriers of the Technological enablement & exploitation

The participants highlighted the following enablers and/or barriers to be missing:

- Incentives to offer interoperable technologies.
- Supports for distributed flexibility resources to improve the economics - similar to supports we put in place for early adoption of PV and wind.

This shows the industry's need for effective incentive and support schemes to promote interoperable technologies and flexibility further.

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Figure 4.8 presents the **recommendations of the technological enablement and exploitation**. None of the recommendations identified received disagreement from the participants. The two recommendations that received higher positive consensus in the responses relate to the need for investing in scalable and adaptive infrastructure and the utilisation of advanced data analytics for informed decision-making. The participants identified no other recommendations.

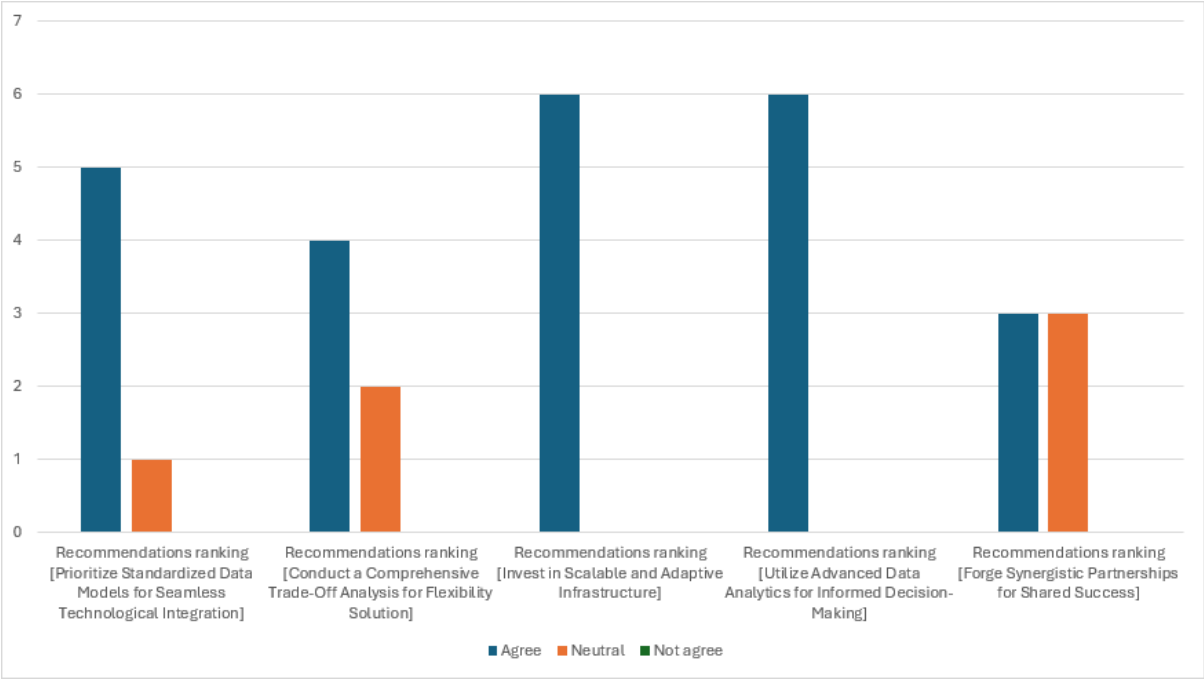

Figure 4.8 - Recommendations of the Technological enablement & exploitation

4.5.2.3 Cybersecurity & Privacy

As shown in Figure 4.9, **enablers of the cybersecurity and privacy** the participants identified 'Regulatory investments in Advanced technology' as the most important enabler. The rest of the enablers demonstrated solid and levelled importance when adopting the solutions proposed by the project.

Figure 4.10 presents the **barriers of the cybersecurity and privacy**. It shows that the barriers defined as 'System Integration Challenges' and 'Enforcement Challenges' were rated from important to very important. This indicates that integration issues and enforcing compliance are viewed as significant obstacles. The data implies that these barriers, if not addressed, could hinder the progress of cybersecurity and privacy measures proposed by OneNet, emphasising the need for focused efforts to overcome integration complexities and enforcement inconsistencies.

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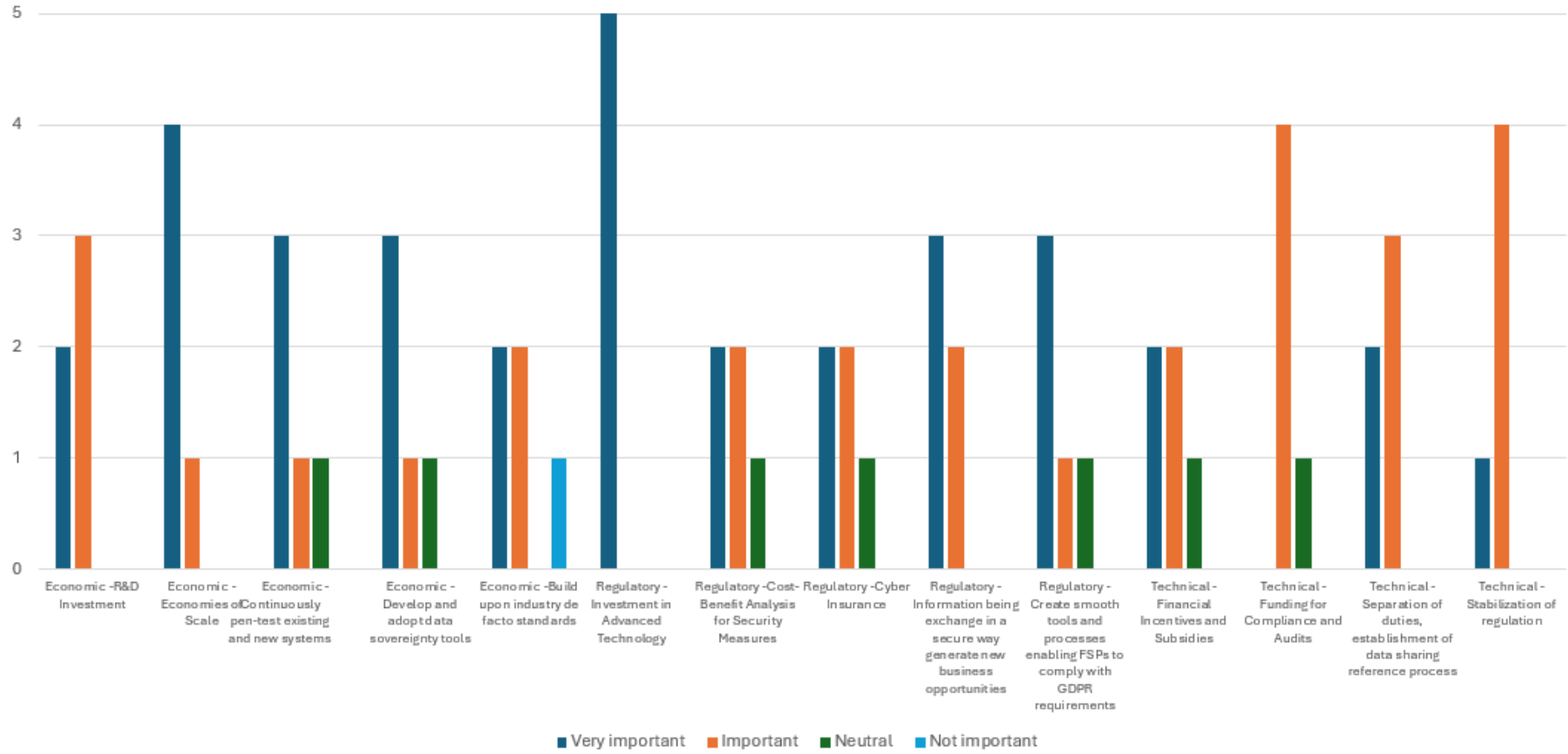

Figure 4.9 – Enablers of the Cybersecurity and Privacy

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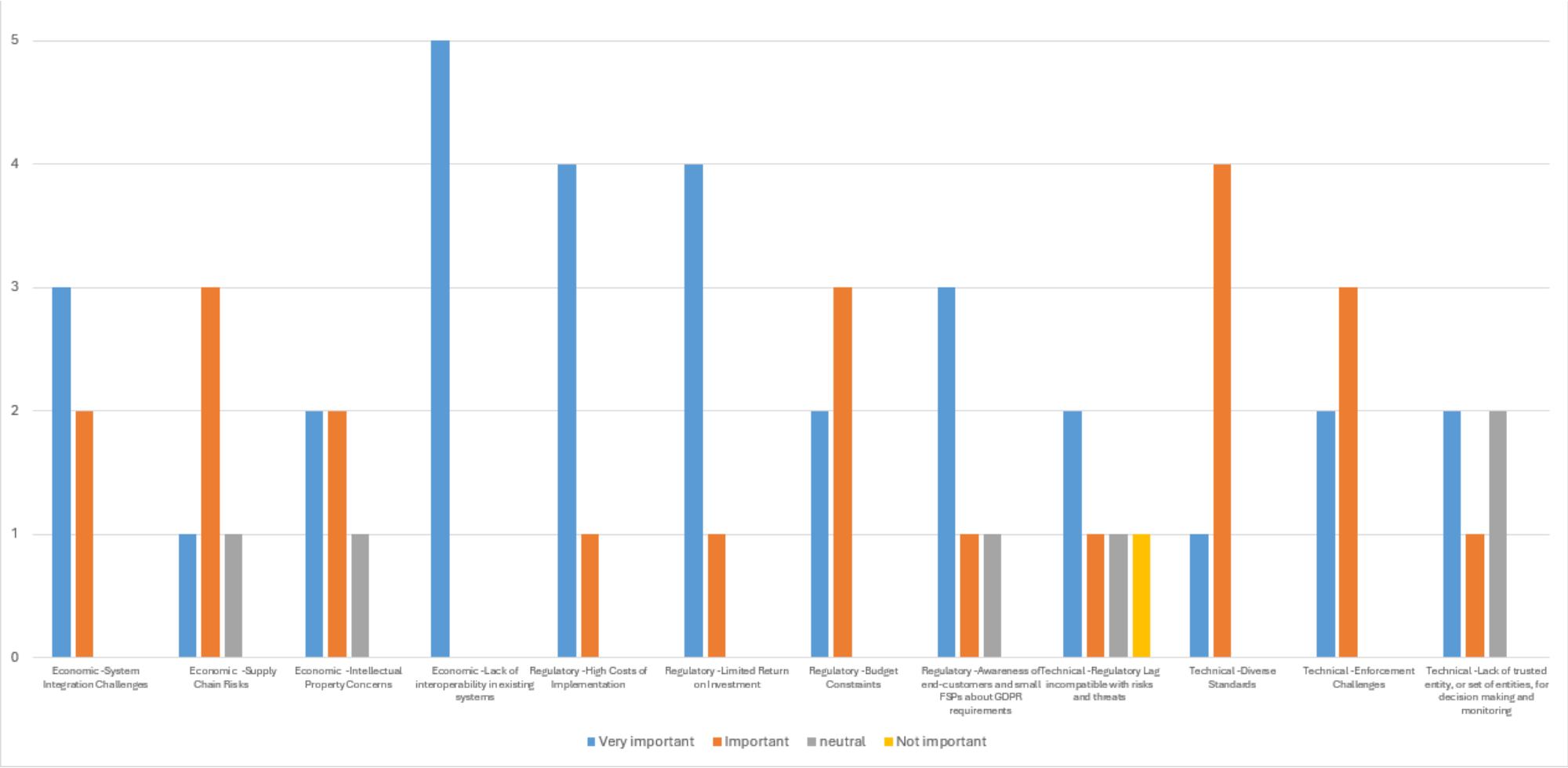

Figure 4.10 – Barriers of the Cybersecurity and Privacy

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In ranking recommendations (Figure 4.11), the suggestion to find a balance between security requirements and implementation costs varies between neutral and agree, which may reflect the complexity of achieving this balance in practice. On the other hand, there is a general agreement on the recommendation to 'Encrypt sensitive data', showing a shared belief in the importance of protecting data integrity and confidentiality as fundamental aspects of cybersecurity.

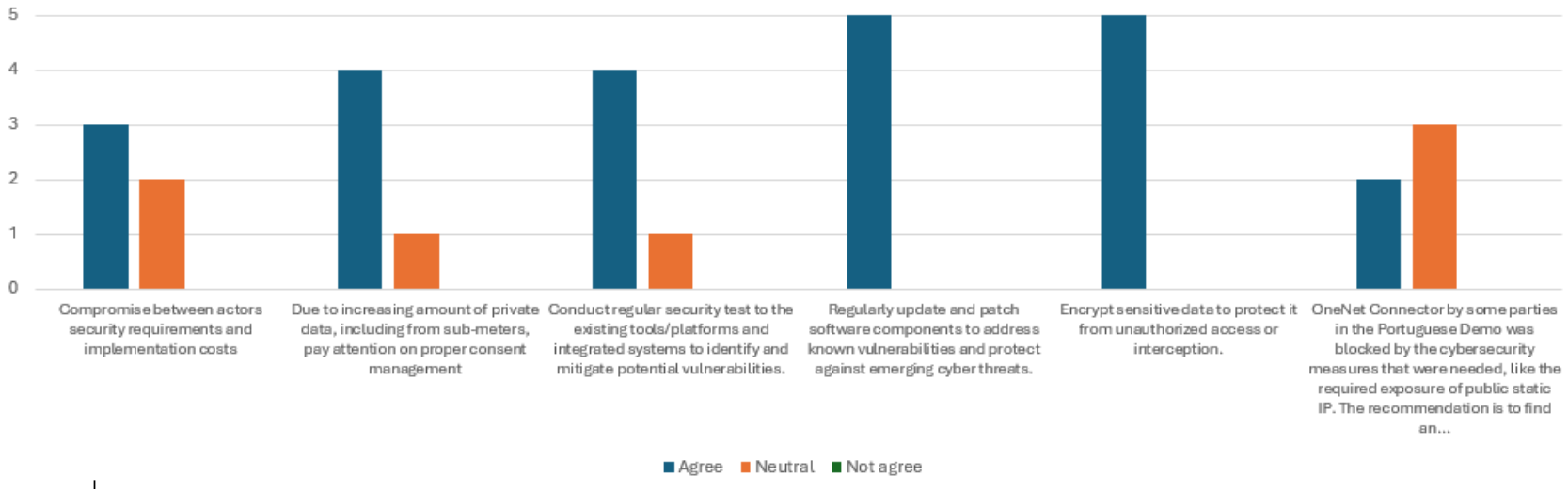

Figure 4.11 – Recommendations of the Cybersecurity and Privacy

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4.5.2.4 Stakeholder participation & coordination

None of the identified **enablers of the stakeholder participation and coordination** (Figure 4.12) was considered "not important" to the participants. The most alignment was seen in the economic enablers, with all the enablers deemed either important or very important. This emphasises the need to encourage participation and investment by the stakeholders while ensuring an equitable distribution of economic benefits. From the regulatory perspective, the transparency on reporting requirements and enhanced communication for higher customer awareness, together with the need for further harmonisation and standardisation, were perceived as either important or very important by the participants.

From a technical point of view, all participants considered the need for higher standardisation and data integration to be very important. This included implementing a Common European Data Space for Energy, standardising data exchange protocols, and standardising interfaces and data models. The exchange of knowledge and best practices was also highlighted as an important enabler for increased stakeholder participation and coordination.

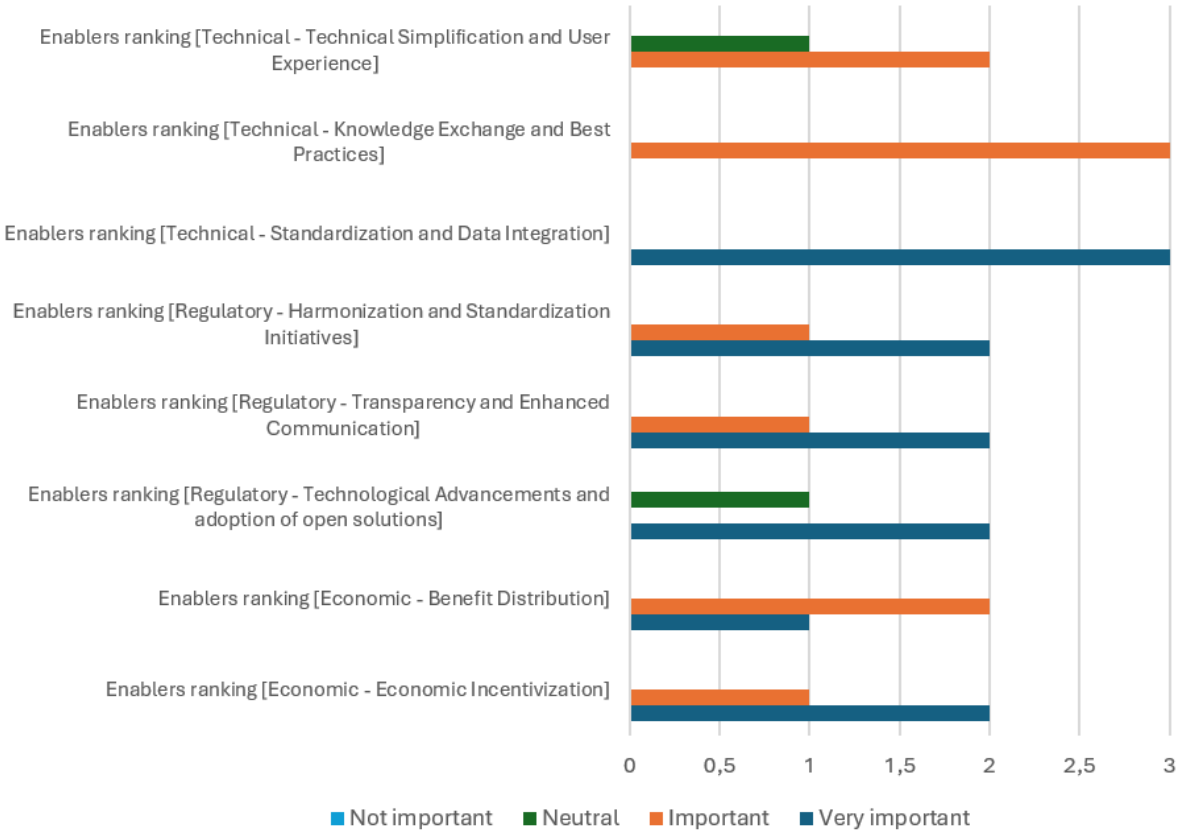

Figure 4.12 – Enablers of the Stakeholder participation & coordination

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None of the identified **barriers to stakeholder participation and coordination** (Figure 4.13) were considered "not important" to the participants. The most alignment was seen in the economic barriers, with all the enablers deemed to be either important or very important. This emphasised the high impact of the economic disparities and integration costs, the non-quantifiable nature of the benefits, and the economic risks of data sharing.

From the regulatory perspective, the voting was more split, with higher positive consensus related to the non-existence of governance for pan-European data exchange, the diverging regulatory framework and missing regulation concerning data ownership and access.

From a technical point of view, data access and privacy were generally considered very important, as were the limited availability of grid data from SOs and the data security and privacy concerns.

The participants identified no additional enablers or barriers.

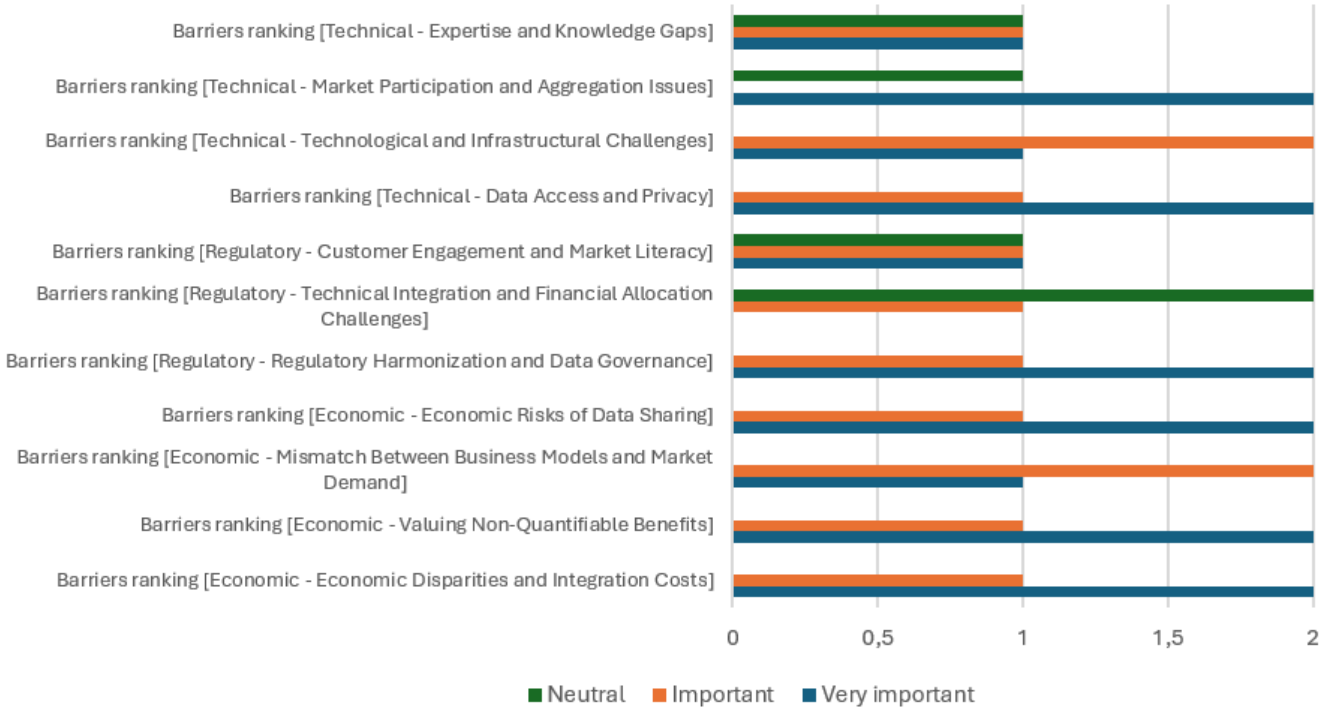

Figure 4.13 – Barriers to the Stakeholder participation & coordination

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Figure 4.14 presents the **recommendations for the stakeholder participation and coordination**. Some of the participants disagreed with two of the recommendations listed, namely the implementation of structured role definitions and duty separation and the creation of adequate regulation for smaller residential FSPs. This shows the importance of setting the right balance in terms of flexibility and complexity of the regulatory framework. Both the stakeholder involvement and knowledge exchange, as well as the adoption of adaptable and user-friendly architectures and interfaces for easy integration, saw general agreement from the participants.

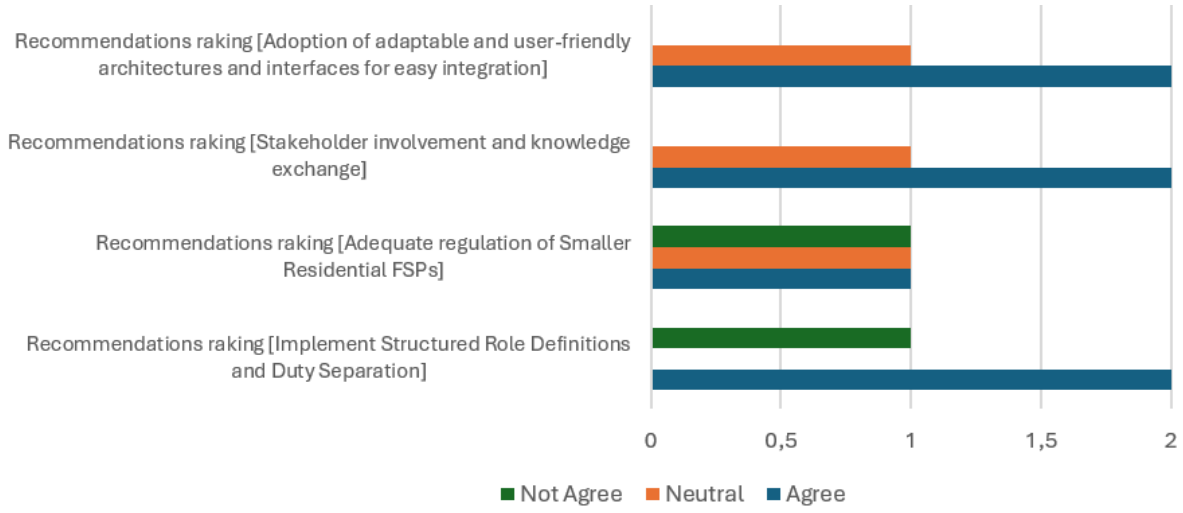

Figure 4.14 – Recommendations for the Stakeholder participation & coordination

The participants highlighted the following recommendations to be missing:

- No more regulations

This clearly shows the concern in guaranteeing a simple regulatory framework with the necessary degree of flexibility.

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4.5.3 Market Design Session

The participants were asked for feedback regarding different aspects of the topic via Mentimeter. Below are their answers.

Stepping outside of your roles as a professional within the industry, what are the biggest barriers that prevent you as a consumer from participating?

- Insufficient financial benefit / how can I schedule my energy use without any price signal / No clear initiatives from relevant authorities to highlight the importance of flex market
- Complexity / Too complex / Not knowing where to start / knowledge of the available options
- My technologies at home are not automated / no technology available
- Investment costs
- Lack of interest
- Regulatory issues / complex regulatory and admin procedures
- Lack of turnkey no fuss solution
- No demand from local DSO/TSO

Most of the participants who responded to this question answered that the current complexity of engaging as a prosumer in the existing energy market and the need for sufficient financial benefits were the largest barriers to their participation (Figure 4.15).

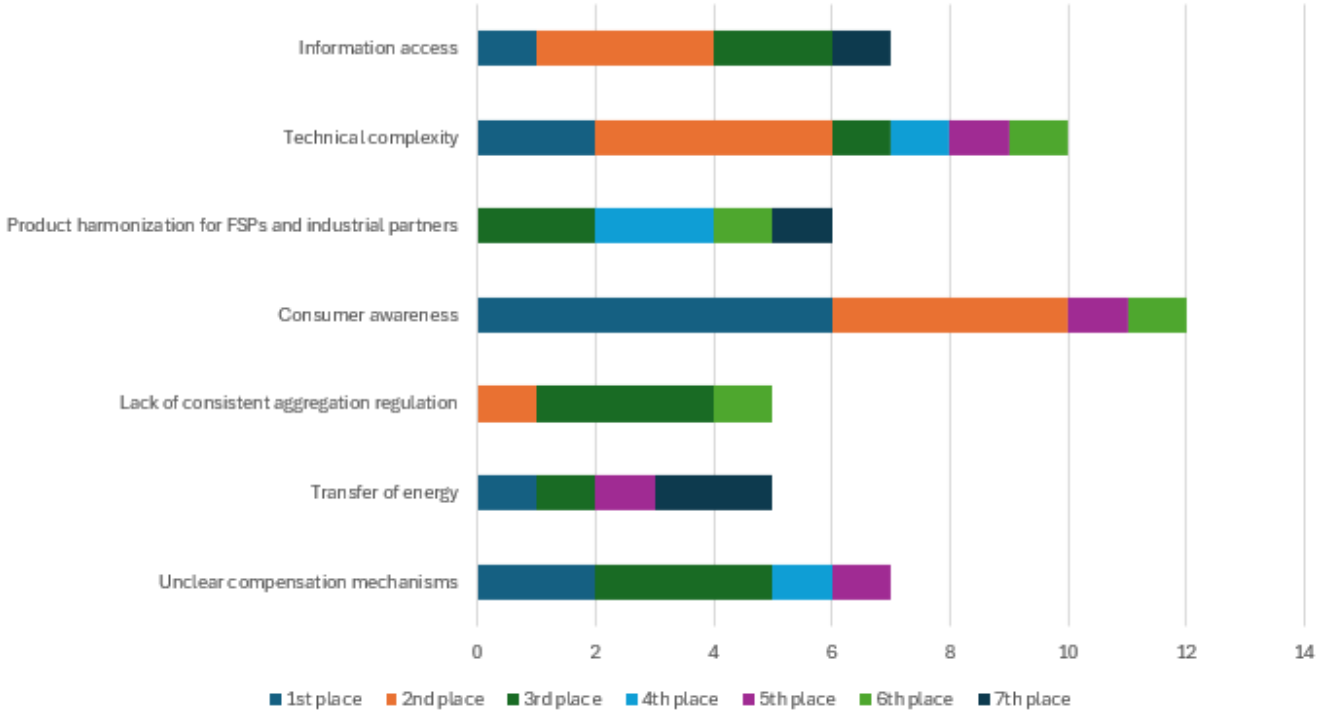

Figure 4.15 – From the barriers previously discussed, what are the top 3 most essential barriers?

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With the upcoming new network code on DSF, many barriers will be solved. However, today, what has the highest priority for innovation?

Long-term flexibility products as a trade-off for grid investments are recognised (Figure 4.16) as the topic with the highest priority for innovation.

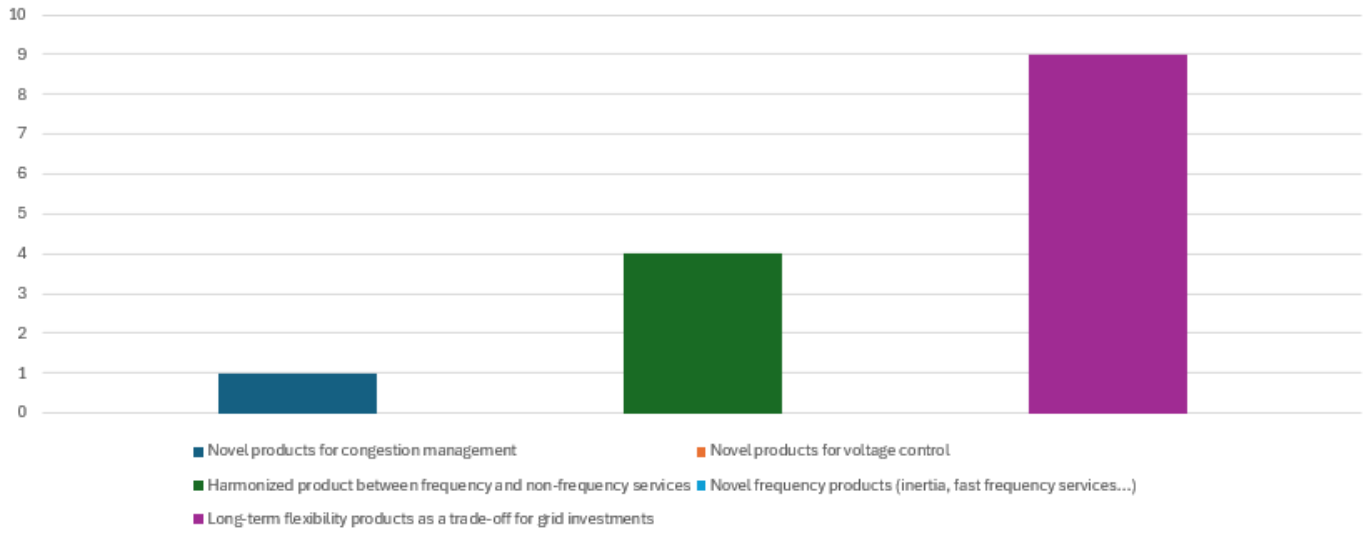

Figure 4.16 - With the upcoming new network code on DSF, many barriers will be solved. However, today, what has the highest priority for innovation?

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Who should take up the role of the independent market operator?

Most participants (Figure 4.17) responded that the third party should take up the role of the independent market operator. An independent market operator who is not buying flexibility already on the market certainly has some benefits, such as transparency and independence, which may also increase trust in the market with other market participants.

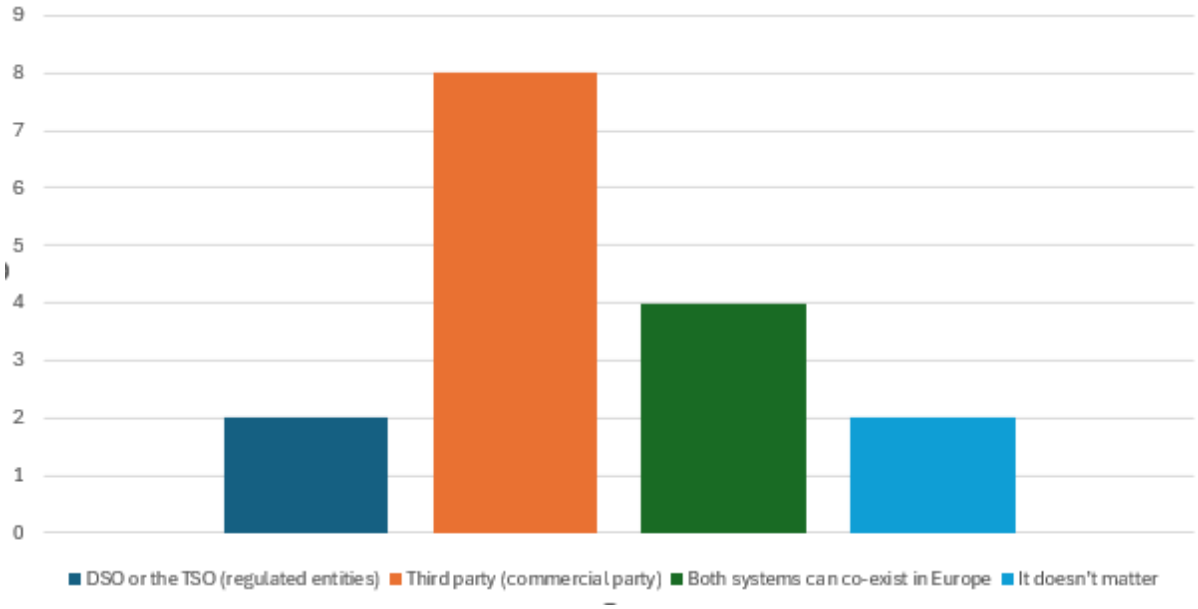

Figure 4.17 - Who should take up the role of the independent market operator?

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As a TSO/DSO, what do you consider to be the main drivers for efficient TSO-DSO coordinated flexibility markets?

Regarding achieving efficient TSO-DSO coordinated flexibility markets, the participants indicated (Figure 4.18) that the primary enablers would be clear remuneration (pricing schemes, validation, and settlement) processes for FSPs and having secure and efficient network representation. However, it is essential to note that during the discussions following this question, the attendees clarified that all four drivers were critical to achieving this goal adequately.

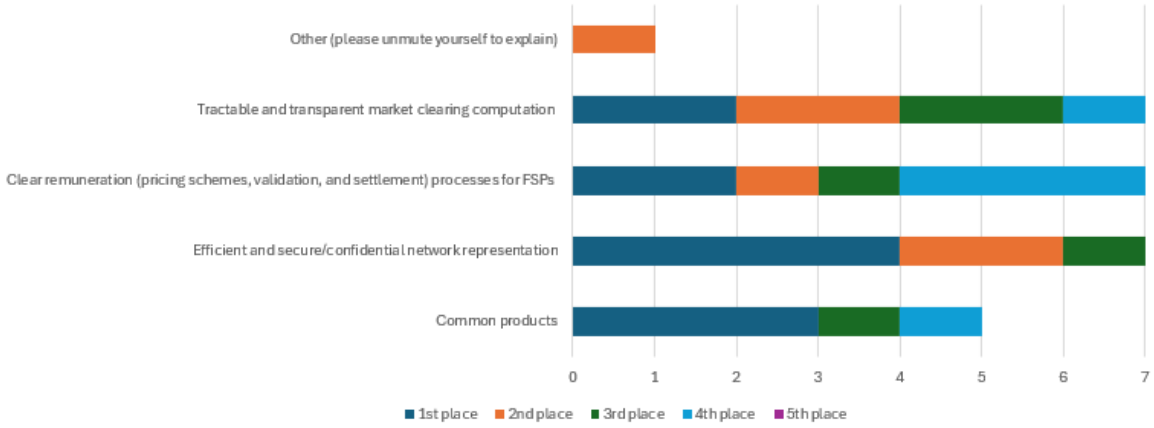

Figure 4.18 - As a TSO/DSO, what do you consider to be the main drivers for efficient TSO-DSO coordinated flexibility markets?

As a TSO/DSO, what do you consider to be the main barriers for efficient TSO-DSO coordinated flexibility markets?

In contrast to the previous enablers' question, the audience was split on the most considerable impedance to efficient TSO-DSO coordinated flexibility markets (Figure 4.19). Some believed that TSO-DSO communication was the primary barrier, and others thought it was the difference in flexibility needs between the two parties.

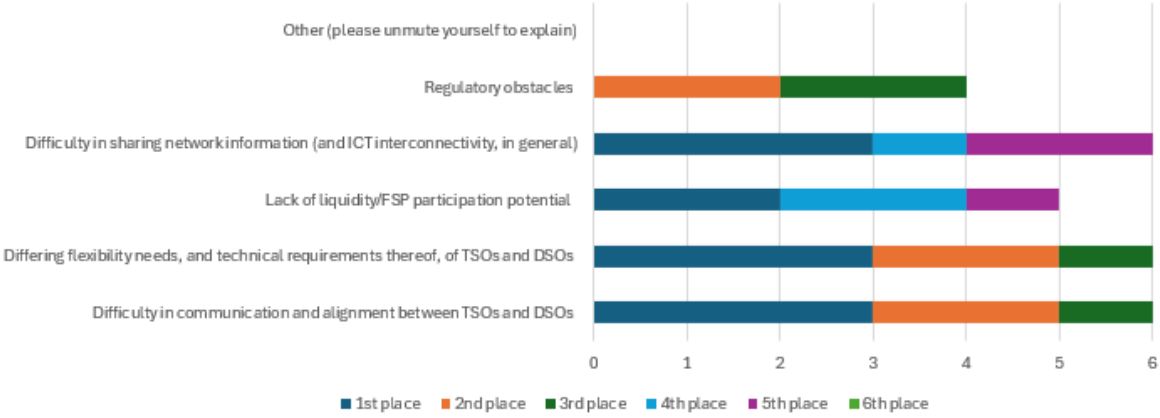

Figure 4.19 - As o TSO/DSO, what do you consider to be the main barriers for efficient TSO-DSO coordinated flexibility markets?

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What level of harmonisation/streamlining do you think is required for prequalification processes?

Most workshop participants agreed that the prequalification process should be harmonised at the national level with EU-level coordination via standardised guidelines (Figure 4.20). All members agreed that the main concern with any level of harmonisation was the market variations at the national or local levels across Europe.

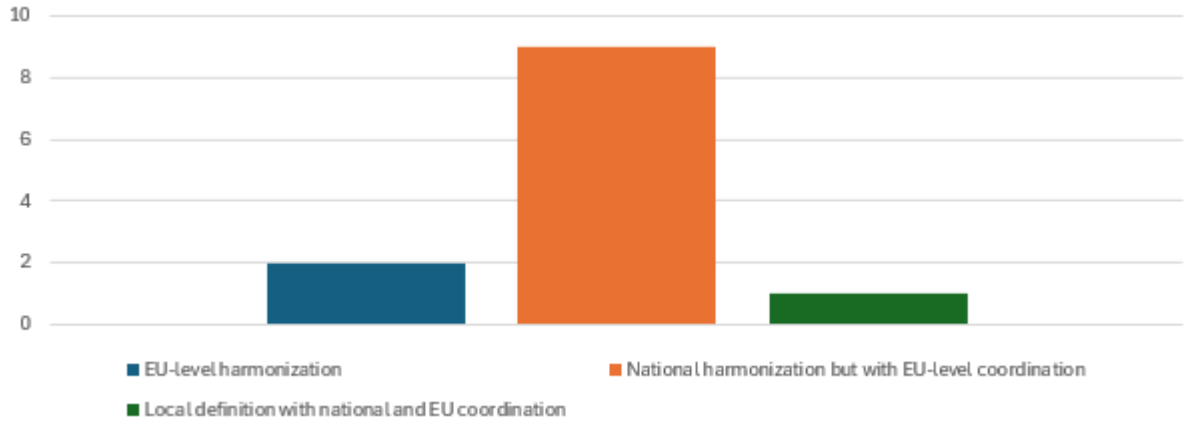

Figure 4.20 - What level of harmonisation/streamlining do you think is required for prequalification processes?

Would your recommendation differ when considering different products (e.g. balancing, congestion management, voltage control, etc.)?

Of those who said their answer would change (Figure 4.21), their reasoning was aligned in that FCR balancing is performed across national borders on the EU level and should, therefore, require harmonisation at the EU level.

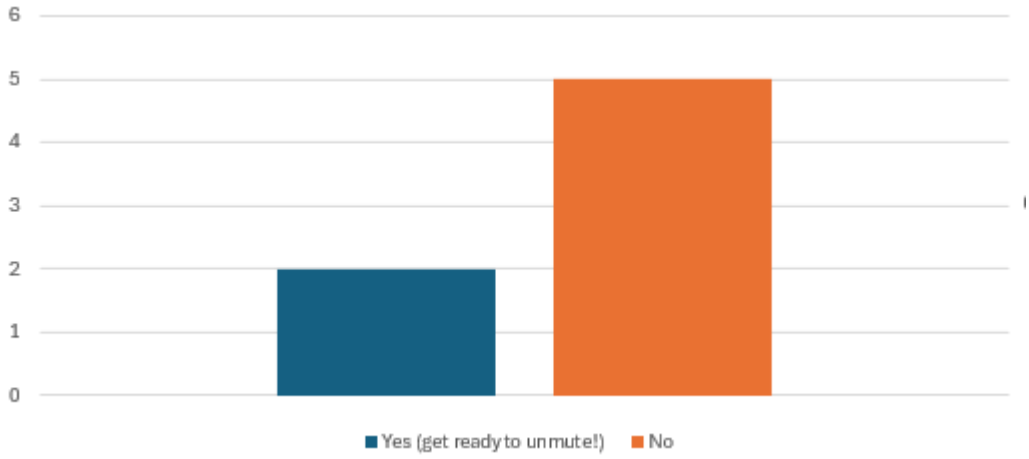

Figure 4.21 - Would your recommendation differ when considering different products (e.g. balancing, congestion management, voltage control, etc.)?

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What do you consider the main barriers to harmonized, coordinated, and streamlined prequalification processes?

Amongst the barrier categories working against prequalification harmonisation (Figure 4.22), the highest impact was identified as coming from technical components (or the lack thereof) preventing services from operating across different market systems or keeping different market systems from aligning on technical requirements.

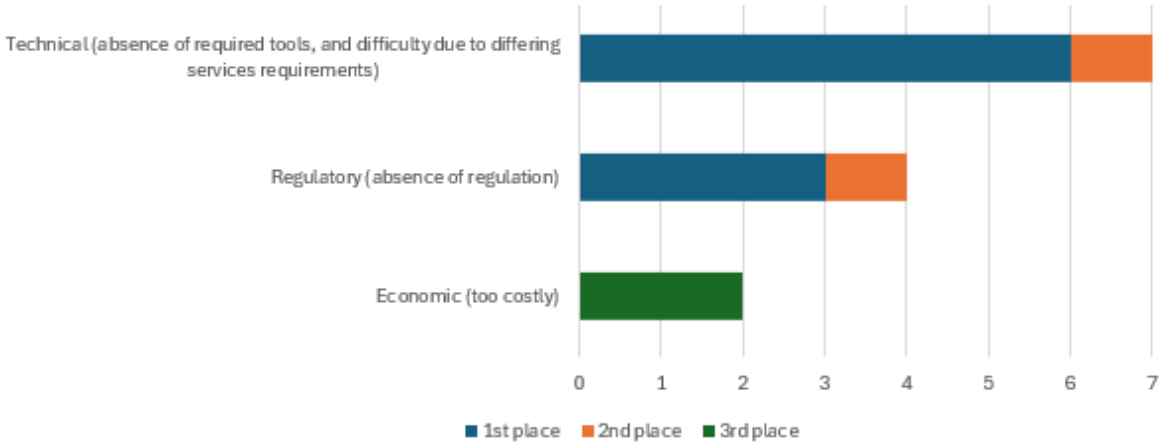

Figure 4.22 - What do you consider the main barriers to harmonized, coordinated, and streamlined prequalification processes? Are they:

Are costs associated with setting up flexibility markets and/or participating in them to be prohibitive compared to flex mechanisms or reinforcement?

All participants agreed (Figure 4.23) that the costs associated with setting up a new flexibility market (or participating in these markets) were not significantly different from those associated with acquiring flexibility mechanisms or grid reinforcement costs. This indicates that financial costs are not the primary barrier to implementing flexibility markets across the EU.

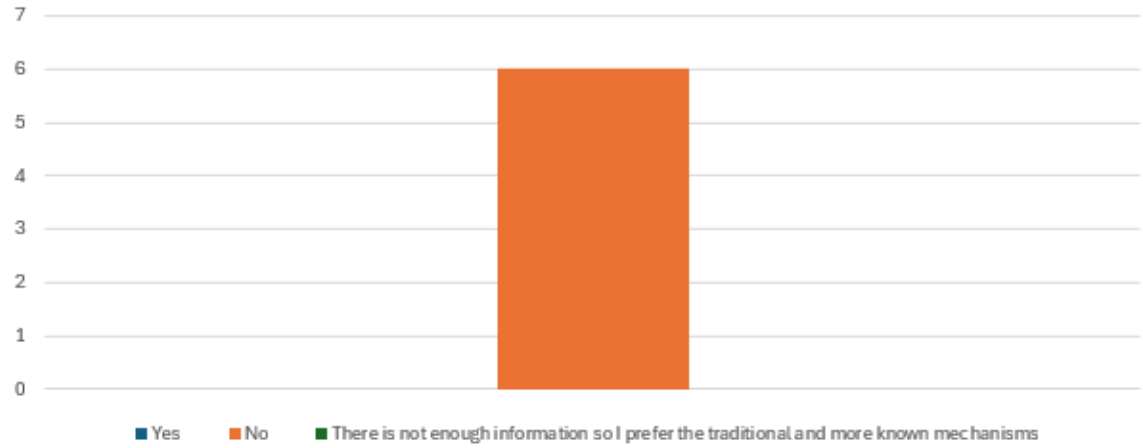

Figure 4.23 - Are costs associated with setting up flexibility markets and/or participating in them to be prohibitive compared to flex mechanisms or reinforcement?

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What do you consider the main enablers are for scaling up the setting up of flex markets, increasing their replicability and decreasing their costs?

Participants identified (Figure 4.24) as the most important enablers for scaling up the setting up of flex markets, increasing their replicability and decreasing their costs the learning from demo activities and network code on demand response. There was also almost a consensus that enabling the use of "free bids" would have the least impact of the enablers listed.

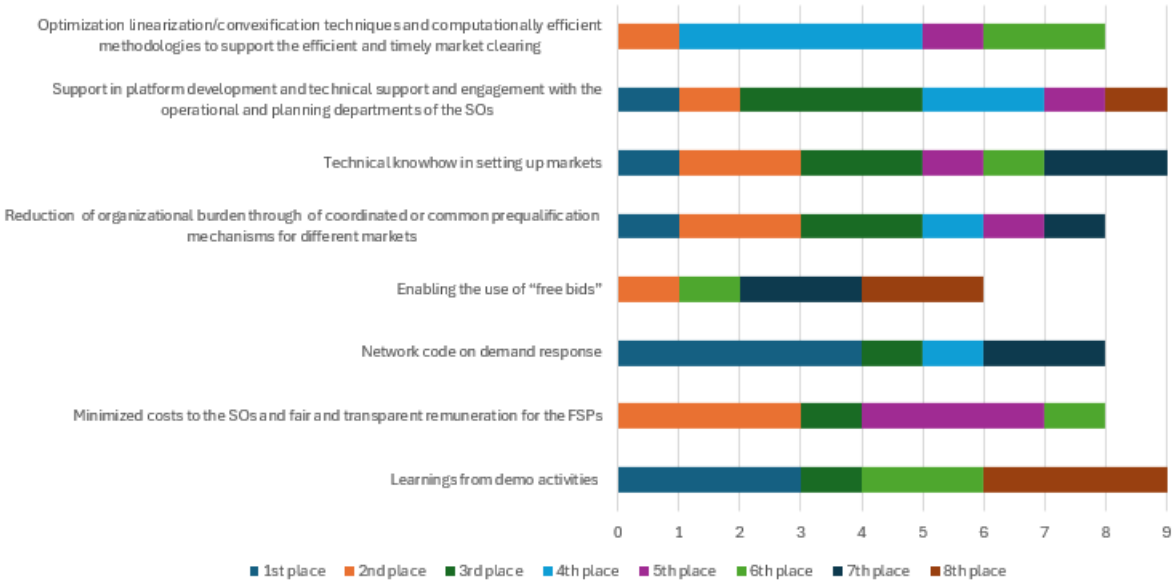

Figure 4.24 - What do you consider the main enablers are for scaling up the setting up of flex markets, increasing their replicability and decreasing their costs?

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What do you consider to be the main barriers for coordinating the procurement between markets, enabling participation of FSPs in multiple markets?

According to the participants (Figure 4.25), uncoordinated market timing is currently the main barrier to coordinating procurement procedures across markets. Aside from this, differences in prequalification processes and aggregation rules were the next most impactful barriers preventing procurement coordination across markets.

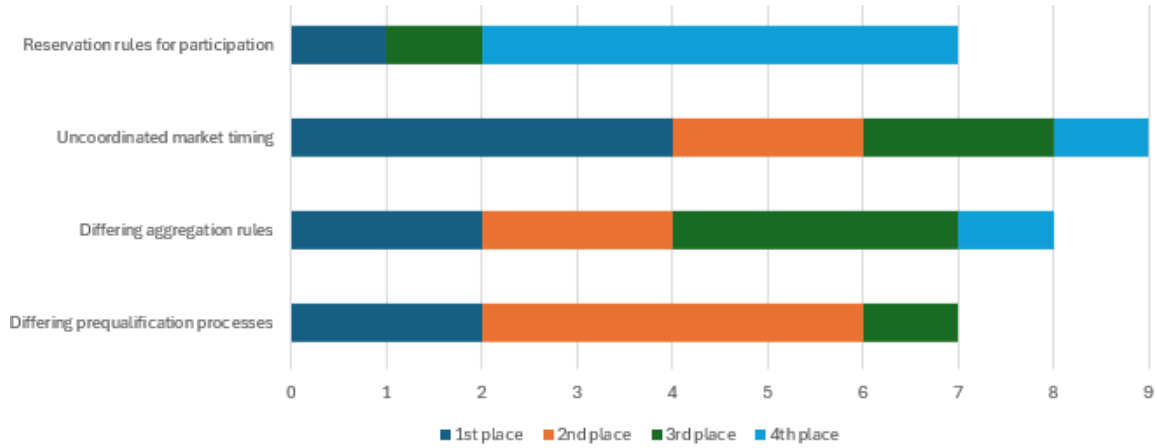

Figure 4.25 - What do you consider to be the main barriers for coordinating the procurement between markets, enabling participation of FSPs in multiple markets?

The network code on DF proposes a list of criteria with which baseline methods should be aligned. Do you agree with this?

The workshop participants agreed (Figure 4.26) that baseline methods should be aligned. Still, they were split on whether this means they can differ as long as they follow the same design criteria or if this alignment should imply full baselining of similar products and services harmoniously.

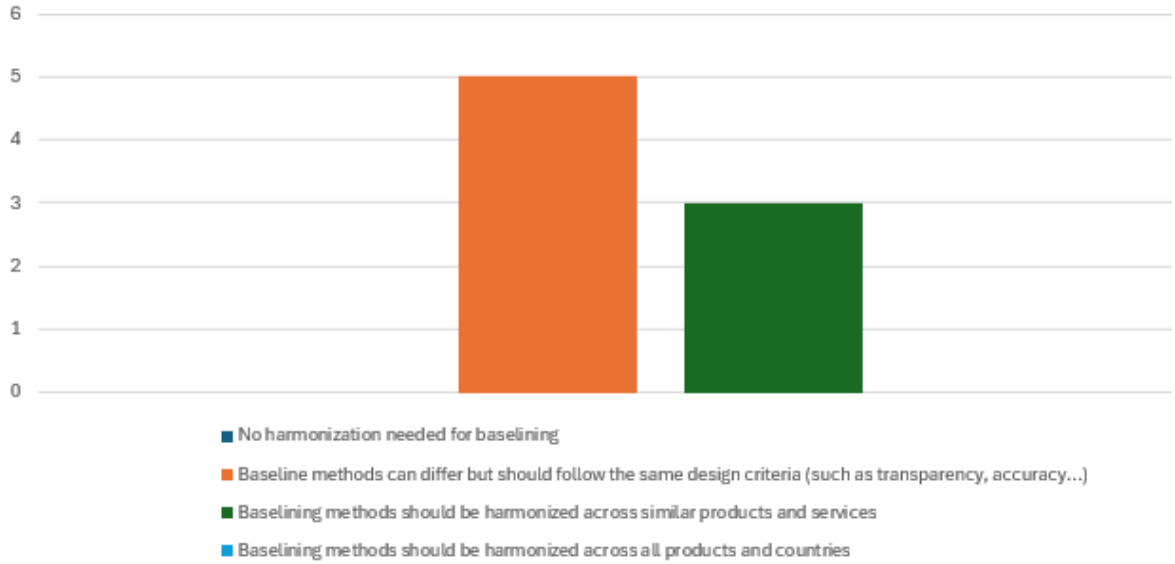

Figure 4.26 - The network code on DF proposes a list of criteria with which baseline methods should be aligned. Do you agree with this?

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Are there solutions for these barriers?

All participants agreed and remained optimistic that despite the barriers, solutions could be implemented.

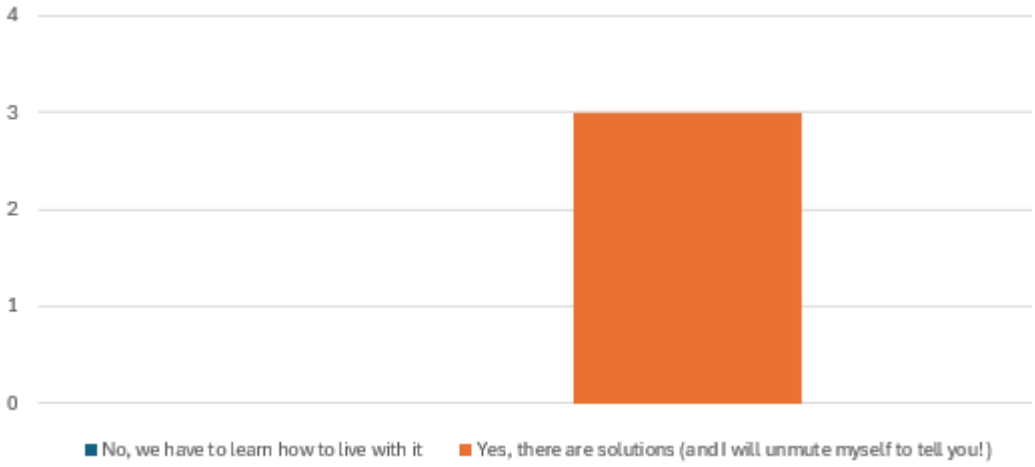

Figure 4.27 - Are there solutions for these barriers?

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5 Conclusions

During the years of project implementation, GRIFOn activities have aimed to obtain feedback from relevant stakeholders and create consensus on the solution. The GRIFOn Task Force, in cooperation with WP leaders, defined topics where input from stakeholders outside the project's community was needed.

When starting the GRIFOn initiative, the GRIFOn Task Force decided to actively involve the stakeholders and get their feedback via interactive workshops. Five workshops were organised during the project—four as online webinars and one as a live event. Online webinars had more participants than a live event, so more feedback was gathered during online events.

GRIFOn workshops presented the project results, built consensus in the stakeholder community, and collected stakeholder feedback. Feedback received was used to adapt the tasks. For example, regarding the question of interoperability (the theme of the 2nd GRIFOn workshop), project partners designed and implemented a precise methodology for defining cross-platform services and the data descriptions of their Business Objects. Sixty-four harmonised cross-platform services have been defined, and further definition of customer services is possible after OneNet. This supported the process towards standardisation – OneNet users were encouraged to use commonly accepted definitions/descriptions of services (Cross-Platform-Services) and data schemes for the respective Business Objects.

The last three workshops, described in this deliverable, focused on:

- General conclusions from the Scalability and Replicability Analysis.
- Enabling seamless data exchange between energy stakeholders through an IDSA-based reference architecture.
- OneNet Roadmap.

Project partners prepared two white papers on the OneNet Roadmap, which derive from deliverable D11.7, and bring together the results of the project and outline how to scale the results up to a pan-European scale. The first white paper is titled Interoperability Strategy for OneNet, and the second is Market Design for OneNet. They were presented during the fifth webinar, and the feedback received was incorporated into the final versions of the documents.

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