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Proceedings of the 13th ETIP SNET Regional Workshop

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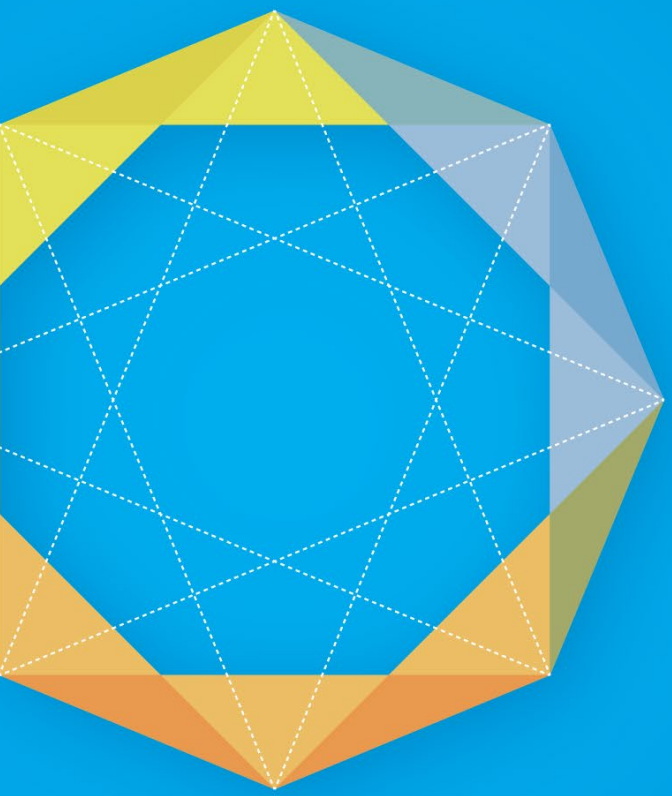

ETIP SNET

European Technology and Innovation Platform
Smart Networks for Energy Transition

ETIP SNET Workshop Proceedings – 13th Regional Workshop

(9th November 2021)

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1. INTRODUCTION

As part of its mission of guiding Research and Innovation activities to support Europe's energy transition, the European Technology and Innovation Platform for Smart Networks for Energy Transition (ETIP SNET) will organize 8 Regional Workshops in the course of the next 3 years, covering the whole European Union.

To guarantee coverage of all EU countries (including associated ones), these Workshops have been named "Regional" because they gather together Member States in 4 Macro "Regions". The gathering is mainly based on criteria of neighbourhood and common geographic characteristics and priorities.

Please, find them below:

- Western Region: (France, Ireland, Portugal, Spain and the United Kingdom)
- Central Region: (Belgium, Netherlands, Luxembourg, Poland, Austria, Germany, Switzerland, Czech Republic, Slovakia)
- South-Eastern Region: (Bulgaria, Croatia, Cyprus, Greece, Hungary, Italy, Malta, Romania and Slovenia)
- Northern Region: (Finland, Denmark, Norway, Latvia, Lithuania, Estonia)

This "Regional" dimension has been discarded for the first 3 workshops due to the pandemic crisis and due to the fact that the workshops have been held online. In this context the regional dimension did not bring any added value to this format.

In the framework of ETIP SNET – from 2016 till today – a first series of 8 Regional Workshops has already taken place. You can find the minutes and PPTs of all of them HERE.

The 3rd workshop of the new series of the 8 Regional Workshops took place **on 9th November 2021 from 9.30 till 13.00.**

1.1 OBJECTIVES OF THE REGIONAL WORKSHOPS

The aim of the regional workshops is to contribute to the next ETIP SNET R&I Implementation Plans, Roadmap update and the Progress Reports. The selected R&I projects present their findings and will help to identify R&I gaps to update the R&I Implementation Plans (2023-2026) and update of the current Roadmap 2020-2030.

The Regional Workshops have four overall objectives:

- Present and create knowledge on project research results, good practices and lessons learnt of R&I projects on energy system integration;
- Monitor and identify gaps in R&I topics and priorities and to have convergence among national, regional and the European levels;
- Ensure consistency between national and European views;
- Collect information from national and regional projects to feed the Progress Reports and Implementation Plans and Road Map.

1.2 ORGANISATION OF THE REGIONAL WORKSHOPS

To achieve all the main goals mentioned in the paragraph above, the workshops are divided in 2 Panel joint sessions and 4 Parallel sessions.

During the first join session the main aim is to map ETIP SNET Research Area, R&I Priorities and link them to the Topics of the 4 Parallel sessions. Discussions around the general R&I priority gaps at EU and National level from EC angle, from the Members States perspective and from the stakeholders' perspective are concluded.

During the 4 parallel sessions, European, national and regional projects addressing energy system integration issues are presented, according to the 4 thematic priorities identified before each Workshop on the basis of exchanges with EC, ETIP SNET Working Groups and Projects Representatives.

During the final Joint session, the Key conclusions from each of the Parallel sessions are presented along with specific Recommendations from ETIP SNET WG5 in terms of "Innovation implementation in the business environment".

All the inputs collected during these workshops will be used by ETIP SNET in drafting the two Implementation Plans scheduled to be published in December 2021 and in August 2023.

As stated in the Introduction, 8 workshops are planned for the 2020-2023 period. In 2021, due to the sanitary crisis, it was decided to organise these workshops virtually.

The 4 themes selected for the third workshop held on 9th November 2021 – and object of this proceeding report – have been the following:

- Theme 1: Decarbonising EU Islands
- Theme 2: Operation of Integrated Energy Systems with High-RES Penetration
- Theme 3: Digitalisation: Monitoring and Control; Semantic Interoperability
- Theme 4: Consumer and Data to discuss the relation of products, privacy and policy

The 4 themes have been selected based on the research areas of the ETIP SNET Working Groups and the BRIDGE initiative as well as with the aim to contribute to the ETIP SNET Implementation Plan and Road Map.

1.3 STRUCTURE OF THIS REPORT

For each of the Workshops a Report including all the proceedings and key recommendations will be produced.

The proceedings will gather the following information:

- List of projects presented at the workshop, with a short description of each of them;
- Number of people registered to the workshop and their distribution per country and organisation of origin;
- Minutes of each session and main questions raised during the panel sessions, including SLIDO questions and results from each session;
- Recommendations for innovation implementation in the business environment.

2. ETIP SNET 13th REGIONAL WORKSHOP

The 13th ETIP SNET Regional workshop was held online via MICROSOFT TEAMS on 9 November 2021, 9:30 – 13:00 CET.

The workshop was attended by over 100 people and overall, 16 projects from all over Europe presented their findings. Detailed information is included in the next paragraphs.

2.1 PROGRAMME OF THE WORKSHOP

The agenda of the 13th Regional Workshop held on 9th November 2021 from 9.30 to 13.00 is the following:

AGENDA		
PLENARY SESSION - introduction **09:30 – 10:40**		
TIME	***TOPIC***	***SPEAKERS***
9.30 – 9.45	**Welcome and opening**	**Maria Laura Trifiletti** - ZABALA
9.45 – 10.00	**ETIP SNET and BRIDGE Presentation**	**Iñigo Azpiri Irazabal** - ETIP SNET Vice Chair
10:00-10:30	**Round table: Focus on the regional and national level**	**Moderators:** **Ludwig Karg** - B.A.U.M. Consult Panellists: **ETIP SNET Technical CORE TEAM** ➢ **Rainer Bacher** – BACHER Energie ➢ **Nikos Hatzirgyriou** – ICCS ➢ **Aris Dimeas** - ICCS ***Regional and national representatives:*** ✓ **Michele De Nigris** – RSE, National Stakeholder Coordination Group representative ✓ **Jatta Jussila** - CEO at CLIC Innovation Oy, Finland, member of the Support Team for Joint Programming Platform ERA-Net Smart Energy Systems
10:30-10:40	Q&A Session	
Parallel Sessions **10.40 – 12.10**		
Decarbonising EU Islands		**Operation of Integrated Energy Systems with High-RES Penetration**
MODERATORS		**MODERATORS**
Aris Dimeas – ICCS **Franco Di Persio** - CIRCE (ETIP SNET WG2)		**Nikos Hatziargyriou** - ICCS **Santiago Gallego** - i-DE (ETIP SNET WG1)
PANELLISTS		**PANELLISTS**
• **Josep Mitats Carmona** – Veolia (REACT Project)		• **Alexander Wiedermann** – MAN Energy Solutions (ETIP SNET WG3)

• **Kostas Komninos** – Dafni (Kythnos Smart Island Project) • **Diego Pisera** – algoWatt S.p.A. (VPP4ISLANDS Project) • **Alessandra Montanelli** – Sinloc (NESOI Project)	• **John Lowry** – EirGrid (EU-SysFlex Project) • **Katerina Valalaki** – Hypertech SA (MERLON Project) • **Gabriele Comodi,** – Università Politecnica delle Marche (MUSE GRIDS Project) • **Georges Kariniotakis** – MINES ParisTech (SMART4RES Project)
STRUCTURE	**STRUCTURE**
99 second's pitches Panel discussion Q&A	99 second's pitches Panel discussion Q&A
Digitalisation: Monitoring and Control; Semantic Interoperability	**Consumer and Data to discuss the relation of products, privacy and policy**
MODERATORS	**MODERATORS**
Rainer Bacher - BACHER Energie **Elena Boskov-Kovacs** – Blueprint Energy Solutions (ETIP SNET WG4)	**Ludwig Karg** – B.A.U.M. Consult **Esther Hardi** – Energiecooperatie 2030
PANELLISTS	**PANELLISTS**
• **Nathalie Grisey** – RTE France (OSMOSE Project) • **Hans Bludszuweit** – Fundación CIRCE (INTERPRETER Project) • **Mònica Aragüés Peñalba** – CITCEA-UPC (BD4OPEM Project) • **Lazar Miletic** – Blueprint Energy Solutions (X-FLEX Project)	• **Kalle Kukk** – Elering (EU-SysFlex Project) • **Heidi Tuiskula** – Smart Innovation Norway (E-Land Project) • **Ivelina Stoyanova** – E.ON Energy Research Center (OneNet Project) • **Pedro Crespo del Granado** – Norwegian University of Science and Technology (NTNU) (BEYOND Project)
STRUCTURE	**STRUCTURE**
99 second's pitches Panel discussion Q&A	99 second's pitches Panel discussion Q&A

PLENARY SESSION – conclusions **12:10 – 13:00**		
TIME	***TOPIC***	***SPEAKERS***
12:10-12:15	**Session introduction**	**Moderator: Maria Laura Trifiletti** - ZABALA
12:15-12:35	**Presentation by WG representative on results of questionnaire**	**Venizelos Efthymiou** – University of Cyprus **Mahboubeh Hortamani** – BAAM Consulting (Both ETIP SNET WG5)
12:35-12:40	**Key conclusions session 1**	**Franco Di Persio** – Fundación CIRCE (ETIP SNET WG2)
12:40-12:45	**Key conclusions session 2**	**Santiago Gallego** - i-DE (ETIP SNET WG1)
12:45-12:50	**Key conclusions session 3**	**Elena Boskov-Kovacs** – Blueprint Energy Solutions (ETIP SNET WG4)
12:50-12:55	**Key conclusions session 4**	**Ludwig Karg** - B.A.U.M. Consult **Esther Hardi** – Energiecooperatie 2030
12:55-13:00	**Conclusions**	**Maria Laura Trifiletti** – ZABALA

2.2 LIST OF ATTENDEES

191 people registered for the workshop. Overall, the workshop was attended by over 100 people.

The distribution of registrants by country is provided in the figure below:

Figure 1: Distribution of registrants by country

3. PROCEEDINGS

3.1 PLENARY SESSION

Maria Laura Trifiletti welcomed the participants, indicating that ETIP-SNET is working together with stakeholders from industry, research centres and universities towards the energy transition to reach targets set up by the European Commission and also to identify common R&I priorities. Moreover, she noted that the regional and national level is important since the research shall not only be focused on the European level. In particular, the relevant activities shall also be linked with priorities at national and regional level.

4 parallel sessions have been held in the workshop:

- *Decarbonising EU islands*
- *Operation of integrated energy systems with High-RES penetration*
- *Digitalization: monitoring and control; semantic interoperability*
- *Consumers and data to discuss the relation of products, privacy and policy*

A short introductory poll was also held with the following questions:

- *Do you know ETIP-SNET?* The majority of the participants indicated that they know ETIP-SNET
- *What does ETIP-SNET stand for*? The majority of the participants identified the correct meaning of ETIP-SNET.

- *Have you participated in previous regional workshops*? It appears that the workshops are reaching new people, while there are also participants that keep joining the workshops.
- *In which country is your company/organization located*? There is a good coverage of all European union countries, while persons from UK are also present.
- *Which sector are you from?* The majority of the participants are from a research institute, while additional sectors are indicated.

Inigo Azpiri (ETIP-SNET vice-chair), noted that ETIP-SNET (European technology and innovation platform for smart networks for the energy transition) was established in 2016 with the support of the European commission, building on previous activities, which were focused on the grids. The focus has been expanded to the entire energy system, integrating and optimizing all sources and vectors, going beyond the electricity grid. ETIP-SNET's objective is to guide the European research and innovation to an energy system where all sources and vectors are integrated. ETIP-SNET is composed of a very rich community of more than 350 experts from different stakeholder groups.

ETIP-SNET has published its Vision for 2050, where the stakeholders' view on the system is provided, indicating how the actual system will look like in 2050, while also identifying top level requirements for the innovation on the relevant areas. In particular, the electricity grid is the backbone for the future low-carbon energy system, while a fully digitalized grid will allow stakeholders, including prosumers, to trade energy. With this vision for 2050 in mind the short-term issues are considered, developing a 10-year Roadmap. This is a consolidated view from the stakeholders for the future research and innovation needs and relies on a detailed analysis of the national, European and international projects, while the input from workshops is also important. Considering the shortest term, the Implementation Plan is published for a time-horizon of 4 years. The Implementation Plans identifies the priority actions in different topics which are relevant for the research and innovation. The Implementation Plan covering the period from 2022 to 2025 is scheduled for the end of December 2021.

ETIP-SNET is organized in 5 Working Groups (WGs). The *1st working group* focuses on how a reliable, economic and efficient energy system can be achieved. On April 2021 this WG released a position paper on Smart Sector Integration, which is also available on ETIP-SNET's website and in the coming months the WG is going to release white papers on Hydrogen and Grids, Flexibility for Resilience and E-mobility. The *2nd working group* investigates the energy storage technologies that ensure system flexibility. This WG has a strong collaboration with other ETIPs, especially ETIP batteries which focuses on the battery side, while other storage technologies are also taken into account. Right now, the WG works on a white paper on defining the approach for circular economy in the storage field. *Working group 3* deals with flexible generation from thermal base generators. This WG has a strong collaboration with ETIP-RHC (Renewable Heating and Cooling) and they are working on a joint white paper for the next year on chapters on energy sources and technologies and the relevant challenges. *Working group 4* deals with the digitalization of the electric system and also the customer participation. This WG developed use cases, focused mainly on the residential customers, with the idea of interconnecting the ecosystem related to the electricity sector and providing an easy access for the provision of services in a plug and play approach (this is the reason that the 'one stop shop' term is used). The next steps in this WG include the reply to the Digitalisation action plan consultation and the collaboration with other working groups in order to focus on customers and involvement of citizens. *Working Group 5* works closely with the rest of the groups to study the results of the European projects and the lessons learned, identifying the projects' research and innovation needs in the coming years.

Inigo Azpiri also noted that the BRIDGE initiative has as objective to link all the different European projects in order to have a structured view of cross cutting issues. The topics that are covered in BRIDGE are Smart Grids, Storage, Islands and Digitalization. It is very important for ETIP-SNET to collaborate with such initiatives in order to define the innovation needs for electricity grids.

Ludwig Karg informed the participants that ETIP SNET has very valued and recognized experts that are very familiar with energy transition and networks on EU level, national level, and regional level and are very committed to share their knowledge.

Rainer Bacher indicated that, in order to achieve a progress on the energy transition, it is important to understand who should contribute and on what level (national, European, industrial, university level etc.). In this respect, the SET plan (strategic energy technologies plan) was created a few years ago, setting up ten key actions, ranging from renewables, to energy systems, to transport and all the different elements of an energy system. ETIP-SNET is concentrating on one of these focused themes of the ten actions, which is the resilience and security of the energy system. The keywords for ETIP-SNET concentrate on the system, bringing energy system parts together, and making the system robust, affordable, secure and sustainable. ETIP-SNET has more than 300 parties involved on different levels, trying to contribute from the stakeholder point of view, and not so much the governmental point of view. ETIP SNET creates key documents, which describe what the 350 stakeholders think is needed in order to achieve a progress in the energy system resilience and security: the Vision, looking to 2050, the roadmap for a 10-year period and the 4-year-forward view which is called Implementation Plan.

Rainer Bacher also noted that towards building European networks to manage everything there are many technical and technological issues which need to work together. The key challenge is to bring all the relevant bodies together. Moreover, it is important to bring together all the relevant stakeholders with views that need to be seriously considered towards changing the system.

Concerning who will be responsible to implement the Implementation Plan, Rainer Bacher noted that the relevant message in the Implementation Plan, shall be written in a way that the governments, the European commission, the stakeholders (smaller or larger ones), DSOs, TSOs, and the communities understand, in order for the appropriate proposals for projects to be made. In this respect, the Implementation Plan shall be implemented not only by the industry, but also by academic research, communities, cities, etc.

Nikos Hatziargyriou noted that ETIP-SNET coordinates the views of a very large number of stakeholders. In particular, the stakeholders of ETIP-SNET cover all actors of the energy sector: transmission and distribution system operators, renewable energy producers, thermal generation producers, storage manufacturers and operators, system academia, national stakeholders' groups, consumers, ICT vendors and operators. This provides a chance to organize all the relevant views about the future integrated energy system and prioritize the research needs in order to realize the vision of the decarbonized energy systems. In this respect, the relevant interactions are very important to provide consolidated views to the European commission and the stakeholders on which research projects should be funded.

Concerning the term 'regional' that is used for the workshops, Nikos Hatziargyriou noted that the European policies and the European views and dreams are universal for the whole Europe. In this respect, it is very important to observe how regions and countries try to implement these visions from their point of view. It is also important to have a coordinated research plan so that duplications are

avoided, while also avoid wasting relevant efforts. Moreover, it has been noted that is important to learn from each other, in order to learn what has gone well or wrong in national level and what can be made better next time.

Aris Dimeas noted that it is important to collect new ideas and also learn what has been covered from ongoing projects, in order to improve the implementation plan and map all the relevant activities in the new version that will be published by the end of the year. Moreover, it has been indicated that additional research efforts have been viewed in the past regional workshops, especially from non-BRIDGE projects. In particular, apart from BRIDGE projects, national projects are also taken into account and this is the reason that nationally funded or transnationally funded projects are invited to the parallel sessions.

Jatta Jussila (CEO of CLIC Innovation) noted that CLIC Innovation, is a cross sector organisation of open innovation clusters or in other words an ecosystem for sustainable development. They are active in three fields: 1) the energy system development, 2) the development of circular economy and 3) the development of bio economy. They are based in Finland but operate internationally, thus they are also part of the support team for the ERA-Net smart energy systems.

The local/regional level

Although it is very important to be active in innovation activities in all scales, the relevant local, regional and national scales are quite crucial. In particular, the local regional players in the relevant networks have a good understanding of the local needs, the local infrastructure and the relevant barriers in the market indicating a good chance to create innovations and solutions that meet the local demands. It is also important that these players get connected with partners outside of their own countries or regions, in order to avoid creating already developed solutions. Moreover, already developed solutions can be replicated in other regions, under other circumstances and operating environments.

Moreover, it has been indicated that the infrastructures may vary a lot when considering the local/regional level, while variations in the regulatory environment are also noted. Additionally, it has been noted that although EU is moving towards a common regulation, the European companies should create solutions that can also be sold outside Europe. In this respect, the conditions in the relevant market regions shall also be understood.

ERA-Net smart energy system

Jatta Jussila noted that ERA-Net Smart Energy Systems is a joint programming platform that promotes energy system innovations and connects national and regional public funding programs for research development and innovation activities for energy. Among other activities, the program finances cooperative projects. Moreover, ERA-NET Smart Energy Systems has built the knowledge community for knowledge sharing in order to create and replicate solutions. Additionally, it has created an impact network, as well as a validation network with Living Labs and Testbeds, in order to connect the projects that are funded by the ERA-Net Smart Energy Systems with regional and local players which are connected to the real-life context (for instance customers in different areas or the technological infrastructure in certain areas). In this respect, the projects can validate the functionality of their developed solutions in different environments or validate their acceptance from customers or the customers' perceptions.

ERA-Net Smart Energy Systems is well linked with the Horizon program. Moreover, there exists a corporation line with the national stakeholder coordination group (NSCG) which is represented by Michele De Nigris.

The NSCG (National Stakeholders Coordination Group)

In particular, *Michele De Nigris* represents the NSCG (National Stakeholders Coordination Group), which provides a discussion forum for public authorities, member states regulators, etc. that discusses about needs, priorities, development and policies. Similar needs have been noted by ETIP towards involving the different stakeholders and hearing the relevant views and experiences. In this respect, the NSCG indicates the stakeholders' points to be taken into consideration for an integrated energy system planning. Moreover, the National Stakeholders Coordination group tries to ensure the consistency and efficiency among all the different frameworks of ETIP, the relevant Working Groups, the ERA-Net and the clean energy transition partnership.

Concerning the coordination of the relevant stakeholders, it has been noted that the stakeholders that are of direct interest are the ones linked with policy-related issues. In this respect, thematic discussions are considered on subjects linked with policy-related issues (like, for instance, regulatory sandboxes, energy communities, local flexibility, etc.). Policy-related concerns on regional matters, on storage and energy system planning, on consumer and citizen involvement, are of particular concern. Moreover, it has been noted that it is quite important that the policy related issues concerning energy data management move from the national to subnational, regional and local level.

Donating data

Michele De Nigris also noted that donating data can be compared to donating blood, which implies donating the essence of the individual. Moreover, people may donate blood for a purpose, so a purpose needs to be linked to donating data (e.g., smart meter data). However, sometimes people are very reluctant to give away their data. In particular, profiling, manipulation, monitoring, controlling, influencing behaviour can be carried out when considering data related to social media. However, if transparency is evident and if a common and global purpose for global benefits is expressed, then data can be donated for the global benefit of the energy system.

Moreover, concerning energy communities, the way of managing and using the relevant data and, therefore, the way of providing the data, can be easier due to a direct connection between the data provided and the global or local benefit received for providing these data.

Link with member states

Linking with member states across the SET plan is one of the objectives of the set plan implementation working groups and this is what is presently being carried out in the working group 4. In particular, the member states collaborate in the discussions about the best use of national funds for the resilient energy system. The idea is to identify common priorities so that the member states also consider similar, or consistent priorities in their development. This cannot be achieved by one single stakeholder; thus the member states need to also consider the industrial and the regulated part of the relevant aspects. Moreover, it has been noted that the European funding shall also be aligned with the relevant national/local funding.

Interpretation of the term 'regional'

It has been noted that the answer to the question 'what is defined as regional?' depends on the persons that are asked to answer. For instance, if someone in Bavaria is asked, they would not even admit that Bavaria is a region, yet people in Brussels may believe that Finland is a region. On the other hand, Finland may not be considered as a region, taking into account that it is a large country (area-wise), while the country is further divided in regions with some regional operators. Generally, a single answer to this question may not exist.

Concerning, Finland, Jatta Jussila noted that culture issues related to the education are not varying inside the country. However, from the infrastructure point of view the situation might be different. For instance, regarding the energy systems, the production is located in different parts of the country and therefore the energy related infrastructure is also different in different areas. Thus, regional or local parties may have a better understanding of the relevant local barriers that are present. In this respect, players in the different levels are important, ranging from local ones up to bigger regions or even nations.

Interconnection of cities, branches, stakeholder groups, etc.

Jatta Jussila noted that CLIC connects everybody from all the country who is active in the energy sector and wants to contact them (even the city level players and the smaller cities). CLIC is also connected with the government, ministries and public financing institutes, which can provide a link to the different levels of players in the country.

Pan-European System

Rainer Bacher also noted that there exists the ability to connect to a local PV on the roof of a home but also to a large wind power station in the northern sea via the high voltage grid. In this respect, the relevant organizational challenge, which has to do with smaller and larger regions on the national and the transnational level is evident. The relevant processes shall be organised in a reasonable way, starting from today, taking into account political and subsidiary issues, while also keeping in mind the relevant technical possibilities. ETIP-SNET contributes to bringing together these issues with the integration of systems and players. Moreover, Ludwig Karg indicated that the relevant pan European system is built of subsystems and can be considered as a big 'system of systems', going down to small regional systems, homes and citizens. Additionally, Michele De Nigris noted that not only the global picture but also smaller parts (or 'pixels') shall be taken into account, like the energy communities, the local communities, etc.

Clean energy transition partnership

Michele De Nigris noted that the portfolio of the Clean Energy Transition Partnership (CETP) is extremely large, going well beyond the networks, also dealing with technologies for the generation, carbon capture, storage and utilization, district heating (related to energy efficiency in homes and local and global networks). The CETP indicates an important partner, not only for ETIP-SNET but also for other ETIPs. Moreover, it has been noted that the calls (and co-funded calls) for the development of the global and local energy systems shall take into account the regional-local point of view but also the national point of view.

Removing the complexity from the end consumers

Elena Boskov-Kovacs noted that the nature of European citizens has changed, especially since COVID, and the general idea of the system that is being built and designed right now is to remove the complexity from the end consumers, while getting all the benefits of digitalization. Moreover, she noted that the energy communities are considered as static, in terms of people who live, yet the setup and the nature of these communities has changed. These communities are quite different now compared the period before COVID (e.g. a lot of people work from home) so thinking of the energy communities of the future (which are more fluid than static) is quite important.

3.2 PARALLEL SESSIONS

After the plenary sessions, participants were invited to join one of the four parallel sessions devoted to different key topics of the energy transition:

1. Decarbonising EU Islands
2. Operation of Integrated Energy Systems with High-RES
3. Digitalisation: Monitoring and Control; Semantic Interoperability
4. Consumer and Data to discuss the relation of products, privacy and policy

Each parallel session was organised as follows:

- 99-second pitch by European, national and regional projects
- Moderated panel discussion between representatives of European Commission, ETIP SNET Working Group and projects
- Interaction with the audience via SLIDO and Q&A session

Below the list of participants for each parallel session:

Table 1: Panellists from the parallel sessions

Parallel session nr.	Participants
1	• Aris Dimeas - ICCS – Moderator • Franco Di Persio – Fundación CIRCE (ETIP SNET WG2) - Moderator • Josep Mitats Carmona – Veolia (REACT project) • Kostas Komninos – Dafni (Kythnos Smart Island project) • Diego Pisera – algoWatt S.p.A. (VPP4ISLANDS project) • Alessandra Montanelli – Sinloc (NESOI project)
2	• Nikos Hatziargyriou - ICCS - Moderator • Santiago Gallego – i-DE (ETIP SNET WG1) - Moderator • Alexander Wiedermann – MAN Energy Solutions (ETIP SNET WG3) • John Lowry – EirGrid (EU-SysFlex Project) • Katerina Valalaki – Hypertech SA (MERLON Project) • Gabriele Comodi, – Università Politecnica delle Marche (MUSE GRIDS Project) • Georges Kariniotakis – MINES ParisTech (SMART4RES Project)
3	• Rainer Bacher - BACHER Energie – Moderator • Elena Boskov-Kovacs – Blueprint Energy Solutions (ETIP SNET WG4) • Nathalie Grisey – RTE France (OSMOSE Project) • Hans Bludszuweit – Fundación CIRCE (INTERPRETER Project) • Mònica Aragüés Peñalba – CITCEA-UPC (BD4OPEM Project) • Lazar Miletic – Blueprint Energy Solutions (X-FLEX Project)

4	• Ludwig Karg – B.A.U.M. Consult - Moderator • Esther Hardi – Energiecooperatie 2030 - Moderator • Kalle Kukk – Elering (EU-SysFlex project) • Heidi Tuiskula – Smart Innovation Norway (E-Land project) • Ivelina Stoyanova – E.ON Energy Research Center (OneNet project) • Pedro Crespo del Granado – Norwegian University of Science and Technology (NTNU) (BEYOND project)

3.2.1 PRESENTATION OF R&I PROJECTS

During each of the parallel sessions, R&I projects from a variety of European countries were presented, as displayed in the table below.

Table 2: Projects presented during the 13th Regional Workshop

Project	Country (Project Coordinator)	Purpose	Speaker
Session 1: Decarbonising EU islands			
REACT	Spain	REACT stands for Renewable energy for self-sustainable Island communities. The project is funded under the European Union's horizon 2020 program. The consortium is comprised of 25 partners from 11 European countries. The work started back in January 2019. The project has three demo islands to validate the technical and financial feasibility. The goal is to support the deployment of innovative technologies such as high efficiency PV systems power to hydrogen storage, battery energy storage systems, EV chargers and heat pumps. The project will support synergies among different energy sectors such as: electrical heating and cooling, transport, water and wastewater treatment. Furthermore, the project will support the user engagement and the development new business models.	Josep Mitats Carmona
Kythnos Smart Island	Greece	Kythnos has been a testbed for energy technologies on islands for several years, starting in the 80s with the first installation of a wind park in Europe. In the years to come, Kythnos will become a true "living lab" where innovative solutions for the efficient upgrade and smart management of local infrastructures, including energy, water, waste, transport and street lighting will be designed and deployed. These interventions will lay the foundation for the island to extend its tourism season beyond traditional peak periods and strengthen the interdependence of its primary, secondary and tertiary sectors; ultimately, building a local economy that is diverse, circular and sustainable.	Kostas Komninos
VPP4ISLANDS	Italy	VPP4ISLANDS means virtual power plant for interoperable smart islands. It's an innovation action research project funded by the horizon 2020 program with a consortium of 18 partners that represent 8 countries. The project coordinator is University's Marseille and the project involves five demonstration pilots. The objectives of VPP4ISLANDS are to facilitate the integration of renewable system, accelerate the transition towards smart and green islands and exploit the efficiency potential and innovative storage approach. In VPP4ISLANDS project disruptive solutions will be developed focusing on a virtual power plant that	Diego Pisera

		integrates energy storage system and flexible loads, using blockchain technology.	
NESOI	Italy	NESOI is a technical assistance platform to support energy transition processes of European islands, facilitating the decentralization of energy system and contributing to European policies to achieving 2030 targets. NESOI will provide to islands training, technical support, cooperation opportunities and robust funding opportunities to concretely convert Island Sustainable Energy Action Plans into Renewable Energy Sources (RES) plants, building and energy infrastructure retrofitting, energy bills reduction, local job creation and more. Last year, the first call for proposals was launched and more than 100 applications were submitted. We were able to finance 20 initiatives. A reserve list was also created, from which additional 40 projects will be activated. There are four initiatives ongoing located in 50 islands in 11 different countries. These initiatives could trigger more than one billion euros of investment.	Alessandra Montanelli

Session 2: Operation of Integrated Energy Systems with High-RES Penetration

Alexander Wiedermann

The Working Group of flexible generation has a global view on the role of conventional and renewable energy sources. On the energy system, it identifies research needs to make sure whether technologies are available, whether they have to be upgraded to a larger scale focusing on flexible generation in terms of sector coupling but also on some gas turbine-based technologies which couple the electricity sector and the heat sector. A lot of carbon dioxide could be saved by just switching from coal to gas, but the WG is also looking in the future where it sees two very important aspects which have to be looked at, namely fuel flexibility, which means the capability of conventional power generation switching into green fuels and also load flexibility. In the future, a switch from central power generation to more decentralized units is possible and we need to check how far. Some plants or gas turbine plants could come in to stabilize the grid when renewables, wind energy and solar photovoltaics, are not available to the extent needed. In the future, a very powerful transmission system and a strong interaction between users and producers are needed to cover the load when there's darkness in Finland or Norway and sunshine in Greece and Italy cannot help because the transmission systems, probably also in the future will not be available to the extent needed. We also have to think about decentralized resources. We see that in 2018 the industrial and residential sectors are at a very low electrification level and we need in the future extensive electrification. Of course, this will be partly compensated by smart grids technologies and energy savings, but basically, we need to bring wind and solar energy also to the transportation sector and to the other sectors of course. In terms of storage, we see that in the future we need also to extend the storage capacity by a huge amount, e.g., in Germany we need to go from GWhs of storage capacity which we have currently to TWhs. Thermal and heat storage can be extended, but one of the keys for the sector coupling is the power to gas and in particular the production of green hydrogen. Our hope is that using and developing current technologies will have a scaling effect that will make green hydrogen in the future affordable for us.

EUSysflex	Ireland	EU-SysFlex is a complex project and a very broad project given that there are thirty four power platforms involved in this project across 15 jurisdictions. Its main objective is the identification of system wide challenges associated with the integration of 50% RES-E across the European power system by 2030. The pan European power system has been analyzed to identify what technical scarcities arise as we transition towards a power system dominated by non-synchronous variable renewables, mainly wind and solar. Existing energy market structures have been identified most evolved to incentivize the necessary investment in low carbon generation or the required volume of flexibility and system services to address the identified technical scarcities. A flexibility road map for Europe will be unveiled at the completion of our project next February. Through seven demonstration projects and technology trials across Germany,	John Lowry

		Portugal, Italy, Finland, France, Poland, Estonia and Ireland, flexible capability technologies have been identified to provide services to grid as well as exploring system operation tools, cross border and cross sector data management and exchange	
MERLON	Greece	MERLON means integrated modular energy systems and local flexibility trading for neural energy islands. After analysis in two pilot sites in Enercoop and Energy Gussing in Spain and Austria respectively, it has been identified that these local distribution grids are facing grid stresses due to the stochastic output of the variable renewable energy sources. Furthermore, there is an unstable regulatory framework, coupled with non-viable market offerings for small consumers. MERLON provides a complete solution offering innovative business models, where energy communities take the role of DSO or aggregator and provides also a digitalized holistic solution that integrates a decentralized battery energy storage system with grid forming capabilities. These are coupled with technologies enabling the modification of the demand for participation in explicit demand response scheme in EV integration. This way, MERLON aims to optimally and holistically coordinate and integrate local flexibility resources by providing accurate renewable generation and demand forecasting and optimal scheduling to transform a local energy system with a weak grid infrastructure to an integrated energy system with active engagement of consumers through energy communities and a battery energy storage system to support renewables integration at the local level.	Katerina Valalaki
MUSE GRIDS	Italy	The goal of Muse Grids is to demonstrate how the integration of several energy networks can improve flexibility in local energy communities. This is achieved via a municipal scale, local energy community located in Italy in Osimo and a large scale local energy community in Belgium. Different energy networks are used, mainly electricity and natural gas, but also in the Italian demo, district heating and water network. The load profile of electricity production and consumption in a day of summer shows the typical duck profile that happens by the very high share of renewable energy. In this municipal scale local energy community there are up to 23, 24 megawatt of PV producing renewable electricity injection back to the national TSO (TERNA), that reaches a peak of up to 22 MW during the year. The goal of the project is to show how flexibility can improve self-consumption of local renewable energy production in local energy communities. In particular, it is demonstrated how electric vehicles, with vehicle to building and vehicle to grid capabilities, controllable loads, such as heat pumps and smart energy thermal systems, and storage systems, such as batteries and a large thermal energy storage (TES) coupled with the cogeneration plant and district heating network (CHP-DH) provides high flexibility to the energy system.	Gabriele Comodi
SMART4RES	France	Smart4RES is a research and innovation project with twelve partners from six countries. For the integration of renewables in power systems and in electricity markets it is necessary to have good forecasts for their production, a few minutes to a few days ahead. The vision of Smart4RES project is to achieve outstanding improvement in RES predictability through a holistic approach that covers the whole model and value chain related to RES forecasting. The RES forecasting model chain that is developed starts with the data, then we have the weather forecast, the power forecast, the prediction services and finally the applications that use this forecast for power system and	Georges Kariniotakis

		electricity markets. Highlights of the project include improvement of weather forecasting using ultra high-resolution models and models to predict the renewable production following a seamless approach able to consider multiple sources of data and different time frames. An approach is developed for collaborative forecasting that permits to share data, while respecting confidentiality and privacy constraints and a data market concept is proposed to monetize the value in the data. Finally, the use of forecasts in power systems and markets is optimized through artificial intelligence and then a prescriptive analytics approach attempts to simplify the complex model.	
Session 3: Digitalisation: Monitoring and Control; Semantic Interoperability			
OSMOSE	France	One topic that is covered in the OSMOSE project is the demonstration of grid forming controls, which are necessary for the stability of the system. It is a local and extremely fast control (less than 200 ms). The project has works on two demonstrators based on battery energy storage systems. The main contribution of the project is to successfully implement grid forming control in these two demonstrators. In particular functional specifications have been translated into technical requirements that are suitable for grid codes and applicable to control design. The project has also worked on the monitoring and the definition of compliance test and criteria to assess the grid forming functionality. In this respect, this contribution may pave the way for grid forming control to be a standard control for inverters connected to the grid. OSMOSE has also contributed to the interoperability between equipment of substations, by demonstrating an interoperable and efficient IEC 61850 engineering process.	Nathalie Grisey
INTERPRETER	Spain	The project has a budget of 4 million Euros, a duration of 3 years and comprises 9 partners across 6 countries. The project has three pilots in Spain, Belgium and Denmark. The Interpreter core platform connects data from the pilots' infrastructure with data services. A grid modelling tool also provides the grid model according to the relevant data (which can be quite diverse, with different data levels). 10 data services are also developed alongside the grid modelling tool. In particular, concerning grid operator and maintenance (O&M) the following services are offered: non-technical losses detection, Ancillary services for DSO (Flexibility), Optimal grid control & self-healing, Predictive Maintenance, DSO/TSO interaction for ancillary services. Concerning grid planning the following services are offered: Optimal reactive power compensation, Nodal capacity allocation, Planned phase balancing, Optimal dispersed storage location and LCC/LCA. The main challenge of the project is data availability, which also includes data quality.	Hans Bludszuweit
BD4OPEM	Spain	The power system evolution is marked by decarbonisation, decentralization and digitalization. In this context, large amounts of data are available but they are not always used. Moreover, artificial intelligence techniques have the potential to help extract value from these data and support the decision-making process for enhancing the power system operation. The BD4OPEM (big data for open innovation energy marketplace) project focuses on the distribution and consumption domains, and relies on data from different sources (among them smart meters), which are important for allowing the traditional power systems' transformation into smart power systems. The objective of the project is the creation of an energy marketplace. This is based on the development of an analytic toolbox that serves as an	Monica Aragues Penalba

		interface between data providers and data analysts. In particular, data providers are those that have access to data, while data analysts will be processing this data in order to improve the monitoring operational maintenance and planning of the distribution grids. The project will be offering services like congestion identification, topology, identification, fraud detection V2G services, etc.	
X-FLEX	Spain	The project is funded by H2020 and comprises 12 partners from 6 EU countries. X-flex proposes a set of efficient, cost effective and integrated solutions that facilitate the optimal combination of decentralized flexibility assets, both on the generation and on demand side. All parties, including prosumers, are enabled to offer their flexibility creating benefits to all the actors in the smart grid value chain. X-flex develops 4 products that will offer services to all the energy stakeholders (from network operators to final consumers, prosumers and flexibility providers including other intermediate players such as retailers and aggregators). Interoperability is the main pillar of the X-flex platform, which integrates all the X-flex solutions in order to provide services for all the energy actors and ensure a more secure stable and clean energy supply to enable a local electricity marketplace, leveraging flexibility assets. The X-flex platform will provide the high performance and reliable middleware that will integrate all the subsystem services and actors of the project. Data exchange could be grouped into three categories: 1) X-flex flexibility and monitoring assets, 2) X-flex tools (3 tools and one platform) and 3) Horizontal modules (set of services for communication and analysis of data). The main elements of the architecture of the platform comprise the data integration interface, the data management system, the internal and horizontal modules, the support layer and user interface for stakeholders, the interoperability elements, and the X-flex tools.	Lazar Miletic
Session 4: Consumer and Citizen Engagement: Engaging groups and individuals			
EU SysFlex	Brussels	The general objective of the project is to introduce more reliable renewables in the system. In order to do that, flexible assets (flexible demand, storage, etc.) are required. A flexibility platform has been developed where different kinds of flexibility providers can make their offers, while flexibility buyers (TSOs and DSOs mostly) can easily access all those flexibilities on the market and buy whatever they need. This platform enables trading of any flexibility product, so it's agnostic to the products. Moreover, when TSOs and DSOs define common products for different needs, it is not up to the flexibility provider to decide for whom they need to sell their flexibility or for what purpose. Additionally, most of the data remain in the flexibility platform (where they are actually needed). Even the TSOs/DSOs do not need all the data within the platform. Generally, it is up to the stakeholders to decide how/where to use the data, yet it is something that needs to be clearly defined.	Kalle Kukk
E-land	Norway	The scope of the project is to create a toolbox in order to address the challenges that arise with the need to decarbonize the energy sector. The developed toolbox has three layers: 1) the community layer which has specific tools for building the community, and engaging with the community, 2) the business layer with specific tools focusing on the communities and how they can benefit from the transition which is happening in the energy sector and 3) the technology layer with specific ICT tools and algorithms to facilitate the relevant transition. Three pilot sites will be	Heidi Tuiskula

		considered in three European locations (Norway, Romania, and Spain), while the results will be replicated in pilot sites in India.	
OneNet	Germany	The project aims to create a fully replicable and fully scalable architecture that enables the whole European electrical system to operate as a single system. It facilitates the universal participation of stakeholders at every level (from the lowest level of small consumers up to large producers), regardless of their physical location. In order to enable the universal data exchange among platforms, services, applications and end users a common IP architecture is being developed. In this respect, common interfaces to enable the communication between different environments among participants are also developed. The project aims to set the ground for a common market design for Europe, which will be tested in demo sites in 14 countries across Europe. ONENET builds upon the large knowledge of previous horizon 2020 projects. It also aims to reach Pan European consensus for the developed solution, organizing a large-scale discussion forum for the International Energy community. Concerning the involvement of citizens in the solution developed within the project, it has been noted that the demo sites involve the end customer directly.	Ivelina Stoyanova
Beyond	Italy	The Beyond project is looking at the formation of communities, but also the formation and design of local electricity markets within these local communities (also considering the integration within the regional dimension). Enablers for digitalization, like blockchain and other technologies, are evaluated and then implemented in real life demo sites in Norway, Austria, and Ireland. The project is looking at new designs (considering the market perspective), driven by digitalization and innovation, creating new marketplaces that can exploit flexibility for end users, or give a better price for local solar PV production. The project also considers clustering virtual communities: electricity is shared among prosumers and consumers virtually, who are clustered, based on the best match against each other.	Pedro Crespo del Granado

3.2.2 PANEL DISCUSSIONS

Panel Discussions have been held within the parallel sessions. The main issues addressed and the relevant comments are collected in the table below:

Table 3: Main questions and comments by project

Discussion Topics & Comments
Session 1: Market based Energy Systems
***Introductory talks by the moderators**:* *Franco di Persio the main questions for the panellists:* • *What are the main achievements of your project?* • *What are the main technical and regulatory barriers to increase RES penetration in the islands?* • *What are the main challenges your project is facing?* • *Have you investigated synergies with other energy carriers and energy storage technologies in your projects?*
Response by REACT Project- Josep Mitats *The project finalizing the deployment activities and assets are currently being deployed in all the islands. One of the biggest challenges is the strong regulations and the protected environments mainly on these very small islands. Another challenge is the integration of systems form different manufacturer into one cloud-based platform. This platform will allow the management and the control of DR and will increase the energy efficiency as well the energy cost savings of the end users. Furthermore, the project representative indicated that the regulation should become less complicate to allow these types of implementations on other islands. Finally, the project develops RES and Demand forecast which are integrated in the cloud platform next to other analytical services.*
Response by Kythnos Smart Island Project-Kostas Komninos *The project is at the final phase of deployment which includes different interventions in the sectors mainly on the demand side. But one of the main achievements right now is that there is the very good collaboration, trust and support by the local society. The project started interventions like changing conventional luminaires for street lighting with LED ones. The installation of EV charging stations is also ongoing as well the installation of the Chargers. The project organised several meetings with the locals and discussing the different interventions and this has actually formulated an enabling framework for the integrators to come. Regarding the regulatory barriers, considering that Kythnos is non interconnected island, there are specific provisions in their regulation for the operation of the systems and these provisions pose limitations in the number and then the amount of RES to be installed as will curtailment in the Wind Farm production.* *Regarding synergies with other energy sectors, the project is focusing on the integration of EVs, desalination units and bio waste/bio gas.* *Also, the energy control centre can enable the further and the maximization of the decarbonisation of the island.* *Finally, Kostas Komninos pointed out how the discussion with the local community was organised. The focus was not on the decarbonisation but on the local needs, such as sustainable tourism, transportation, water quality and waste management. The local needs formulated the objectives of the project.*
Response by VPP4ISLANDS project- Diego Pisera *The best achievement of the project was the creation of a digital twin cause since data are important. Merging different domains, such as the power flows, maintenance schedules, etc new knowledge can be created.* *Furthermore, one challenge in order to develop business models of renewable energy communities or transportation, is the existence of sufficient historical data about the consumption and the RES production.* *Regarding the regulatory barriers, Diego Pisera focused on storage and commented that it is not possible to develop profitable business model for storage because the cost is still quite high. to make a storage profitable, we should provide also global and local ancillary services, global services are related to frequency regulation, local ancillary services are related to services that storage and flexibility in general could provide to DSO. To make a storage profitable, the provision of global and local ancillary services is important.*

Regarding the synergy with other carriers, the project is investigating the synergy between hydrogen (using fuel cell technology) and the battery energy storage system. The goal is to provide flexibility with lower cost of energy.
Finally, Diego Pisera, analysed the importance of the ICT systems and the management of data considering cyber security.

Response by NESOI project -Alessandra Montanelli

NESOI is a support action and is not deploying any specific technology, but provides advisory services and grant funding to support projects in their development phases, right before the implementation. The main objective is to turn transition plans into projects. Next the target is to trigger investments and activate finance and to help islands in their processes. The main challenge for NESOI was to develop concrete support and design a combined approach merging both the experiences from the partners of the consortium but also with the local knowledge.
The main achievement is the outcome from the very first round of projects with more than 100 applications, which means that the interest from the islands is very high, the decarbonization is actually an issue and islands are willing to complete their paths towards energy transition.
Concerning the barriers, from a technical point of view is the project fragmentation. Namely projects are spread all over Europe and national frameworks are different. This should be taken into proper consideration and for this reason NESOI adopted a combined approach. Islands are suffering from this probably more than the mainland and this is also linked with low unitary costs for intervention which leads to difficulties in reaching for example adequate critical mass for investment. Furthermore, if we think of small islands there is an issue on the infrastructure. Often, there is a poor infrastructure concerning for example the grid, roads, etc.
Concerning the regulatory barriers, sometimes there are very complex frameworks, for example, concerning the permitting procedures that are in some cases more complex than on the mainland due to protected areas. Another issue is the uncertainty which is linked with the current evolving framework. For example, the framework energy communities since there are still a lot of gray areas and some clarifications are needed from the regulatory point of view. These types of problems the project is facing in Italy and Croatia.
Finally, the project is also trying to involve local communities in an early stage. In the planning process of the project local advisors are involved.

Open Discussion

Mathaios Panteli from the university of Cyprus raised a question about the replicability of the developed solutions. REACT is testing the solutions in small islands with approximately 1000 citizens and exploring the deployment to larger islands. But the transition from LV to MV systems is quite complicated and a modular architecture is needed. Furthermore, the CAPEX/OPEX should be analysed in order to identify the economic feasibility of each technology.
An interesting issue that was raise in the conflicts between different public bodies. For example, in Cyprus the ministry of transportation is promoting electromobility while the ministry of energy raises concerns about possible congestions in the network. Finally, Aris Dimeas commented that it is relatively easy to replicate solutions from small sized islands to medium size, but not for large islands such Crete or Cyprus.

Aris Dimeas asked about the differences between islands in the North and the South region of Europe. In the NESOI project the islands from the north are usually small and less mature. The opposite situation is in the South, namely bigger islands are involved with technological solutions already in place. Also, tourism has bigger impact on smaller islands is higher, since they have very high consumption for a limited period of time during the year. VPP4ISLAND identified that due to the different climate conditions different types of load and production units are in place. E.g., district heating in the north and A/C units in the south. This situation might lead to different solutions. Kostas Komninos commented that Hydrogen can be an interesting option for the islands and there is an ongoing project with Hydrogen storage in the island of Majorka. Josep Mitats commented that if the CAPEX of hydrogen technology will be improved then several interesting projects in the islands could be investigated.

Session 2: Operation of Integrated Energy Systems with High-RES Penetration

***Introductory talks by the moderators**:*

Nikos Hatziargyriou summarized the very interesting results of the projects by stating that in order to reach the European targets of decarbonization we need specific support both at transmission and distribution level. We need to increase RES hosting capacity in distribution network and also the transmission system and in both cases, flexibility is very important. Of course, we need also tools like better forecasting, better protection and control to face the problem of reduced inertia due to the power electronics that are decoupling rotating masses from the system. The four projects are dealing with these issues, the first was about the large-scale integration of renewables at transmission level, two projects were mainly focused on distribution and describing how flexibility would support the penetration of renewables and then the very important needs for increased forecasting accuracy so we can operate the system with the right reserves.

The following questions were debated:

- Does your project involve large RES plants, like large off-shore/on-shore Wind Parks, large PV plants or distributed technologies, like roof-top solar, smaller PV and wind plants connected at the distribution level?
- What are the main regulation and market barriers for large scale RES deployment in your system? How do RES participate in the markets? Which markets? How does RES participation affect the market prices, if it does?
- What are the main technical barriers for large scale RES deployment in your system? What is needed to balance frequency and voltage in systems with very high-RES penetration?

Responses by John Lowry

There are significant challenges at transmission and distribution level both in terms of the physical infrastructure required to integrate large scale renewables to manage the likes of congestion and also put in the market structures in place and the tools for forecasting and operating in a very complex environment, but without a clear understanding of the technical shortfalls on the future power system and without an understanding of how we can respond to those shortfalls and also without a clear understanding of what the technical capability of plant and systems to provide a necessary system flexibility and services to respond to that need, it will not be possible to reach our ambition by 2030's.

In the pan-European system we are talking about how we define regions by synchronous areas. So, we looked at Ireland's synchronous area which is quite unique. The continental system which is a synchronous area in its own way and also the Nordics and understanding the technical scarcities that arise within those systems given our ambitious scenarios. All scenarios differ for those different synchronous areas and the challenges that arise differ for those synchronous areas but what we can extrapolate from what has happened in Ireland as a unique synchronous areas that the higher up you go in terms of renewable integration, the greater the challenges from a technical scarcity perspective are and that you need to design market structures and put in the right incentives in place in order for investment to be made in the right flexible solutions in order to operate in a very high RES environment with a very high percentage of variable RES, such as wind and solar. We've seen this in Ireland, we are now able to operate the system up to 75% renewables at a given time. Our ambition is to push that to 95% by 2030 to facilitate our national targets and the EU targets. The work we're doing within the EU-SysFlex is helping support that and similarly that can be extrapolated across Europe as Europe moves towards the greater percentage of variable RES. We will bring those lessons forward in a coherent roadmap, not only recommendations, but also identifying what future work needs to be done, what future research and investment needs to happen in terms of demonstrations and pilots.

While I mentioned three synchronous areas, it is important that greater interconnection between those synchronous areas occur in order to maximize the capability across the entire European power system and we need to move towards a greater integrated system and different regions, whether they are national regions or pan-European regions or synchronous area regions supporting one another in order to reach our overall ambition. I don't believe that we can do it without taking that perspective. If we look at Ireland in terms of its ambition offshore, we're coming from a very low base of practically zero offshore renewable capability to a situation in 2030, when we'll have over 5 GWs, at least that's our ambition, which is almost equivalent to the demand of the system. So, in order to utilise that potential and the greater potential beyond that, we need to enhance our interconnection, we need to integrate systems at European level in order to export that energy that is not being used or to use it in different ways and it goes beyond that I think, it goes beyond the electricity system. We need to look at things in a much more holistic way and a whole system thinking and looking at the power to X, hydrogen and how all these can be integrated into a whole system.

Responses by Katerina Valalaki

In MERLON, in both pilots we investigate how energy communities can play different roles and support the holistic integration that MERLON proposes. Indeed, prosumers engagement is a critical factor in order to enable the utilization of flexibility at residential or commercial buildings. To this end, we can take advantage of energy communities because energy communities' people are already sensitized environmentally, they have interest apart from reducing their cost savings to contribute to the European decarbonization plan, so we need to give them specific incentives for their participation in specific market structure and business models that can enable their optimal coordination with the local grid which in turn can increase renewables penetration a local level.

Incentivizing consumers to turn them into active citizens is probably the most difficult part of this transition, this has been proven so far. We should mention that the pool of actual users to be used for demonstration in MERLON is not so high. We have ten actual users in the Austrian pilot sign and around 15 in the Spanish pilot. However, we have established the living lab where we bring together all stakeholders and we try to communicate the MERLON scope to them with simple words and through nice user interfaces. Regarding the business models, in MERLON we have explored how an energy community can take the role of DSO or aggregator. They can collectively gain benefits through assuming such roles. A main business model examining the project is a local distribution constraints management, so we investigate how the holistic framework proposed along with the battery energy storage system with grid forming capabilities can alleviate thermal constraints in the network. There was a question that playing the role of distribution system operator is extremely complicated and it needs a lot of knowledge and experience to be able to operate securely the distribution network. Just to mention that both cooperatives examined in the project are somehow different legal entities that have already relationship with the local DSOs. So, these are the main representatives that assume such a role but considering the whole community taking such roles, the benefit would be assured. However, of course, the operation is at the hand of the more knowledgeable people that are involved in the DSO part.

How is the knowledge in the local energy communities to be so technical to operate grid forming inverters? This is one of the main innovations that MERLON introduced. Actually, we have an expert on battery energy storage system in the consortium, who was responsible for sizing, procurement, purchase, installation and commissioning of the battery energy storage system in both sites. The whole approach was developed within MERLON and both batteries are now in place in the demonstration phase.

Responses by Gabriele Comodi

In our project we choose local energy communities in which we have both electric vehicles and batteries and in one of them thermal energy storage. In the city of Osimo we have thirty 37 MW of renewables and 1 MW cogeneration. So, we have more than 1000 distributed generation resources and only 3 of them are higher than one MW, we mainly deal with rooftop and distributed generation PVs. So, which is the role of electric vehicles and batteries? First, we are facing a transition toward electrification of mobility. The idea is that in our demos we install charging stations to have a grid to vehicle flexibility provider. What we are testing in our demo is to define a different profile of charging, in order to provide flexibility in the public electric vehicle charging station. I underline the public charging station because when we deal with vehicle to building and vehicle to grid, we must do that behind the meter. I mean it is not possible for Italian regulation to provide the electricity back to the grid, so what we do in our demos is to provide flexibility vehicle to building behind the meter. In a smart building, that we can call collective self-consumption low energy community, we have several points of delivery, real batteries, controllable load, PV and a vehicle to building charging station. We can use electric vehicles fleet like distributed energy storage. That cooperates with the energy building energy management system in order to maximize self-consumption of renewable energy installed in the building. With regard to the effect of electric vehicles in the profile of the local energy communities, the main result is that it is difficult to change consumption patterns of electric vehicle users.

What we are doing in our project to make people consume excess energy from renewables just in the time that they can charge the vehicle is to define a couple of strategies. The first one is to combine a rooftop PV with a wall box charging station for their own use, so they are aware of how they consume. Maybe they maximize their self-consumption without affecting the DSO. To face the problem of over generation during weekend we work with industrial companies' fleet. What we are trying to do is to have the electric vehicles fully discharged on Friday, in order to maximize their consumption during weekend. In any case at the moment, we are dealing with a few electric vehicles, so it is not possible to completely address over-generation during weekends. In any case, we can set up this kind of energy management system but there are a lot of problems, like ensuring that all electric vehicles are connected to the grid at the same time. An idea is to have probably in this building a mix of storage technologies, we have also batteries together with electric vehicle charging stations to provide the flexibility to the DSO. But it is difficult to change consumption, charging patterns of electric vehicles because the main driver is not energy transition, it is mobility.

Responses by Georges Kariniotakis

System operators, DSOs or TSOs, have already quite large experience in using forecasting tools and they have developed their own, they buy services, by different companies that provide forecasts and now we are in a phase where they buy multiple forecasts by forecast providers because they want to have the best product. I think what the DSOs and the different stakeholders is necessary to realize is that a good forecasting product is kind of alternative for what we discussed today about flexibility, like storage, like enhancing the grid etc. I mean if we manage to reduce the forecasting errors of wind production or solar production by some percentage, this translates immediately to benefits in terms of investments. We have to invest to less storage because we have to balance less prediction errors. We have not to forget that in all practical applications, the management of the energy systems, at distribution grid, transmission grid, a microgrid, an energy community is done at two scales, one is the predictive time scale where we take decisions for the next hours – days and then we operate the system as a function of what happens. If the decisions we make in the predictive scales are not good enough, then we need to have a lot of storage, we need to activate flexibilities, we to do many things to operate the system. Of course, we are not going to have ever perfect predictions, because we are not able to predict perfectly the weather conditions, but the first thing to keep in mind is that we always want to have better predictability, especially in the years to come, when we will have more and more RES penetration. So, there is always a margin to improve and what TSOs and the different actors should keep in mind is that to favor innovation and not buy a product for our forecast. We have shown in the project that there is potential to improve predictability, but we need to accompany these efforts with the necessary efforts to promote innovation to that direction. For example, everybody speaks about digitalization and data we want have open data a lot of data, and now we have new measuring technologies for renewables like radars, sky cameras, satellite images from different satellites and all these are available. But how can you extract the value of this data? We have seen for example in the case of Denmark that if you use just the data from the neighbouring sites of a wind farm, you can improve the predictability of wind production for the next six hours by 20% and this is by just using the data that are available. So, one thing is to favor innovation and the second thing is to favor the exchange of data, so they can be integrated in the different forecasting processes.

We see today that there are some new needs for forecasting, like for example for renewables to participate in ancillary service markets. There you need specific forecasts because you want to provide some level of guaranteed power with a very high availability, i.e. when you are called to provide regulation upwards or downwards. You can have all the controls to do it at the level of the wind farm, but if you propose for a wind farm to reduce some MW and your forecast when you offer this ancillary service was not good, you cannot do it. So, with higher renewable penetration it is important to improve predictability but also to develop new solutions for new applications, like ancillary service provision etc and this is challenging. What we see is that if we just check the history in the last ten years, SMART4RES for example is the only research project financed by the European commission on predictability of renewables.

An indication of how much accuracy is expected for forecasting wind and solar for operational reasons, say for the next hour 4 hours or 8 hours, we can say that at the level of a single wind farm or PV plant, it is 8% to 10% of the installed capacity depending on the terrain or weather conditions. Actually, this percentage is not important. What happens is that let's say 80 – 90 % of time the forecasts are good because we have the knowledge to predict the weather conditions. However, there are 10-15 % of cases where we fail to predict, because we fail to predict weather etc or we have fronts that are coming and we predict wrongly the timing of the fronts and these cases can actually have high impact. We have seen some case, where we can have 90% of the time accurate forecasts, but few situations can lead to disaster and the monetary impact in terms of safety can cancel all the benefits you can have from the rest. So the question is not to improve generally forecasting but try to improve these situations that have a high impact for the system in terms of security and economic operation.

Session 3: Digitalisation: Monitoring and Control; Semantic Interoperability

***Introductory talks by the moderators**:*

Rainer Bacher informed the participants that the session tries to focus on two sub parts of digitalization: 1) digitalization around monitoring and control of the system and the parts and components of the system and 2) interoperability. He also informed the participants on the ETIP-SNET's key documents: Implementation Plan, Roadmap and Vision.

Elena Boskov-Kovacs also noted that the commission has been running a public consultation on the Digitalization of Energy Action Plan and roadmap, while also noting the key importance of Working Group 4 on the relevant consultation. In particular, to meet the European Green Deal objectives the twin green and digital transition is needed for a smart integrated and cleaner system. Components of the relevant Action Plan comprise data sharing infrastructures, cybersecurity, interoperability, etc. Such components will allow reaching the targeted digitalized energy system that is able to deliver goals such as new tools to manage the energy systems, more efficiency in the network's new market participants, etc.

Rainer Bacher indicated that ETIP-SNET's is asked to identify (in a way understandable by the Commission and the governments) the relevant regulations, benefits, the reason for investing in such activities, etc. , while also providing the

relevant advice. He also noted that in the last Implementation Plan, the Digitalisation research area comprises 5 Topics, which further include research tasks. In this respect, it is very important in this session, to acquire information on these tasks towards reshaping them.

SLIDO Question: In order to overcome obstacles in creating digitalized decarbonize Europe's energy networks, are we lagging more in competitive technology development or legislations?

The majority of the results concerned the answers 'right legislation' and 'Innovation in Technology and their integration' (around 60% - 40% respectively). A response 'Change management and organisational adoption' was also indicated in the chat, which is quite crucial.

Who can mostly benefit from the OSMOSE project and what is the TRL level for the solutions developed?

The project provides services and functionalities mainly for system operators (particularly TSOs). However, a definition is provided on what is needed for the system to operate efficiently, while also providing recommendations for stakeholders (like equipment-manufacturers) on how to implement the different things that are needed for the system, and on what shall can be anticipated in the relevant grid codes. In this respect, the relevant stakeholders can be aware of the relevant expectations in the future power system.

The relevant solutions are characterised by a high TRL. In particular, there are already requests for wind parks developed now to provide grid forming control so the project is quite close to the market. Moreover, the relevant demonstrations in the project involve vendors that can implement the developed solutions in their equipment.

Interpreter Project: TRL level, interoperability and data availability:

The Interpreter project is a research project, with a goal to achieve a TRL 6. In particular, there are some tools which are more advanced. The less advance part is the low data availability scenario which may require another project to be solved.

The project is mostly oriented towards distribution grid operators. It achieves interoperability among the solutions developed in the pilot sites and the relevant functionalities in commercial systems with the 'Fuse platform'. This platform is a data lake (comprising data in TSO format, DSO databases with relevant formats, etc.), where the data is transformed to a unified format (some adaptors-translators are needed).

Additionally, it has been noted that when the DSO wants a service, they usually provide their own data for their own use, while 3rd parties won't share their data with others. It has also been noted that data availability at the DSO level is quite disperse. Moreover, smart meters are required to develop the relevant solutions (some data are required to ensure the feasibility of the solutions). In this respect legislation is quite important (for instance on the installation of smart meters).

What is being offered in the BD4OPEM project, and who benefits from the relevant solutions?

Services focused on operation and maintenance are offered. For instance, flow detection, which is useful for distribution System Operators, as non-technical losses can be important in their grids and this can economically impact their business. Moreover, services oriented towards grid planning are also offered. In particular, forecasting tools may allow better decisions on the required grid reinforcements: reinforcements are traditionally based on actions like installing transformers, lines, etc, however, the flexibility inherent in distribution grids shall also be taken into account.

Additional services offered in the project concern predictive maintenance and congestion identification based on defining the probability of having a congestion on the electrical grid, not by electrical specialized software, but by employing machine learning techniques.

The main beneficiary of these services are the DSOs. Nevertheless, some of the services can be interconnected and the output of some of them can be used as input for others. In this respect, service developers that do not have the expertise to develop something can acquire a service that is developed by another entity, to use it as input for developing the service that they actually have the expertise for.

Open access and BD4OPEM

It has been noted that it is important to reuse project results towards achieving a faster transition to a CO_2 neutral system. In any case, open source is a hot issue not fully solved today.
Concerning the BD4OPEM project, some data, if properly processed and agreed within partners, could be recyclable or usable (maybe by other projects). However, this does not concern all of the project's results.

X-Flex: Tools to be developed, TRL and achievement of monitoring

Serviflex is a tool for the flexibility manager. Its main functionality is the analysis and forecasting of the (aggregated) flexibility provided by flexibility sources such as generation assets, battery systems, power to heat, power to vehicle, etc. Gridflex, which is related to the grid operator, aims to promote the monitoring and the integration of data sources like SCADA systems. The Marketflex tool is a tool for all the market participants (including aggregators), facilitating their access in the flexibility market, local electricity market and ancillary services (for TSOs and DSOs).
The platform will achieve a TRL 6. The platform is not already tested in the pilot site and the relevant results are not yet available. However, it will be tested next year.
The project is half-way through to be completed, thus there are a number of publicly available deliverables. In particular, more information on the X-flex platform, is provided in the deliverables of WP6, which concern the platform implementation.

Regarding the X-Flex project, the monitoring is covered on the platform. In particular, all pilot sites have a different architecture for monitoring the assets, and the platform enables interoperability for all pilot sites by sending data to the platform, using communications standards and protocols (each of these tools communicate with each other with different communication protocols).

Areas requiring additional research

Concerning the transmission system operators, a research topic that is still open how to measure and monitor the different services, as well as how to assess what is exactly done in each case (for instance storage systems connected to the grid, providing different services). Although this is a research topic that is not extremely complicated, is sometimes not considered in projects

It has also been noted that sector coupling is very important. It has also been noted that ETIPSNET is thinking of an integrated energy system, a system of energy systems with electricity as its backbone. That's how systems come together, while the relevant system of system questions has not yet fully been answered.

Moreover, issues related to the online system indicating ways to react in real time (digital twin) are important. Concerning the real time operation of the system it has also been noted that the reliability of data is important. In this case information from the different stakeholders also needs to be combined really close to real time. For example, in case of exchanges of energy between energy producers close to real time, system operators need to make sure it doesn't create any constraints on the grid.

Digital Twins:

It has been noted that digital twins refer to modeling Energy Systems with the aim of being able to capture how they behave in real time.

The Interpreter project focuses now to enable a simple power flow analysis (a simple electric model), while sophisticated elements can also exist. But a question remains on whether dynamic models for other analysis are needed (concerning the distribution grid). In particular, a lot of topics can be covered by this static or quasi static modeling. Although this is a question for distribution grids, transmission grids already have dynamic models.

It has also been noted that digital twin was driven a lot by the needs of distribution systems, which don't have the budgets to put smart devices everywhere (e.g., some distribution systems have a 100% coverage of smart meters, some almost zero). In this respect, it has also been noted that there are still challenges, not related, always directly to the smart meters but to their surrounding system and the relevant communication systems. In particular challenges are noted on the veracity of the data, on the type of data that can be obtained and the latency of this data.

How is the customer or consumer involved in digitalization?

It has been noted that the automation of things is really important towards providing flexibility. For instance, turning on/off the lights or appropriately programming the dishwasher shall be automatic to some point. In particular, If something needs to be controlled, some machine interface may be required, because the human interface faces too much. Apparently, the relevant compromises of the customers/consumers are something requiring further discussion among engineers and social scientists. Moreover, storage shall also be taken into account in order for the customer to be able to use their appliances in case of automatic control situations.

***Concerning the modeling of consumers**, Elena Boskov noted that Working group 4 has worked on this topic. In particular, Working Group 4 has started working on profiling different types of consumers/prosumers and it has been*

identified that different types of consumers have very different types of behaviors and can be used in the simulation of consumption, while also evaluating how much they can add to the grid. This topic will be indicated in the following deliverables

Why do newcomers in the energy industry bypass operators and try to invent on very user-friendly tools, going directly towards the end customers?

It has been noted that regulation is required for grid related issues, since they are natural monopolies (security of supply and reliability are required by the law). On the other hand, the consumer or customer, does not think in terms of natural monopoly, but in terms of markets (e.g., incentives). Thus, there is still the gap on where the market is and where the natural monopoly works. For instance, there is still an open question on whether the storage issues, are closer to the consumer side or to the grid side. In this respect, the new companies are just looking for business opportunities, not caring about natural monopolies.

Session 4: Consumer and Citizen Engagement: Engaging groups and individuals

Why do we need that data except for billing the consumption?

It has been noted that there must be a concern, a clear purpose and a defined time for what the data can be used. Concerning the EUsysflex project, a set of use cases were designed, which are agnostic to specific services behind the data. The data is there and accessible by the data owners themselves, while the data owners can also provide the data to any other person, in a controlled way.

In the EUsysflex project, the data to be used for flexibility services, have been identified. These data are classified as private data or personal/sensitive data. This does not only concern the metering data from the smart meters, but also market data (for example, the bids made to the market), or the ability to receive the control signals for the activation orders. This is very sensitive information which is exchanged between the parties.

Shall the data be considered as 'not so sensitive' only if the grid operator gets them and as 'sensitive' if other people get it?

The grid operators are quite heavily regulated, yet cases may exist where the data are misused by them. Moreover, the data shall also be shared with the new emerging players like the service providers, market operators, energy communities etc. (potentially the sharing of data could involve getting something in return, e.g., a service)

How open will people be to share personal sensitive data with the provider of the energy services?

People participating in the projects' pilot sites are more willing to share their data, since they are more willing to explore new things and find out new solutions. It has also been noted that people could be more open to share their data, if it is explained to them what is the collected data, where it is going, what will be done with it and how the data is going to be treated after it has been processed and used. People may also be more open to share their data if they see that there is a clear benefit for them for sharing the relevant information.

Do people know what data they share?

It has been noted that most people are not fully aware of what data they're sharing. Such an issue could result to people declining to share any data or not participating at anything, because they cannot oversee the consequences of data sharing. In this respect, a broad education for the wider public is necessary. Moreover, better information is required on what data is stored, for how long and for what purposes, if the company is going to forward it, etc. Such information shall be included when someone is signing a contract. In this respect, it is important to teach people how to understand the relevant opportunities, while being cautious regarding the data market and data ownership.

Concerning the provision of data to a local utility, what shall be expected in return?

The provision of data will be linked in the future not only with the provision of energy, but also with the provision of flexibility (which may only be achieved by data sharing). In case data is not shared, the relevant services may not be provided.

Misuse of data:

It has been noted that in the dark web, the consumption data of a lot of customers or consumers are available for only a few euros (from 5 to up to 12 euros). Someone could buy these data and abuse them (e.g., sending the consumption data to marketing companies).

System Operators may also misuse the data. For instance, a DSO, after evaluating the data of a particular customer for 2 or 3 years, could demand a tailored tariff that tries to target the customer's peak time, in benefit of the grid but not in benefit of the user (who may think that by not offering the data in the first place, they would benefit with a better tariff).

Similarly, the customer's profile may be used to develop pricing patterns that actually make the customer pay more money.

Data may also be misused by energy providers that could give the smart meter data to other parties. Many ways to analyze this data and create new tools may arise, resulting to new services and business cases, which could be developed without even compensating the users for providing their data in the first place.

In this respect, transparency in data sharing is significantly important for the people to decide on whether they will share their data.

Regulation on data management

It has been noted that quite a strong European regulation is in place, including the GDPR. In case someone misuses the relevant data they face huge penalties.

It has also been noted that, although the regulation is clear on the rules applying to house customers and personal data, no clear regulation exists for commercial data (however, the data shall be treated in the same way either they come from a household or a company). It has also been noted that tools, methods and criteria shall be identified in order to better explain the consequences and the perspectives of the GDPR to the energy communities.

Concerning high resolution consumption data collected by an increased number of smart meters, it has been noted that the EU regulation already deals with such issues while new legislation on the data governance, open data or data donation is still expected. Concerning the issues covered by GDPR, it has been noted that data are identified as personal, in case the use of this data allows someone to come back to the physical person or to the relevant physical contract that the data came from. In this respect, if the number of the meter is removed then the relevant data are not within the relevant GDPR restrictions.

Moreover, in case the data is not 'anonymized' GDPR regulation applies. In particular, issues may arise when obtaining the consent from thousands of customers. In this respect, it has been noted that the regulation is not quite clear on how many customers can be aggregated in order for the data to be considered anonymous (for instance, the Portuguese regulator defines the relevant number of aggregated customers to 20).

Minimum data that needs to be collected

Concerning the minimum data that needs to be collected, it has been noted that the consumption and the relevant flexibility need to be provided, while machine learning algorithms for prediction, forecasting and correction can be used. Data are not necessary at the level of each house (the energy community level is more important compared to the individual level).

Concerning the time-resolution of the data to be provided, it has been noted that currently a time resolution of milliseconds is not necessary for the grid operator. However, research on this field is going on and potentially such a high time resolution may be needed in the future.

Moreover, it has been noted that it is important that the required data is important to be available when necessary (a particular state shall be available immediately and not a month later). In particular it is important to know what is happening very close to real time.

Moreover, the bi-directional communication issues are important: controlling the devices behind the meters.

Trust is important

Concerning providing someone the right to control the customer's appliances, it has been noted that risks always exist. However, the relevant doubts can be lifted if the regulation is strong, and the person who receives and uses the data, is trustful enough. In this case, data sharing can also result in benefits like receiving specific services that can be compensated directly in cash. However, the real threats come from the risk that you are releasing information to third parties.

Are there cultural, social and educational differences noted when people share personal or sensitive data?

It has been noted that differences exist even among the different regions of EU countries. Moreover, the organizational structure that is in place in a pilot site is also important. (i.e., how is the country or that region structured). Additionally, the level of trust in the government, and in public services affect the people's decision to share their data. For instance, in Nordic countries, the people trust their government not thinking that they would do something against them. On the other hand, there are also countries characterized by skepticism towards new technologies or digitalization strategies.

Concerning the project E-land, differences are also noted within the same country according to the case examined each time. In particular, differences are noted in India when considering an energy community which is a democratic system where the people together manage the energy system, compared to the case of where the DSO in Delhi is considered.

Does it make a difference, if people are asked to give the data to an anonymous system operator, a local utility or an energy community?

It has been noted that people are more willing to share their data in case of an energy community (sharing data having in mind the wider perspectives and purpose within the community) compared to providing their data to an anonymous channel (raising in this case concerns on who is operating or using this channel, why they want the data, etc.).

Moreover, people are more willing to share their data with public organizations, where there is the emotional component of trust and the feeling of belonging to a group (for instance energy communities or local businesses). On the other hand, people distrust private providers, (who are usually connected with business use cases). However, it has also been noted that regulation is in place regarding private providers and the relevant issues of data security, data privacy, etc.

About forcing the people to provide their data to optimally manage the energy system and for the scope of climate neutrality:

It has been noted that constitutional issues shall be taken into account in this case. Moreover, it has been noted that anything that sounds like forcing people to share personal information for any purpose may indicate that a boundary is crossed for the people. In this respect, taking into account the personal freedom, educational activities alongside motivations (for instance by research and development) shall be considered before forcing people to share private information.

However, it has also been noted that a clear definition on what data will be used and how they will be managed and processed, could justify a stronger intervention.

It has also been noted that the level and detail of data required is also important in this case. For instance, medical records are not required for keeping the system safe. Moreover, it has been noted that there is already sufficient data available to the grid operators to keep the system safe and secure. However, the granularity of the data (closer to the end consumers), which are required in the flexibility market shall be considered. For example, with data in a 10 ms resolution it may be possible to profile the person that is behind the data.

How to ensure that the customer is in control of their data?

The regulatory aspect shall be taken into account, in this case alongside technical tools and economic incentives. If such barriers are removed, while the data exchange is made easy, affordable and secure for the customer, the concerns on data sharing could be reduced.

Areas where additional research is required:

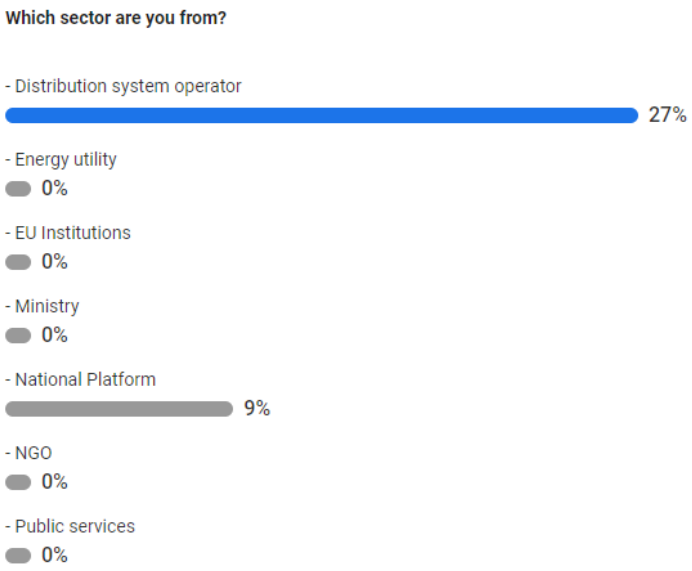
There are still a lot of questions on the value and ownership of data. It has also been noted that cross sectoral data exchange (potentially connected with business models, markets and regulations) is also indicating a huge potential for research questions that need to be answered. In particular, energy systems comprising electricity, gas, heating and cooling and storage require proper data management and regulation and market structures, in order not to hinder the development but also to secure the end users' rights.

3.2.3 SLIDO QUESTIONS

In most of the parallel sessions, the audience was polled using Slido. Here an overview of the main results:

Session 1: Decarbonising EU Islands

Figure 2: In which country is your company/organisation located?



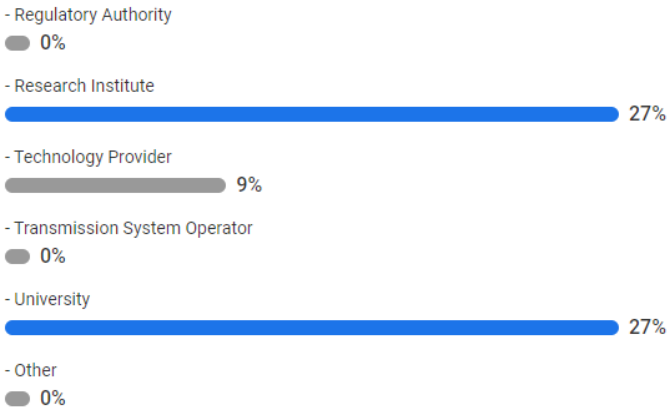


Figure 3: Which sector are you from?

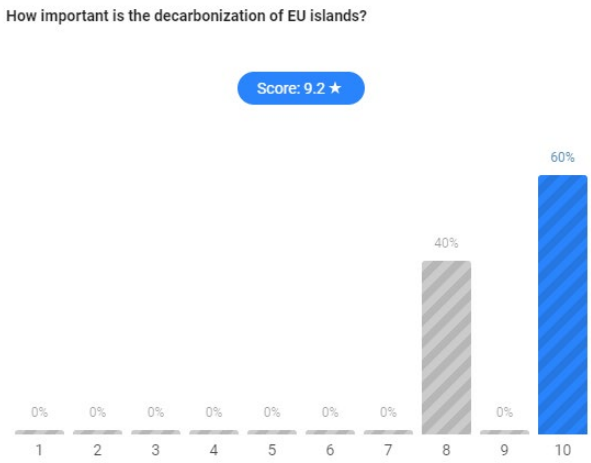


Figure 4: How important is the decarbonisation of EU islands?

Figure 5: What are the main regulatory barriers to increasing RES penetration in the islands?

Session 2: Operation of Integrated Energy Systems with High-RES

In which country is your company/organisation located? [No abbreviations, full country name in English]

Figure 6: In which country is your company/organization located?

Which sector are you from?

- Distribution system operator
20%
- Energy utility
13%
- EU Institutions
0%
- Ministry
0%
- National Platform
0%
- NGO
0%
- Public services
7%

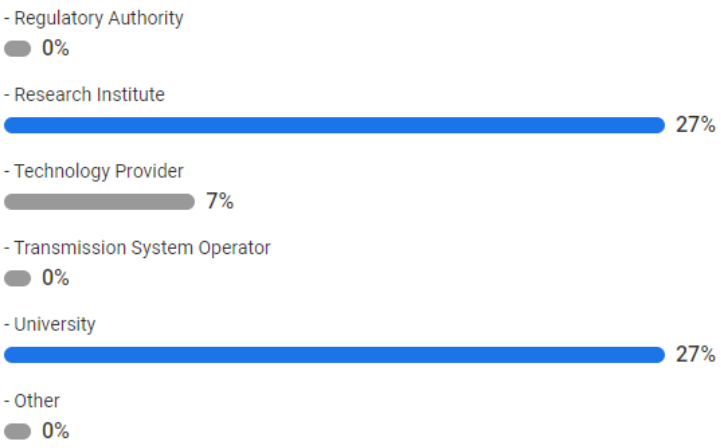


Figure 7: Which sector are you from?

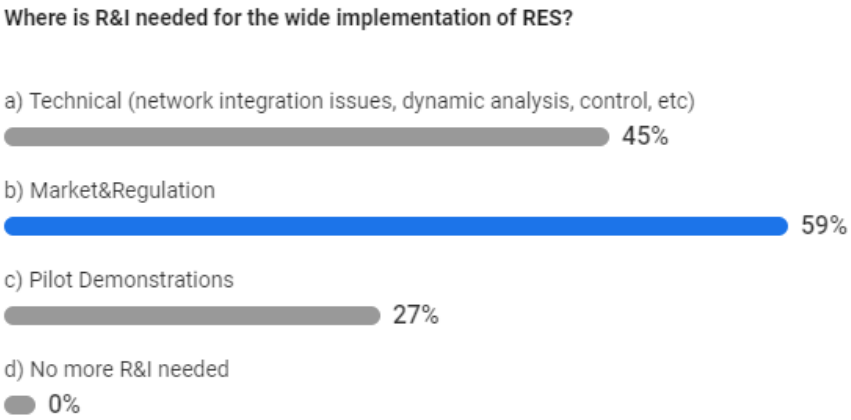


Figure 8: Where is R&I needed for the wide implementation of RES?

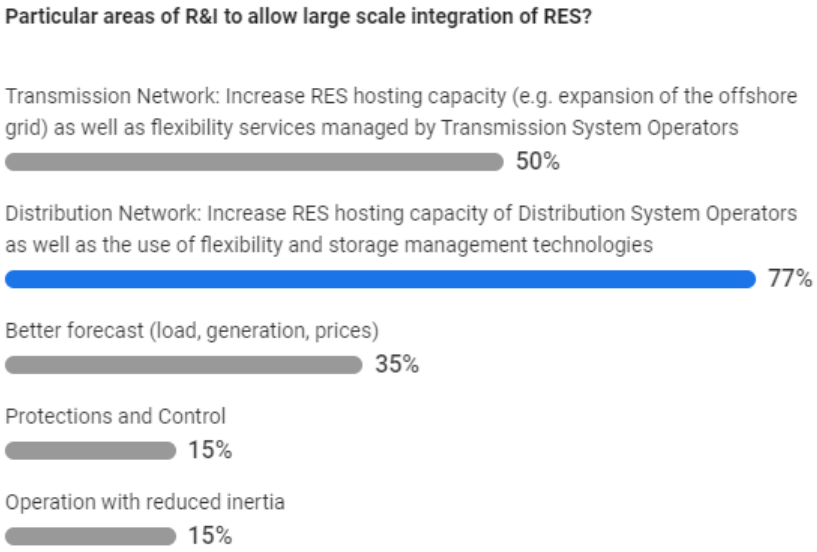


Figure 9: Particular areas of R&I to allow large scale integration of RES?

Session 3: Digitalisation: Monitoring and Control; Semantic Interoperability

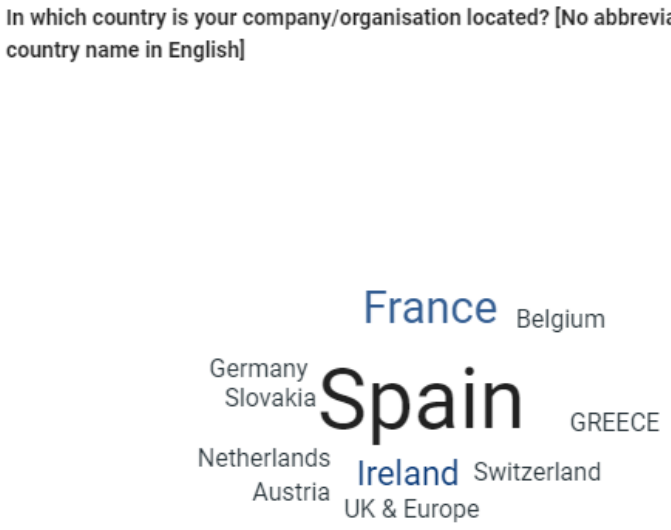


Figure 10: In which country is your company/organisation located?

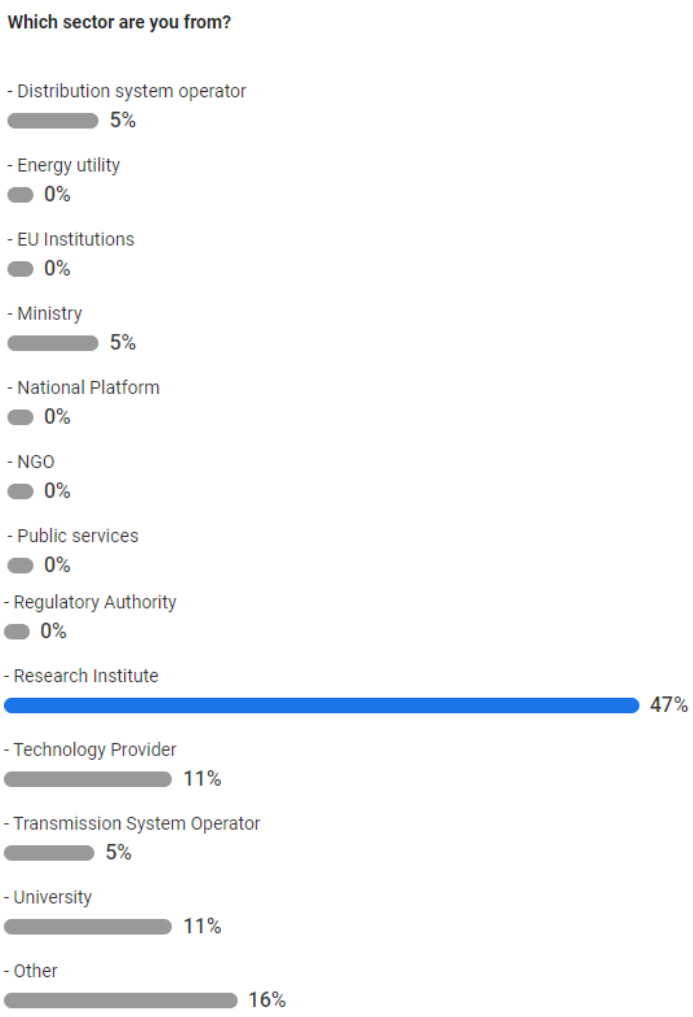


Figure 11: Which sector are you from?

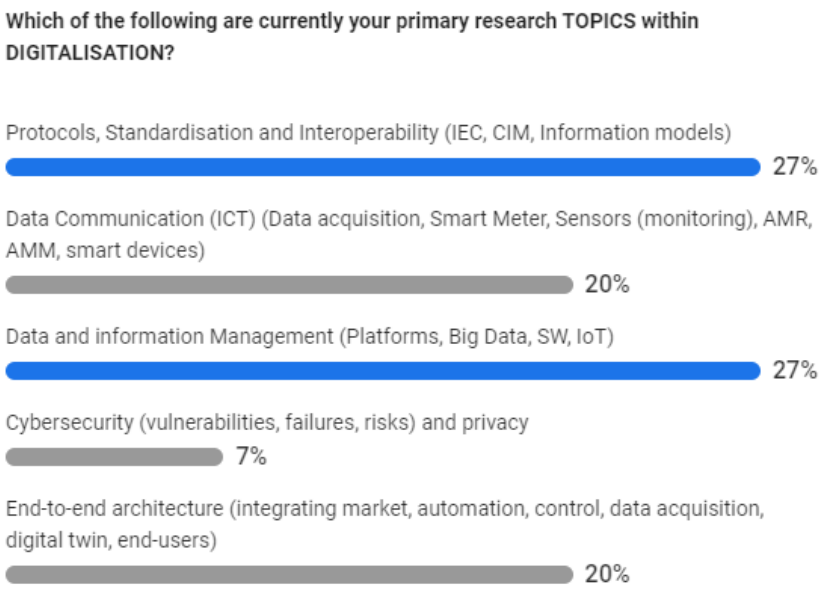


Figure 12: Which of the following are currently your primary research topics within digitalisation?

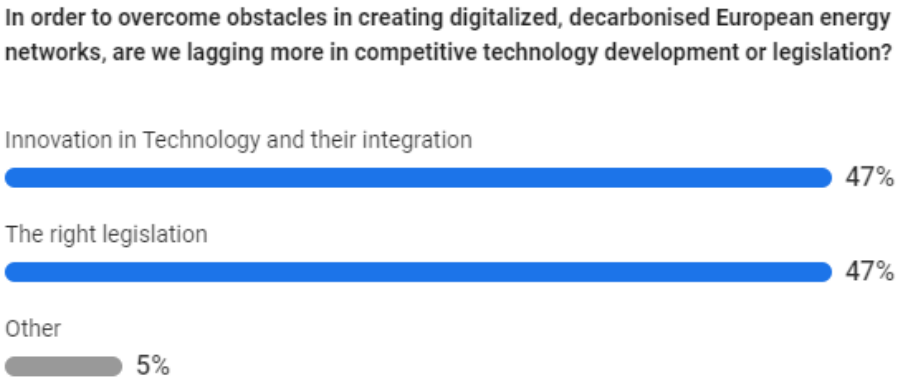


Figure 13: In order to overcome obstacles in creating digitalized, decarbonised European energy networks, are we lagging more in competitive technology development or legislation?

Session 4: Consumer and Data to discuss the relation of products, privacy and policy

In which country is your company/organisation located? [No abbreviations, full country name in English]

Figure 14: In which country is your company/organisation located?

Which sector are you from?

- Distribution system operator 10%
- Energy utility 10%
- EU Institutions 0%
- Ministry 0%
- National Platform 0%
- NGO 0%
- Public services 0%

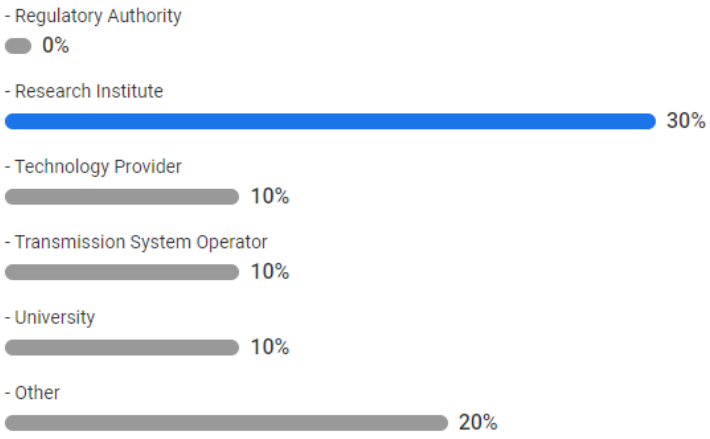


Figure 15: Which sector are you from?

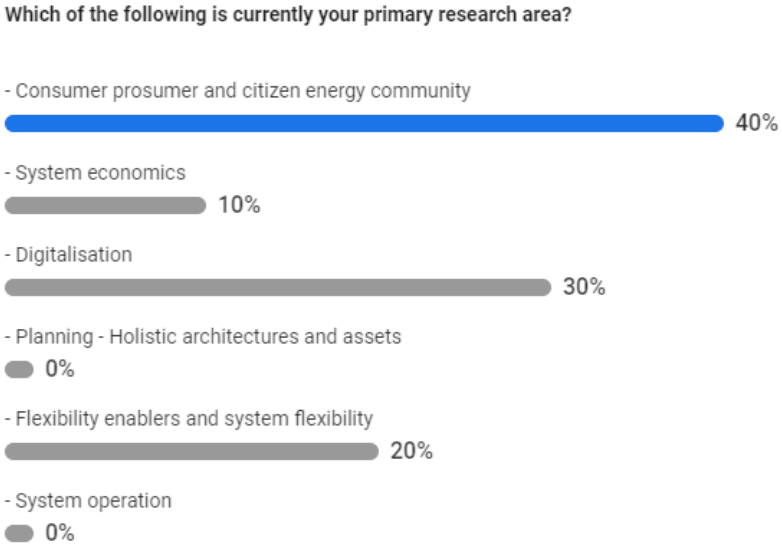


Figure 16: Which of the following is currently your primary research area?

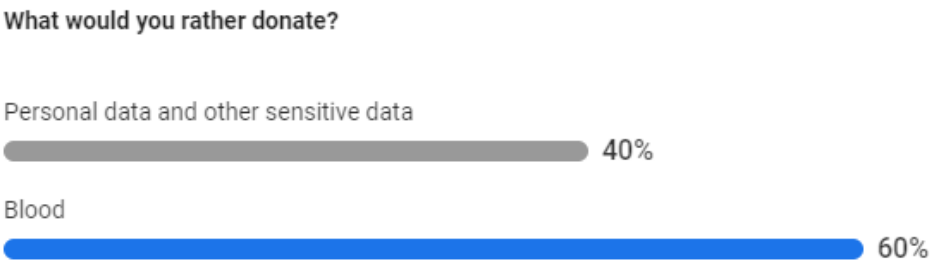


Figure 17: What would you rather donate?

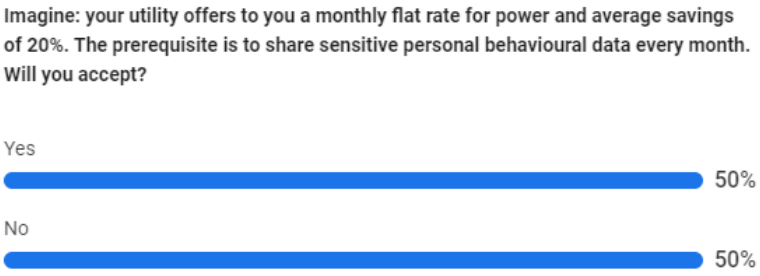


Figure 18: Imagine: your utility offers to you a monthly flat rate for power and average savings of 20%. The prerequisite is to share sensitive personal behavioural data every month. Will you accept?

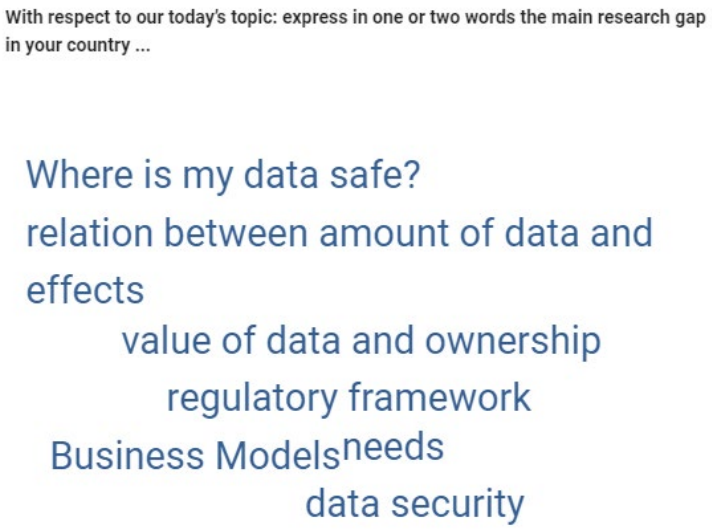


Figure 19: With respect to our today's topic: express in one or two words the main research gap in your country ...

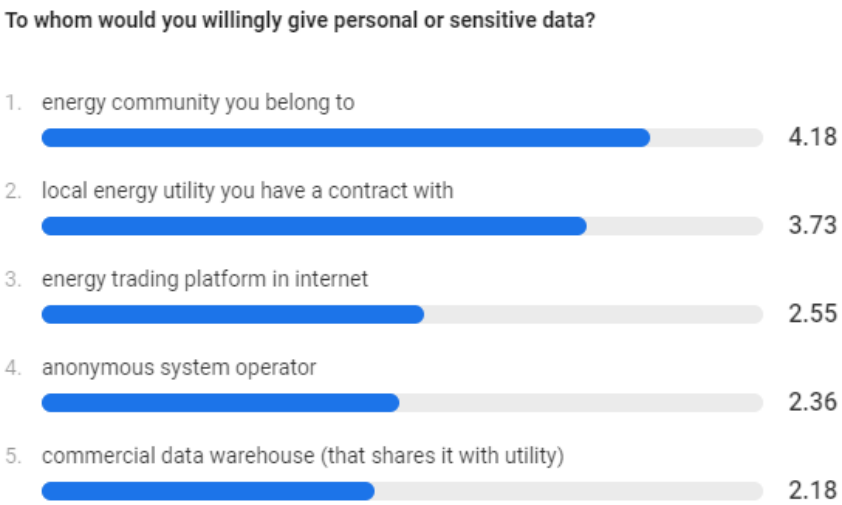


Figure 20: To whom would you willingly give personal or sensitive data?

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS AND RECOMMENDATIONS FROM THE PARALLEL SESSIONS

The following key conclusions have been drafted by the Parallel sessions' moderators as key outcomes of the discussions.

They are reported in the next paragraphs divided per parallel sessions.

4.1.1 PARALLEL SESSION 1: Decarbonising EU Islands

The following issues were noted during the first session regarding "Decarbonising EU Islands":

- **Different technologies** from different vendors to be integrated in one system can be challenging
- **Simplification of regulatory system** will make easier implementation of projects for decarbonization of Islands
- **Regulatory framework**: sometimes in **islands** is more **complicated** than in **mainland**.
- An especially relevant barrier is the **uncertainty** on **energies communities'** regulatory frameworks not consistent across Europe
- **Modelling** of the system and making the model robust and secure to run the system is challenging. Construction of **virtual power plants** thorough **digital twins** and **AI** is key to have a live mathematical and 3D representation of the system, but also extracting knowledge and extrapolating to take decisions automatically.
- **Forecasting** is also **challenging** (e.g., for load and RES production)
- **Involvement** of **local communities** is important: common decisions and engagement with local administration and local citizens.
- **Synergies** with water (desalination), transportation and **local economic activities** is key
- **Local people** are more **concerned** about water, transportation, their **businesses** (e.g., tourism, agriculture) rather than energy/electricity concepts
- It is important to **have good historical data** in order to evaluate business models
- It is also important to ensure that the **investments** for **locals** and **business** models are **working together**
- **Electrical**, **heating**, **cooling** system shall also be **integrated**
- **Differences** between **North** Europe and **South** Europe **islands** reality are reflected in the needs of their citizens with respect to Energy system (e.g., North are smaller compared to South, North more interested in heating support for the electrical system)

- **Replicability**

and **scalability** of projects: can be applicable between small and medium sized islands

- **Storage** is still **expensive** for islands. Allowing **ancillary** services and support to the **distribution** system could help, but it is, still, **not** generally **allowed** in the relevant regulation
- **Hydrogen storage** is an **interesting** option for islands, despite high cost. There is significant work on R&I to reduce the relevant penetration obstacles
- Concerning **battery technologies,** besides **Li-ion**, **flow batteries** could play an important role in the future

4.1.2 PARALLEL SESSION 2: Operation of Integrated Energy Systems with High-RES Penetration

The conclusions on parallel session 2 "Operation of Integrated Energy Systems with High-RES Penetration" can be summarised as follows:

- **Investments** must be located in the right places to allow the **integration** of intermittent **Renewable Energy Sources**. Very useful conclusions can be extracted from **pilots** and **regional demos** and be introduced in a pan-European scenario. Moreover, it is crucial to have a **roadmap** and identify **solutions to the barriers** indicated, in order to reach the relevant goals (the roadmap and the identification of the relevant solutions are still under development).
- **User's engagement** is crucial to reap the benefits of the increasing integration of renewables. In this sense, local **energy communities** have a key role in grasping the attention of users and **empowering** the citizens through **innovative business models**.
- **User consumption profiles** (from EV charging and thermal storage) can be used efficiently to alleviate excess of energy from renewables and provide **flexibility** to the network.
- Improved **forecasting** for **system operators** is achieved not only by having the right (commercial) tools but also by **exchanging data** and improving the models in order to extract the more precise and valuable information.
- **Investments in large-scale storage** (liquid, mechanical, thermal and H2) is urgently needed in order **to cope** with the **generation mix** of the **future**. **Digitalisation**, resources saving and more reliable and affordable energy for industry can also contribute to provide the necessary flexibility.

4.1.3 PARALLEL SESSION 3: Digitalisation: Monitoring and Control; Semantic Interoperability

The conclusions on parallel session 3 "Digitalisation: Monitoring and Control; Semantic Interoperability" can be summarised as follows:

- Challenges identified in **monitoring** and **control** are not only on access to devices but also on achieving **interoperability** and better communication (digital twins, dynamic modelling)

- Many different digital technologies are being developed. A number of projects are mitigating the fact that **smart meters** or smart censoring devices are not in place all across Europe, yet software tools and **advanced platform**s are being developed (data lakes, new big data analytic services, data crunching, new concepts such as grid forming)
- **Data collection and quality** still remains an issue and depends on the level of **automation** of the grids (machine learning)
- Solutions can next move from TSO / DSO R&I to other stakeholders and participants in the market (addressing the needs of final consumers, heavily dependent on the regulation and the speed of legislation across different European regions)
- **Sector coupling** shall also be considered as a next step
- The word cyber security was the one which was mentioned minimally in the relevant SLIDO question. It appears that **cyber security**, at least in session 3, was not represented enough and it was not a core focus.

4.1.4 PARALLEL SESSION 4: Consumer and Data – the relation of products, privacy and policy

The key conclusions on parallel session 4 regarding 'Consumer and Data – the relation of products, privacy and policy' can be summarised as follows:

Concerning how prepared people are to "pay with data" for receiving excellent services:

- It is ok, if they are informed upfront
- **Private** data concerns **personal** data (protected by GDPR) or **commercial** sensitive data (there is a question on how to protect them)
- It is a question of **trust**
- In case people do not know or cannot oversee the relevant situations, extreme position (no data given at all …) can be noted
- It appears that people do not understand "**data ownership**"
- People need to be educated on what are the relevant and sensitive data, where they are used and for what purpose.
- A practical question concerns data from participants and non-participants of a project: participants have signed a contract, others still may provide data …

Concerning the way to collect and use data to create benefits for the consumer and the system operator while not compromising privacy rules:

- Concerning the grid side, **aggregated** data is enough to manage a **stable grid** (data from single households makes things even more complicated)
- Research is required on what data is needed, on what resolution and on what is (really) needed for forecasting.
- In any case, no matter what the resolution is, privacy matters.
- Considering **quality** of data, resolution is less critical than when the data is available (considering real-time cases)

Concerning what social and political sciences know and think about investigating personal and other sensitive data to improve the overall system:

- Cultural and educational background counts
- It is a matter of trust to the **governmental system** in the country
- **Public** institutions are more trusted than the **private** sector

- Local solutions are better trusted than national or global ones (here energy communities have a pro)
- The customer can stay in control of their data with a combination of **legal** and **regulatory framework**, technical tools and economic incentives to use the tools and services
- Answers are divided 50:50 regarding the question 'Shall we force people into donating data for the excellence of the system?'

4.2. RECOMMENDATIONS FROM ETIP SNET WORKING GROUP 5 IN TERMS OF "INNOVATION, IMPLEMENTATION IN THE BUSINESS ENVIRONMENT"

The objective of ETIP SNET Working Group 5 (WG5) is to mobilise experts in support of R&I work in EU to reach the market. It works closely with all WGs of ETIP SNET to utilize projects' results in support of R&I needs for the years to come.

In order to reach this aim, it is essential to have a homogeneity of technology classification and a universal approach that allows to coherently structure and analyse all data coming from projects.

- Build homogeneity in the analysis of projects, work done, and lessons learned: create a common platform
- Build a universal approach in the taxonomy of technologies that constitute the evolution of functionalities in building the smart networks of 2050 in support of the energy transition.
- Build a methodology to judge system needs in the energy transition capable of identifying tangible needs for building on progress made and give feedback to the other WGs for populating their R&I needs in the years ahead;

The results of projects are a valuable source for capturing the maturity of technology evolution contributing to the maturity of the integrated system!

The rolling process as built in the EIRIE platform that is planned to go live late 2021, aims to help the identification of R&I needs to populate the Ten-year Plan and subsequently the Vision of ETIP SNET.

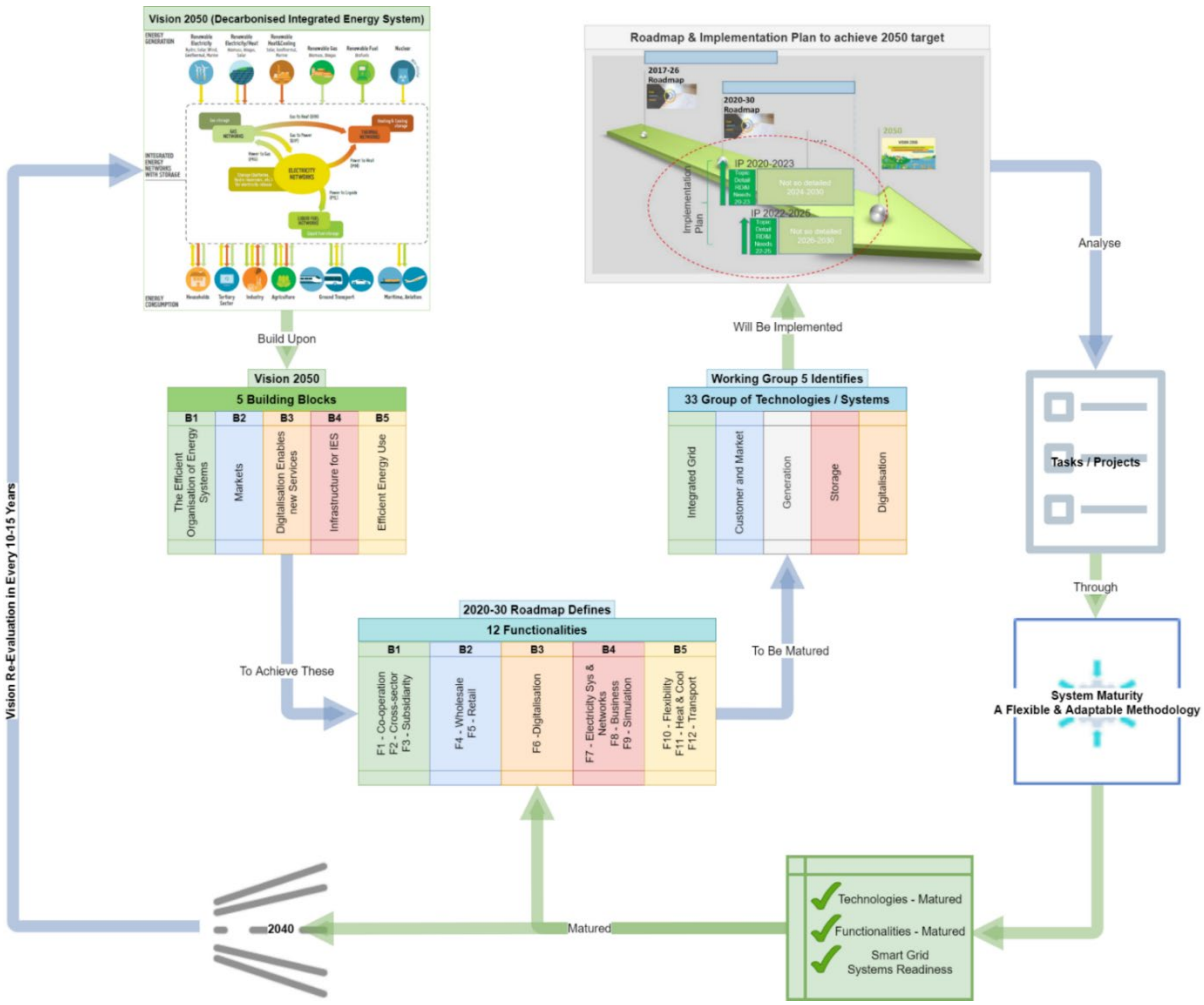


Figure 21: PANTERA RICAP process for capturing evolution of system.

Purpose of the self-assessment

- ***In line with the Innovation Radar assessment***
  - Promoting and showcasing emerging innovations resulting from H2020 projects
  - Bringing together innovative solutions owners and investors/ incubators for facilitating the "go-to-market route"
- ***....and beyond the Innovation Radar***
  - Further deep-diving to the innovation and go-to-market enablers of most prominent solutions
  - A variety of new parameters enabling more detailed (self-) assessment and revelation (self-understanding) of:

- Strong
  "go-to-market" aspects and enablers
- Aspects and enablers that need to be further improved and require further analysis and elaboration

  - Promote the creation of a business ecosystem, not only for business-ready solutions, but also for promising ones that underperform in certain enabling aspects.

- ***What is on for BRIDGE and ETIP-SNET?***
  - A tool to collectively analyse and assess the level of business maturity of certain clusters of technologies
  - Valuable input for fine-tuning Roadmaps, Implementation Plans and WGs/ TFs activities

Key features of the self-assessment questionnaire

- ***To whom and prerequisites***
  - R&I project managers/results owners
  - It requires about 30-40 min to go through a digital questionnaire dealing with a wide range of aspects of 'Innovation support to the market uptake'

- ***A multiple-choice questionnaire to assess the market uptake process of your project***

To meet the above objectives, a questionnaire has been shared with all the projects presented during this 13th Regional Workshop. It is based on three pillars: innovation management, innovation readiness and market potential. The aim is to provide practical advice to projects with a focus on go to market strategy. It will also help the formulation of the Roadmap and Implementation Plan.

The questionnaire consists of 36 questions organised into six main areas covering the innovation facilitation depicted below:

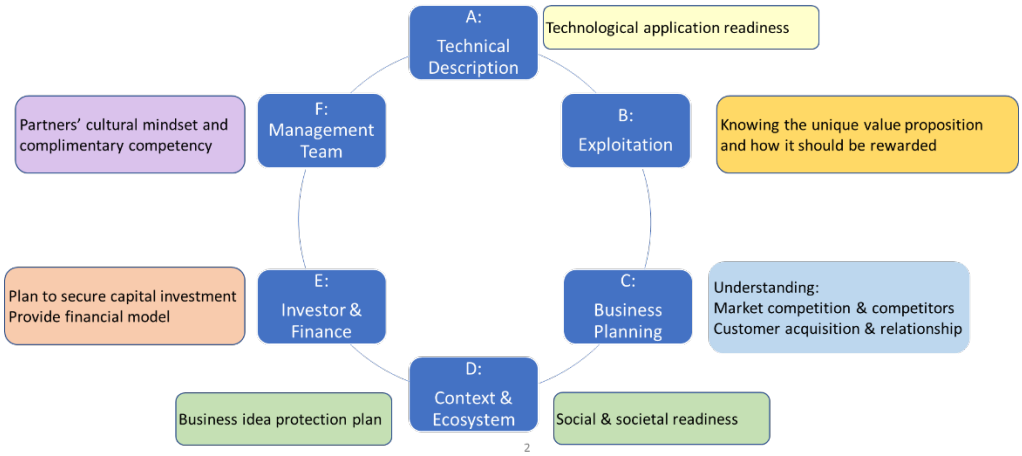


Figure 22: Self-Assessment Toolbox Key Features

All the projects presented during this 13th Regional Workshop have been evaluated according to these six areas and each of them has received a specific score. Results are presented in the visualisations below.

4.2.1 FEEDBACK VISUALISATION: SESSION 1

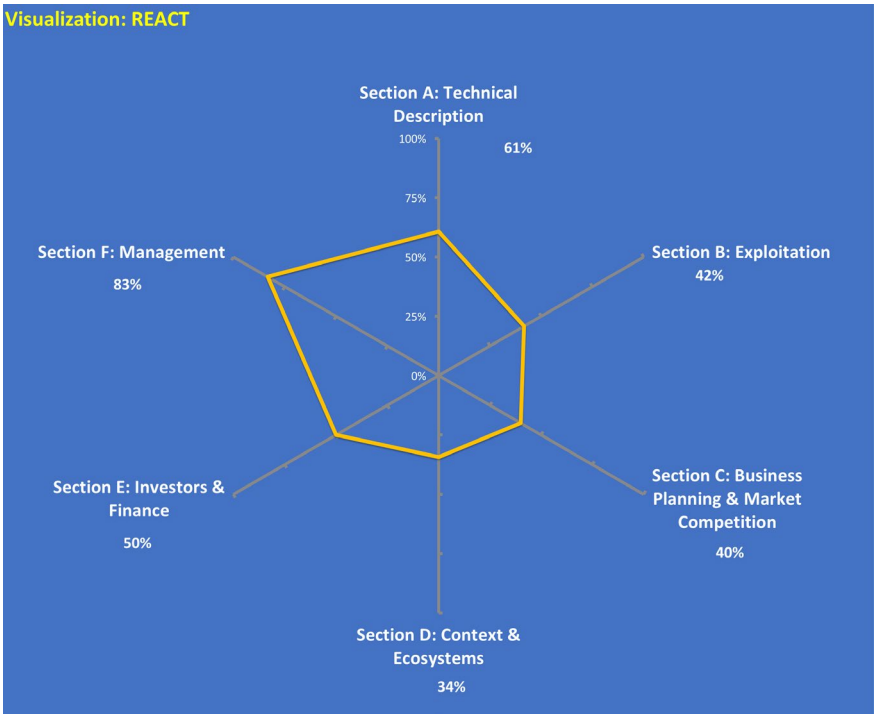


Figure 23: Visualisation REACT

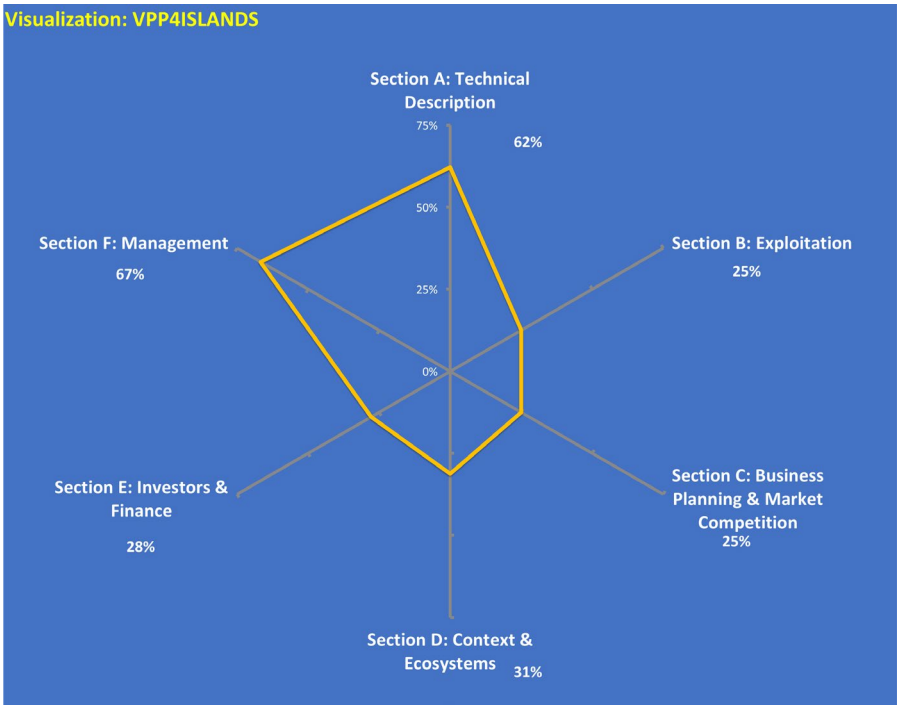


Figure 24: Visualisation VPP4ISLANDS

4.2.2 FEEDBACK VISUALISATION: SESSION 2

Figure 25: Visualisation MUSE GRIDS

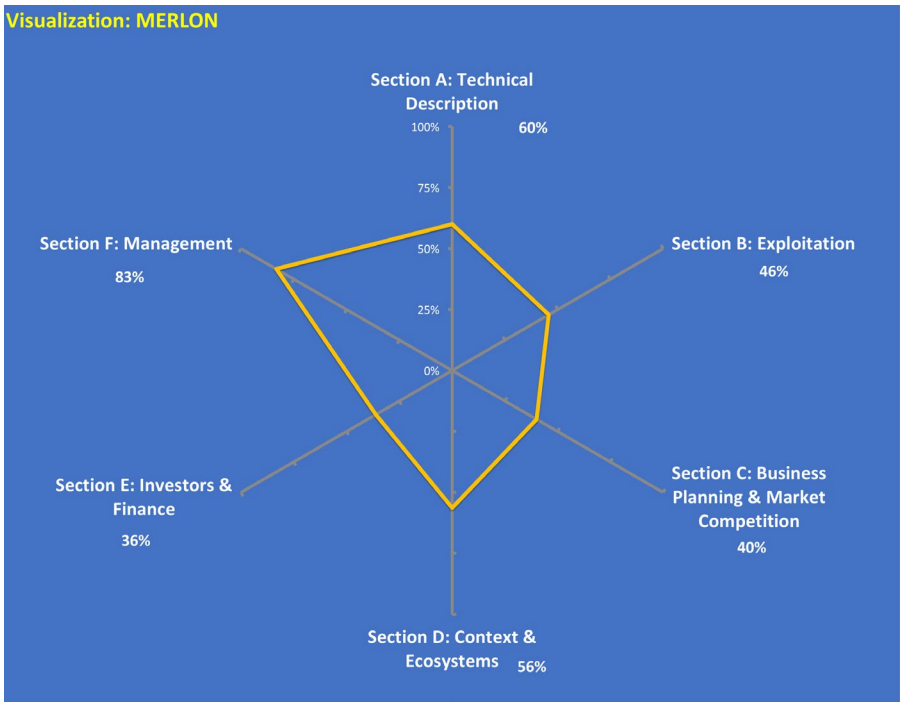


Figure 26: Visualisation MERLON

4.2.3 FEEDBACK VISUALISATION: SESSION 3

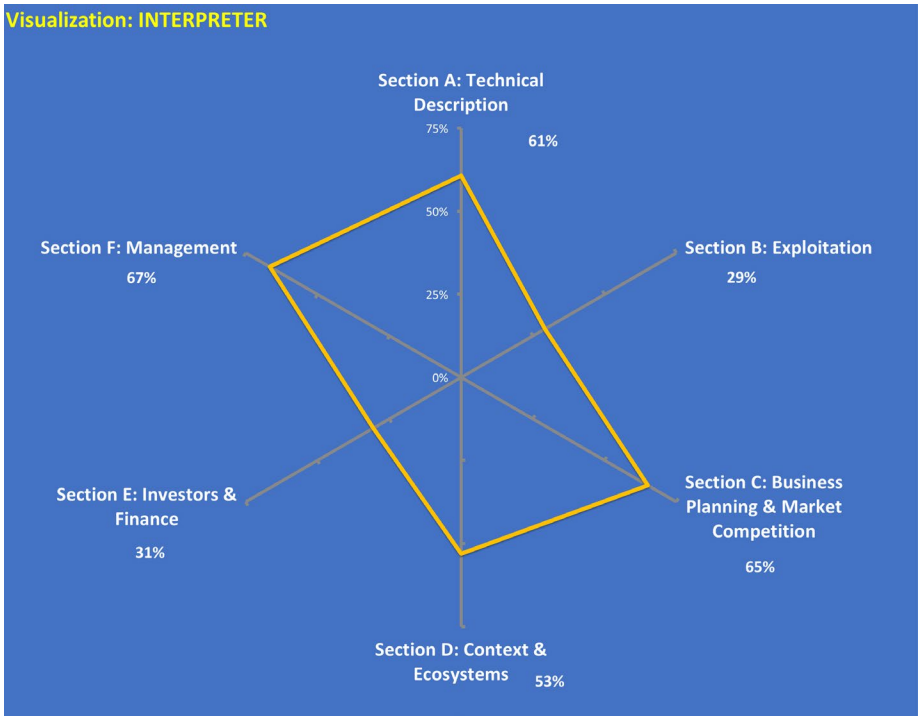


Figure 27: Visualisation INTERPRETER

4.2.4 FEEDBACK VISUALISATION: SESSION 4

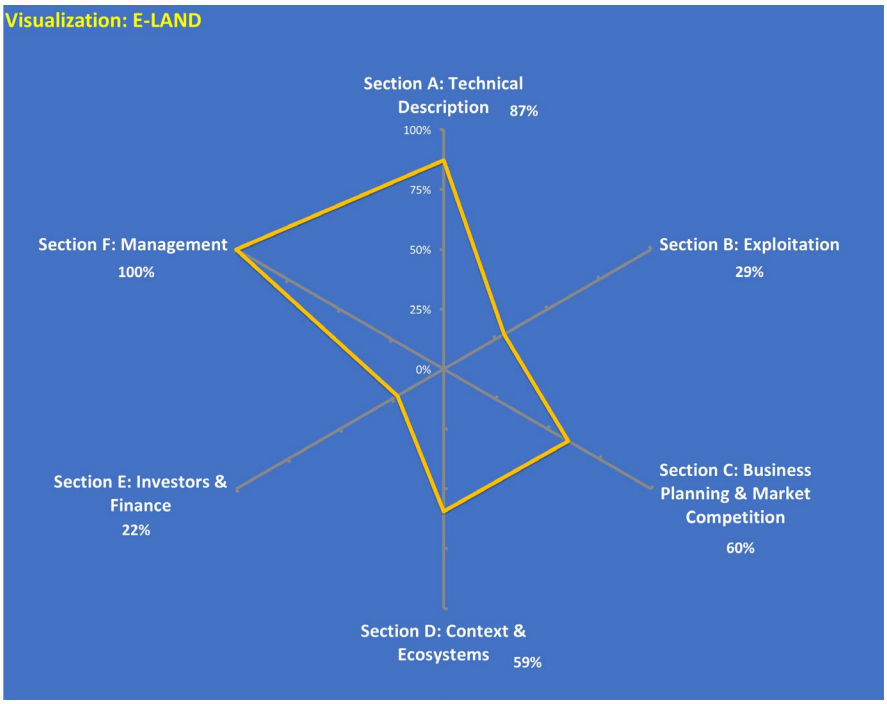


Figure 28: Visualisation E-LAND

5. FEEDBACK FROM ATTENDEES

Participants to the 13th ETIP SNET Regional Workshop received after the event an evaluation form, where they could express their appreciation for the event. In total, 23 responses were received.

Overall, respondents judged the event positively:

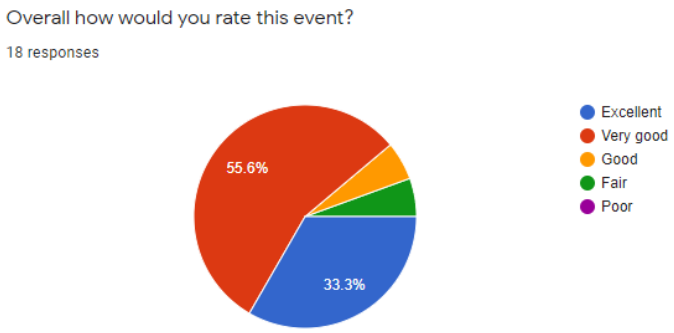


Figure 29: Overall, how would you rate this event?

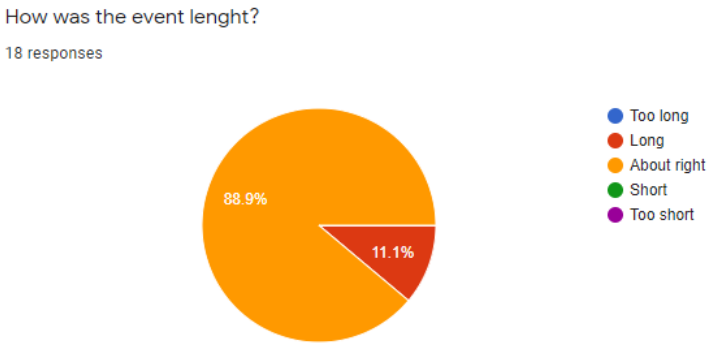


Figure 30: How was the event length?

Participants were also asked to express their opinion on the different sessions of the event. All sessions have been evaluated quite positively.

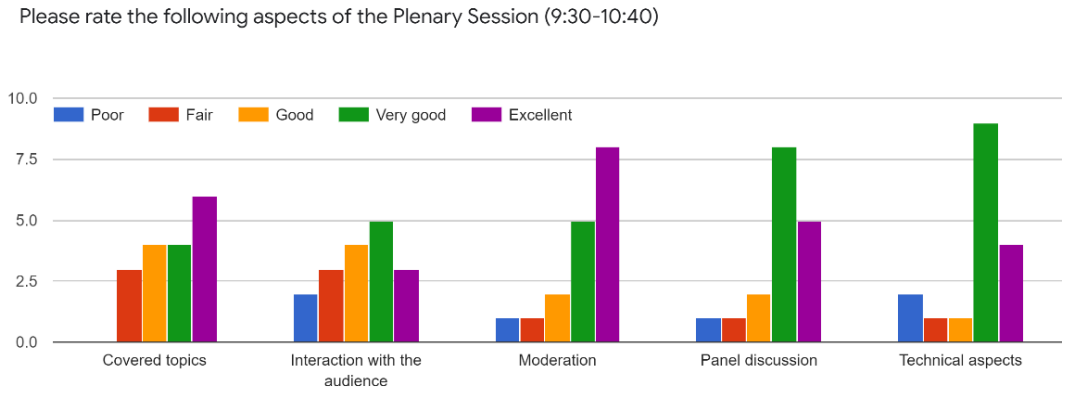


Figure 31: Please rate the following aspects of the Plenary Session

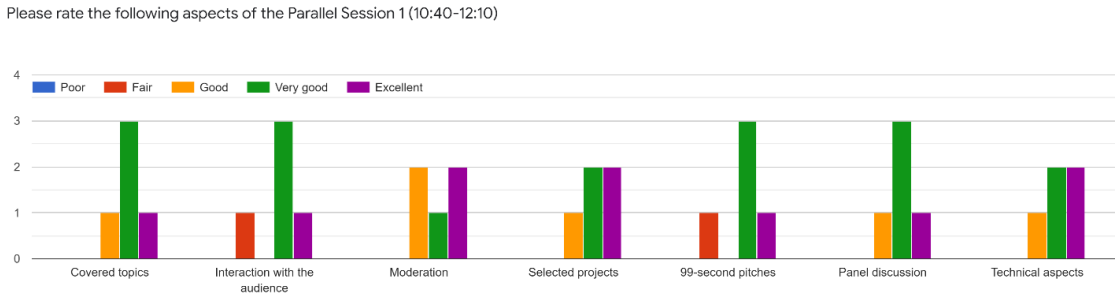


Figure 32: Please rate the following aspects of the Parallel Session 1

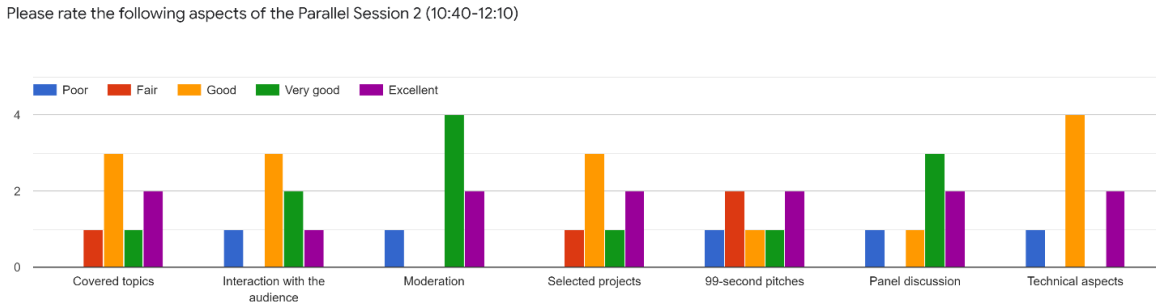


Figure 33: Please rate the following aspects of the Parallel Session 2

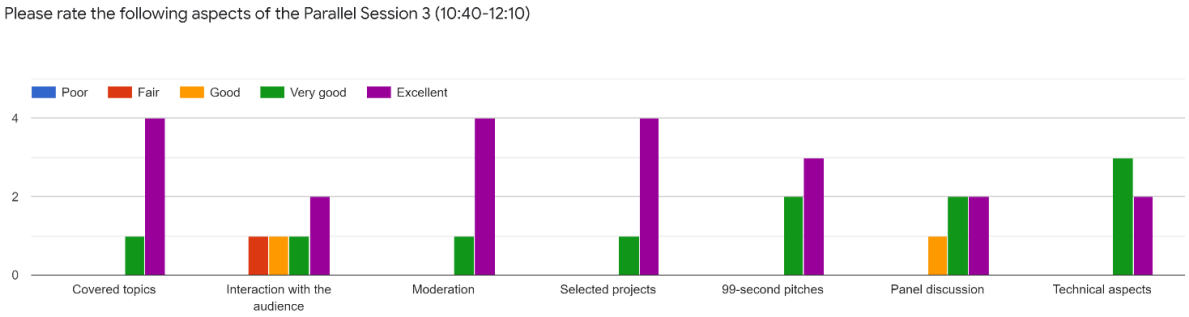


Figure 34: Please rate the following aspects of the Parallel Session 3

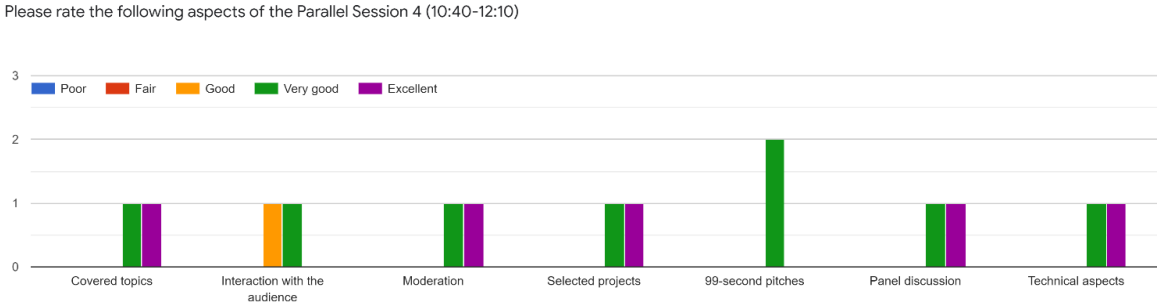


Figure 35: Please rate the following aspects of the Parallel Session 4

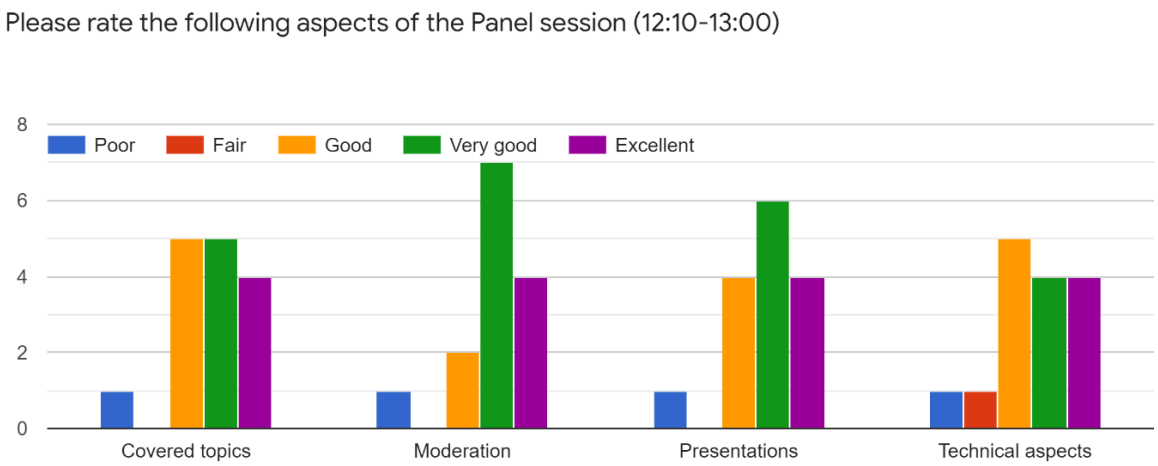
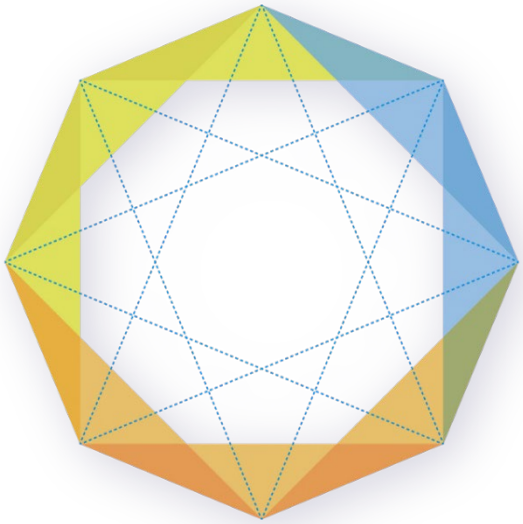


Figure 36: Please rate the following aspects of the Panel session

Although the general feedback from attendees was positive, it was noted that parallel sessions can be limiting due to the too diverse topics discussed in each.



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