ETIP SNET

EUROPEAN TECHNOLOGY AND INNOVATION PLATFORM

SMART NETWORKS FOR ENERGY TRANSITION

European and International Stakeholders Workshop

High level talks among energy systems related initiatives

LEVERAGING THE CLEAN ENERGY TECHNOLOGIES POTENTIAL THROUGH INTEGRATION INTO AN EFFICIENT SYSTEM

Thursday, 14 March 2019, Brussels

Proceedings

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1. AGENDA

9:00	Registration – Welcome Coffee
9:30	**Welcome,** Marie Latour, ZABALA / INTENSYS4EU Coordinator
9:40	**EUROPE's Vision and Targets** - **From ETIP SNET Vision towards 10 years Roadmap** Rainer Bacher, BacherEnergie / INTENSYS4EU - **Heat Roadmap Europe**, Alessandro Provaggi, DHC+ (RHC ETIP) - **AIOTI**, Chair WG Smart Energy, Natalie Samovich, Enercoutim, Head of R&I / Alliance for Internet of Things Innovation - **Hydrogen Long Term Vision**, Carlos Navas, Fuel Cells and Hydrogen Joint Undertaking **15' Q&As** **International perspective :** - **Energy innovation: IEA analysis, activities, and partnerships**, Simone Landolina, International Energy Agency Presentation of ETIP SNET new **report Synergies and complementarities of European and International Initiatives towards Energy Transition,** Michele de Nigris, RSE / INTENSYS4EU
11:15	**COFFEE BREAK - Orangerie**

#3	11:45 - 13:00	**Morning Parallel sessions** on the different aspects of ETIP SNET's Vision **How to make it happen**	
		1.1 TECHNOLOGIES AND TOOLS	**1.2 MARKET**
		Elisabeth Room *Moderators:* *Rainer Bacher, Bacher Energie &* *Michele de Nigris, RSE* • **Upgrading of electricity networks:** impact of power electronics (inertia and control systems, importance of efficient electricity corridors, importance of observability, generation flexibility • **The importance of storage and energy conversion and storage technologies:** importance of vector coupling, PtG, PtH, PtL (and impacts on the electricity grids) • Efficient energy use – heating and cooling: **H&C as powered by RES,**	**Leopold Room (2nd floor)** *Moderators:* *Norela Constantinescu, ENTSO-E &* *Fernando Garcia, Naturgy* • **Cooperation among operators** (TSOs – DSOs trans-vector) wholesale market enabling cross-border exchanges of RES • **Subsidiarity, local markets enabling citizen involvement**, islanding, microgrids, VPPs, flexibility markets • **Regulatory framework, importance of innovation and demonstration**

<table>
<tr><td></td><td></td><td>district networks, waste recovery, waste heat in industries

Interactive discussion forum on technologies for integration and flexibility (coupling, storage, generation, network flexibility, etc.)</td><td>Interactive discussion forum on regulatory innovation and tools, business models, remuneration, innovation benefits-beneficiaries</td></tr>
<tr><td></td><td>13:00</td><td colspan="2">NETWORKING LUNCH - Orangerie</td></tr>
<tr><td rowspan="3">#4</td><td rowspan="3">14:00
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15:15</td><td colspan="2">Afternoon parallel sessions on the different aspects of ETIP SNET’s Vision
How to make it happen</td></tr>
<tr><td>2.1 THE USER AT THE CENTRE</td><td>2.2 DIGITALISATION</td></tr>
<tr><td>Elisabeth Room
Moderators:
Michela Marasco, EC DG ENER & Michele de Nigris, RSE

• Engaging final consumer in energy discussions: changing role of the energy operators
• Local communities, energy conversion and flexible energy storage – impact on the final user –
• Flexibility markets – empowering the final prosumer aggregation, peer-to-peer, prediction

Interactive discussion forum on business models, decentralisation, sharing economy of energy, subsidiarity</td><td>Leopold Room (2nd floor)
Moderators:
George Huitema, TNO &
Rainer Bacher, Bacher Energie

• Digitalisation for new services – aggregation, DSM, peer-to-peer trading, shared platforms, interconnected systems
• Aspects of IoT, analystics, connectivity, AI, MMI, M2M
• Open issues of privacy, data ownership, cybersecurity

Interactive discussion forum on the use and impact of digital technologies, risks and opportunities</td></tr>
<tr><td></td><td>15:15</td><td colspan="2">Break</td></tr>
<tr><td>#5</td><td>15:30</td><td colspan="2">Concluding session – next steps - Elisabeth Room
Michele de Nigris, Rainer Bacher, Norela Constantinescu, Fernando Garcia, Michela Marasco, George Huitema</td></tr>
<tr><td></td><td>16:00</td><td colspan="2">Networking cocktail - Orangerie</td></tr>
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2. LIST OF PARTICIPANTS

(Information corresponding to registrations)

First name	Last name	Organisation / company	Parallel Sessions	
Rainer	BACHER	BACHER ENERGIE	1.1	2.2
Coralie	BADAJOZ	DOWEL	1.2	2.2
Jean-François	BALMITGÈRE	EDF	1.2	2.2
Marcello	BARBONI	EUROPEAN COMMISSION - JRC	1.2	2.2
Angela	BERGER	SMART GRIDS AUSTRIA	1.2	2.2
Andrea	BOGI	EGEC	1.1	2.1
Patricia	BONET	RED ELÉCTRICA DE ESPAÑA	1.2	2.2
Szilvia	BOZSOKI	EUROPEAN COMMISSION	1.1	2.1
Francesca	CAPPELLETTI	RSE	1.2	2.2
Gaëtan	CLAEYS	EUGINE	1.1	2.1
Norela	CONSTANTINESCU	ENTSO-E	1.2	2.1
Aidan	CRONIN	ETIPWIND / SGRE	1.1	2.2
Federico	D'ALBERTI	ENEL	1.2	2.1
Michele	DE NIGRIS	RSE	1.1	2.1
Alice	DETOLLENAERE	BECQUEREL INSTITUTE	1.1	2.1
Rune	DIRDAL	CEWEP - CONFEDERATION OF EUROPEAN WASTE-TO-ENERGY PLANTS	1.1	2.2
Maria João	DUARTE	MITSUBISHI HITACHI POWER SYSTEMS EUROPE	1.2	2.2
Elena	DUFOUR	EERA	1.2	2.1
Venizelos	EFTHYMIOU	FOSS	1.1	2.1
Abel	ENRIQUEZ	ENAGAS	1.1	2.1
Jean-Jacques	FRY	ICOLD	1.1	2.2
Ramon	GALLART FERNANDEZ	GEODE (ESTABANELL&PAHISA)	1.1	2.2
Fernando	GARCIA MARTINEZ	UNIÓN FENOSA DISTRIBUCIÓN / UFD	1.2	2.1
Maria	GEOGIADOU	EUROPEAN COMMISSION	1.1	2.2
Gianluca	GIGLIUCCI	ENEL	1.1	2.1
Cristina	GOMEZ	ENTSO-E	1.1	2.2
Noemi	GONZALEZ	INSTITUTO TECNICO DE LA ENERGIA	1.2	2.1
Marina	GRUJIC MILOSEVIC	VATTENFALL ELDISTRIBUTION	1.1	2.2
Merve	GÜNGÖR	EKOENERGY ECOLABEL, FINNISH ASSOCIATION FOR NATURE CONSERVATION	1.2	2.1
Marta	GURIN	CEWEP - CONFEDERATION OF EUROPEAN WASTE-TO-ENERGY PLANTS	1.2	2.1
Andrea	HERCSUTH	CENER	1.1	2.2
George	HUITEMA	TNO	1.1	2.2

First name	Last name	Organisation / company	Parallel Sessions	
Gustavo	JACOMELLI	ZABALA INNOVATION CONSULTING	1.2	2.1
Han	JIANG	GEIDCO	1.1	2.1
Camille	JOVIGNOT	EURELECTRIC	1.1	2.2
Johanna	KIEROTH	EURELECTRIC	1.2	2.2
Ivana	KOCKAR	UNIVERSITY OF STRATHCLYDE	1.2	2.1
Claire	LAJOIE-MAZENC	RTE	1.2	2.2
Alberto	LAMPASONA	EUROPACABLE	1.2	2.2
Simone	LANDOLINA	INTERNATIONAL ENERGY AGENCY	1.2	2.2
Marie	LATOUR	ZABALA INNOVATION CONSULTING	1.2	2.1
Michael Christian	LAUBENHEIMER	EUROPEAN COMMISSION	1.1	2.1
Eric	LECOMTE	EUROPEAN COMMISSION	1.2	2.2
Sofia	LETTENBICHLER	EUROHEAT & POWER / DHC+ TECHNOLOGY PLATFORM	1.1	2.2
Xi	LUO	GEIDCO	1.1	2.1
Michela	MARASCO	EUROPEAN COMMISSION	1.1	2.1
Gaëtan	MASSON	BECQUEREL INSTITUTE	1.1	2.1
Paola	MAZZUCCHELLI	EUREC / RHC-ETIP	1.1	2.1
Andrei	MORCH	EERA JP SG / SINTEF ENERGY RESEARCH	1.2	2.1
Carlos	MORENO-CARRERO	CEWEP	1.1	2.2
Carlos	NAVAS	FCH JU	1.1	2.1
Nina	OLESEN	EUROPEAN CYBER SECURITY ORGANISATION	1.1	2.2
Francois	PAQUET	COGEN EUROPE	1.1	2.1
Thomas	PELLERIN-CARLIN	JACQUES DELORS ENERGY CENTRE / JACQUES DELORS INSTITUTE	1.2	2.1
Derrick	PISANI	CONNECTIVITY ALLIANCE	1.1	2.1
Alessandro	PROVAGGI	EUROHEAT & POWER / DHC+ TECHNOLOGY PLATFORM	1.2	2.2
Nuno	QUENTAL	EC - DG RTD	1.1	2.2
Lorenzo	RAMBALDI	ENEL	1.2	2.2
Marieke	REIJALT	EUROPEAN HYDROGEN ASSOCIATION EHA	1.1	2.1
Adeline	ROCHET	EUROPEAN CLIMATE FOUNDATION	1.2	2.1
Natalie	SAMOVICH	AIOTI / ENERCOUTIM	1.1	2.2
Anton	SCHLEISS	EPFL	1.1	2.1
Ugo	SIMEONI	EUROPEAN TURBINE NETWORK	1.1	2.1
Borana	TARAJ	EUROPEAN UNIVERSITY ASSOCIATION	1.2	2.1
Jose	TRINDADE	ZABALA	1.1	2.2
Alexander	VANDENBERGHE	ETIPWIND	1.1	2.2
Samuel	VÁZQUEZ	RED ELÉCTRICA DE ESPAÑA	1.1	2.1
Markus	WOLF	EPRI INTERNATIONAL	1.1	2.1
Lizhen	XU	CIRCULAR ECONOMY JOBS	1.2	2.2
Bo	YIN	GEIDCO	1.2	2.1

First name	Last name	Organisation / company	Parallel Sessions	
Roberto	ZANGRANDI	EDSO FOR SMART GRIDS	1.1	2.2
Zedong	ZHANG	GEIDCO	1.1	2.1
Zhanghua	ZHENG	GEIDCO	1.1	2.1

3. MINUTES

3.1 Morning plenary session

- **Welcome – Marie Latour, ZABALA / INTENSYS4EU Coordinator**

Marie Latour welcomed all the participants. She mentioned last year's previous workshop which focused on developing the Vision 2050. Today the participants will come back to the Vision and introduce the following step – the future Roadmap. In the afternoon, the participants will provide feedback on the Vision's different aspects. To set more complete the scheme, the workshop counts with the presence of platforms which work in the energy transition and which are going to present their own vision from the perspective of the section of the energy system they represent. (Presentation of all the speakers and the agenda)

- **Part 1: EUROPE´s Vision and Targets**

- ***From ETIP SNET Vision towards 10 years Roadmap Rainer Bacher, Bacher Energie / INTENSYS4EU***
  (for more information see the ppt.)

The participants were familiarized with the **ETIP SNET Vision 2050**: A low-carbon, secure, reliable, resilient, accessible, cost-efficient, and market-based pan-European integrated energy system supplying all of society and paving the way for a fully carbon-neutral circular economy by the year 2050, while maintaining and extending global industrial leadership in energy systems during the energy transition.

Rainer Bacher presented the agenda in the morning and the objectives of this Workshop:

- From Vision 2050 towards Roadmap 2020-2030;
- Bring together experts and initiatives;
- Discuss the next steps towards deployment, demonstration and research (what we need to do in those fields) for the energy networks with other energy carriers;
- Inspire initiatives how to accelerate the clean energy transition.

He also presented the invited initiatives – ETIPs, PPPs, Institutions. Let use it in the discussions and breaks.

A brief summary of the Vision was presented– How everything is connected, all networks. How can we integrate them all? We need to know who is doing what and when.
Enhance the synergies in view of an overall optimisation and an acceleration of the decarbonisation process. The 3 points of the EU energy policy: Money, Security and Sustainability.

The Vision 2050 was written in June 2018, since then changes have been observed. We can see communications from the EC that resemble statements from the Vision – many match.

Taking the main strategic buildings blocks into account from the EC's communication:

- Maximise the benefits from Energy Efficiency including zero emission buildings;
- Maximise the deployment of renewables and the use of electricity to fully decarbonize Europe´s energy supply;
- Embrace clean, safe and connected mobility;
- A competitive EU industry and the circular economy as a key enabler to reduce greenhouse gas emissions;
- Develop an adequate smart network infrastructure and inter-connections;
- Reap the full benefits of bio-economy and create essential carbon sinks;
- Tackle remaining CO2 emissions with carbon capture and storage.

A summary of the ETIP SNET's building blocks for the Integrated Energy System was presented:

- Integration of the different energy networks;
- More automation with cell-based, self-adjusting energy systems;
- Efficient local and wholesale markets and related operation at all spatial (local, pan-European) and time scales;
- Digitalisation for new services: Demand response by millions of Households (electricity, heating and cooling), Aggregation; Data privacy; Cybersecurity by design;
- Upgraded more flexible physical infrastructures: Power electronics, monitoring, control, storage, conversion;
- Efficient energy use: Buildings, Industry, Mobility, ICT.

Rainer Bacher launched some questions for input of the participants to address these points in the parallel sessions: The renewables must be there but the consuming aspects as well. What do we integrate? How do we move forward? We need to think of the needs in the consumption side – more electricity? Hydrogen?

- ***Heat Roadmap Europe, Alessandro Provaggi, DHC + (RHC ETIP)***

(for more information see the ppt.)

Alessandro Provaggi presented how sector coupling is seen from the HC sector.
As introduction: application of the subsidiarity principle. This means that energy systems are operated in such a way that actions are optimised locally (at the most immediate level) going to the local communities. This takes it closer to the citizens and cities. The focus is on the citizens.

Citizens will not wait until 2050 and the energy transition needs to be fair so it is not rejected by certain parts of the society. There is a matter of urgency.

The purpose in the Heat Roadmap is to create scientific evidence to support long-term energy strategies at local, national, and EU level and empower the transition to a low-carbon energy system, as well as quantifying the impact of various alternatives for addressing the heating and cooling sectors.

Deep energy savings at building level combine savings and supply 30-50% demand reduction. For urban areas district energy network, high demand density areas and supply half of energy demand and for rural areas mainly heat pumps, low demand density areas and remaining half of the energy demand.

All the technologies in the Heat Roadmap are available today.

Sector coupling benefits for customer/citizen:

- Higher efficiency will lead to cost saving.
- Can provide free electricity to EVs – improving air quality, creating local jobs and investments.

Sector coupling requires a lot of digitalisation to support operators in managing optimisation across heat, gas and electricity, production, distribution, storage and demand. These must all be duly interconnected to exchange real-time data and technical interoperability between DHC and electricity to enable heat pumps and EV loading stations to be integrated.

The heat supply of the service sector in Madrid was showed. Compared to data sectors, metro stations, others. There is a lot of potential heat to be used.

Concluding with the European Technology and Innovation Platform that will take part in June 2019.

- ***AIOTI, Chair WG Smart Energy, Natalie Samovich, Enercoutim, Head of R&I / Alliance for Internet of Things Innovation***

Natalie Samovich began by presenting AIOTI. The alliance is a member-led organisation that brings together a wide range of stakeholders that seek to contribute to IoT thought leadership in Europe. They are expanding the stakeholders (around 200), welcomes everyone to join. (For more information see the ppt).

It contains 4 main Working Groups but they also believe in cross sectors:

- ✓ WG1: Research
- ✓ WG2: Ecosystems
- ✓ WG3: Standards
- ✓ WG4: Policy

They are working on:

- Platforms that transform industries;
- Online offline paradigms, IoT still needs to stabilize;
- From bits to electrons and back.

There are four main building blocks for more flexible energy grids of the future: IoT, AI, Distributed Ledger and all of them related to regulation.

Natalie Samovich expressed the need of interoperability between competitive systems or platforms (making a comparison with Uber, Taxify, etc. when one is delayed)

AIOTI aims to open the discussion on Open Energy Marketplaces. Having the marketplace as a framework where all technologies, all resources are coming. They are preparing a first draft paper on their current status (evolving ecosystem and Digitalisation within the EU Energy markets), where they want to be (VISION Open Energy Marketplaces 2030) and what are the barriers. The character of regulations and recommendations is not finished yet. They are enabling IoT technologies, developing and applicating them. Intelligent networks are also part of it.

For their vision of the Energy Marketplaces 2020, they are looking for multi-sided markets for services with multiple revenue sources for multiple actors in the system, including energy efficiency, energy production, aggregated auxiliary services, bundled with transport, telecom and other sectors.

The different stages towards IoT Marketplaces were presented:

- Stage 1: IoT infrastructuralisation;
- Stage 2: Data generation and integration of other internal data sources;
- Stage 3: Analytics and the need for external data;
- Stage 4: Cross-leverage buy, sell and provide data and services leading towards Marketplaces participation.

(The following stage cannot happen if the previous one is not achieved)

Some of the challenges faced by the Industry across Europe were explained:

- ✓ Leveraging rapid technological developments to anchor long-term competitiveness;
- ✓ Securing end-users´ take up and acceptability of IoT applications;
- ✓ Moving into large-scale deployment;
- ✓ Managing and counteracting the risk of fragmentation;
- ✓ Performing in the context of international competition.

They are very active in harmonizing the IoT architectures.

The aims of the organisation were presented:

- Strengthen the integration across the digital value chain to accelerate IoT deployment within the context of a Single Market;
- Drive the development of sustainable innovative European IoT ecosystems in the global context;
- Provide a forum in which global, EU and Members States´ IoT innovation activities can be mapped and bridged;
- Promote global cooperation and collaboration in the area of IoT.

They have partnerships with Brazil, Japan and China. Not just EU but international as well.

- ***Hydrogen Long Term Vision, Carlos Navas, Fuel Cells and Hydrogen Joint Undertaking***

(for more information see the ppt.)

Carlos Navas presented the FCH JU and its work since its creation during FP7. He referenced the different challenges the initiative addresses such as: Achieving deep decarbonisation, managing variable renewables or retaining EU technology leadership to create jobs and wealth.

During his presentation, Carlos Navas stated that hydrogen can be used as an enabler for sector-coupling. The grid cannot be 100% renewable as the variable nature of those energy sources makes it impossible. In fact, hydrogen could take advantage of the good quality gas grid in Europe. We could use the same grid to distribute it.

Furthermore, he presented the case of hydrogen as one of the best long-term storage mechanisms, especially at scale.

As a conclusion, Carlos Navas summarised the Hydrogen Roadmap for Europe, which can be find on FCH JU's website, mentioning some of the short and medium-term milestones such as the increase of carbon-free hydrogen production or the volume of natural gas to be replaced by hydrogen.

- ***Q&As***

Markus Wolf – EPRI INTERNATIONAL – Looking into hydrogen to shipping and flights, is it possible?
Carlos Navas – Yes, they have a contribution. Particularly in the maritime sector, LNG can play a role but it is difficult to reach 2050 goals, hydrogen could be an option.

Anonymous - For Carlos, is the technology available? What is the barrier?
Carlos Navas – Technology is ready, the barrier is the will of the people. There is not a penalty for usage of CO2.

CEWEP (Confederation of European Waste-To-Energy Plants) – Digitalisation for energy efficiency? Looking at Madrid, if all is available why is it not already happening?

Alessandro Provaggi (EUROHEAT & POWER/DHC+ Technology Platform)– Digitalisation is important – brings better communication, fine tuning, which improves efficiency. Regarding wasted heat in Madrid – there are many factors, the main barrier is awareness, there are no incentives; Also agreements between the operator and the heat providers. Natural issues in the early stages of these topics.

Natalie Samovich – The topic of flexibility of demand is one of the main ones. IoT is enabling tech behind it but the issues go beyond enabling the tech.

- **Part 2: INTERNATIONAL PERSPECTIVE**

- ***Energy innovation: IEA analysis, activities, and partnership, Simone Landolina, International Energy Agency***
  (for more information see the ppt.)

One main reason why we discuss the need for an energy sector transition towards low-carbon is the fact that energy-related CO2 emissions have been rising stubbornly for more than a century, in line with rising energy demand and economic growth.

The period 2014 - 2016 was a major change in this regard. For the first time, for three years in a row, emissions stayed flat even though the global economy grew. There were several energy sector trends backing up these observations, but, at the same time, there were also reasons to wonder if this is really a structural energy sector change, or rather a cyclical phenomenon.

2017 was another year of rise in global CO2 emissions. In a few weeks, the 2018 figures will be released, which will show a new rise.

There is a new geography of energy between 2017 and 2020. In 2000, more than 40% of global demand was in Europe & North America (United Stated was the first one) and 20% in developing economies in Asia. By 2040, this situation has changed and China will be the first one in the list of global demand.

The electricity sector accounts for about one-fifth of energy consumption currently however due to its carbon intensity, its share of emissions is twice as large (two-fifths). Therefore, there is great potential for renewable electricity to help decarbonise the sector.

The Sustainable Development Scenario depicts a rapid, but achievable, transformation of the energy sector. He compared this Sustainable Development Scenario with other long-term decarbonisation scenarios. Solar PV should become the leader of electricity production in the world and in Europe, it should be wind.

Rapid cost decreases and deployment of wind and solar PV are transforming power systems worldwide, So solutions must be flexible, each country has their own energy transition plan according to their reality. Need of investment in flexibility. Furthermore, digitalisation in energy is very important in making demand flexible because it can help integrate variable renewables by enabling grids to better match energy demand to times when the sun is shining and the wind is blowing.

The second part of the presentation was related to partnership opportunities. They are tracking clean energy R&I annually. There is an increase, encouraging news, but it is still very little. Only 0.1% of public spending. Regarding private sector, corporate investments are very significant to deliver solutions.

Simone Landolina talked about the IEA Technology Collaboration Programmes (TCPs) and its partnerships. The TCPs have been conducting innovative research leading to breakthroughs in energy technologies for the last four decades.

The conclusions are the following:

- Global CO2 emissions are on the rise again indicating growing disconnect between climate goals and energy-market trends;
- Energy technology innovation is key to foster economic growth, while also improving energy security & sustainability;
- Even with ongoing cost reductions, government policy remains crucial to attract investment in renewables and energy networks, ensure appropriate market design and for reliable & cost-effective system integration;
- The IEA remains committed to providing decision makers with timely data, rigorous analysis, and a unique global network of Technology Collaboration Programmes to accelerate real-world solutions;

- Partnerships should build upon (and cannot substitute) a good policy framework for energy technology RD&I;

- ***Presentation of ETIP SNET new report Synergies and complementarities of European and International Initiatives towards Energy Transition, Michele de Nigris, RSE / INTESYS4EU***
  (for more information see the ppt.)

Michele de Nigris presented the trend of R&I spending in the public and private sectors which demonstrated that collaboration between technologies and initiatives in RD&I must be accelerated.

There are a lot of R&I initiatives, we need to find the best way to accelerate development by collaborating. Previously, the methodology used in the report was explained:

- Identify European and Global initiatives dealing with the integrated energy system;
- Set up fiches on single format to structure analysis;
- Distribute on-line questionnaire (completed by experts' knowledge);
- Analyse the initiatives to identify similarities and gaps;
- Formulate recommendations and identify ideas for collaboration;

He then showed the 33 initiatives which were addressed, 22 European and 11 Global, explaining the weighted relevance of the fractions of the energy system covered. He alsofocused on the closest and most distant initiatives with whom the ETIP SNET could cooperate searching synergies, gaps, and complementarities.

The analysis of the stakeholder participation, concerning the different types of initiatives, was showed together with the analysis of R&D strategy:

- ✓ Contribute to the goal of the SET Plan;
- ✓ Develop efforts to align with European goals;
- ✓ Consider the energy system as a whole – if focus on specific technologies interfaces and interactions are considered;
- ✓ Roadmaps, R&I priorities and publications are result of wide consultations and consensus.

ETIP SNET is focused on standardization while others are focused on regulation.

Regarding Knowledge Sharing Platforms, 3 main categories were identified: GRID Innovation online; the Smart Energy Systems ERA-Net-expera and the BRIDGE project.

In terms of Synergies, the document dives into the subprogrammes, sub-tasks and working groups which is where synergies need to be found.

The final conclusions and recommendations:

1. **Technology Portfolio:** Consider and develop the widest spectrum of technologies by leveraging local excellence and priorities;
2. **International Collaboration:** International collaboration has proved to accelerate cost reduction of new technologies. All countries should be involved;
3. **Coordination:** Stronger coordination is needed to streamline and optimize the achievement of key exploitable results;
4. **Boundaries and approach:** Potential overlaps have been identified in the tasks and subprogrammes and initiatives: efforts shall be made to establish links and streamline;
5. **Stakeholders involvement:** Search involvement and consensus. Catalyze private investment flows;
6. **Intellectual Property:** Regulate Intellectual Property from the start. Standardization is a powerful vector of energy innovation and is based on close collaboration and international understanding.

3.2 Parallel sessions

- **1.1 TECHNOLOGIES AND TOOLS**

Rainer Bacher and Michele de Nigris gave a brief presentation on the scope of the parallel session. They familiarised the participants with ETIP SNET's Vision to foster a better exchange of ideas.

The aim was to focus on 3 main areas:

- **Upgrading of electricity networks**,
- **Storage and energy conversion technologies**
- **Efficient energy use** – Heating and Cooling.

These areas were then analysed according to 3 frameworks: Deployment needs in the next 4 years, Demonstration needs in the next 4 years, and Research needs by 2030, 2040 and 2050.

After this introduction, the moderators gave the floor to the participants.

- EPRI International, Marcus Wolf:

How could the resilience of networks be increased when facing extreme weather conditions?
Michele de Nigris - There are 2 components of the system resilience: offset of the temperatures (long heat/cold waves), and extreme weather conditions (snow and thunderstorms, etc).

- EPRI International, Marcus Wolf:

Concerning the second component it could perhaps be addressed through flexible capacity.
Michele de Nigris – Indeed, this can fit into the "Deployment needs in the next 4 years."

- COGEN Europ, François Paquet:

We need to look at Energy efficiency now, the cheapest energy is the one we do not use. We need to make sure the energy used in the different sectors is efficient. As the energy sources become more renewable, CO2 will drop. But the energy efficiency is also important, it will make sure we use the energy where it is most needed. Perhaps through the efficiency of Hydrogen, we hope technology will improve it, to use it efficiently in power and heat especially.

- FCH JU, Carlos Navas:

Efficiency is simple – if all is equal, if you can choose between hydrogen and batteries, yes, a battery is more efficient. However, there a lot of challenges which make this comparison unequal. Hydrogen is more flexible than batteries. E.g. a single house is better with batteries. But looking at a large scale like countries, needing to provide the right amount of energy at the right time, hydrogen is the best.
Rainer Bacher – We do not know which is right, we just want to look at all the options.

- ENTSO-E, Cristina Gomez:

Regarding storage and vector coupling, where would batteries be included? The technology might be more mature and we are missing business models. However, for Electric Vehicles (EVs) we need more demonstrators.

- *Michele de Nigris* - What are the implications EVs might have in the network? The network could be extended with smart charging and services (vehicle to grid/home). These imply different actions for different boxes here. Smart charging is already happening. Standardization in EVs is one of the most advanced. This might fall in efficiency energy use. Also, flexibility, being in competition with hydrogen.

Gianluca Gigliucci (ENEL) - Concerning storage, we imagine it fully fed by renewables. For this, we need longer duration storage for batteries but how much? What is long duration? How long will we need? How much are renewables feeding the grid? We need this so we can identify key parameters to predict how much we will have in the future. We should use statistics or AI to understand this matter. EURELECTRIC published a Vision, where hydrogen represents a high percentage. Hydrogen is good for improving the flexibility, not as a source.

Michele de Nigris – One more aspect, the alternative would be a short to midterm storage, like batteries. But looking at Hydropower, the solution is there and it is used – must be part of the entire scheme. It will be in competition with the other flexibility facilitators.

Jean Jacques Fry (HYDROPOWER EUROPE) – One of our goals is to supply a flexible electric European system. We need demonstrators of virtual powerplants where we combine hydro with other generation of electricity or energy. We are missing it.

Rainer Bacher – What would the goal of the demonstrator be?

Jean Jacques Fry (HYDROPOWER EUROPE) – It would demonstrate it is useful for the future electric system, to have this management of the electric system. We need it for a safe electric system in 2050 and for societal awareness.

- ETIP WIND, Alexander Vandenberghe:

There is a problem to transport wind farm power to the end users. There is a missing link. Do we have to give up, is it impossible to transport it? If you build a windmill farm you must build storage too?

Rainer Bacher – It is all interconnected, perhaps with hydrogen.
Sofia Lettenbichler (EUROHEAT & POWER/ DHC+ Technology Platform) – We have not heard about thermal grids yet. The technology exists, we must use it. We have to define which should be used where (hydrogen, thermal and others). The technology is there, countries like Sweden are implementing it. We have to use the existing tech, otherwise we are not looking at the full picture. We need investments and contracts. We are competing with renewables which have them. For example, UK is fazing out gas, the Netherlands maybe too. The Netherlands are looking into a big thermal grid to interconnect the big cities. Thermal grids are not the whole solution but are one of the key parts.

Michele de Nigris – Are we missing only policy and investing or are there technology gaps? Which are they? It cannot be just pipes and isolation, there must be optimisation issues. Which do you envisage?

Sofia Lettenbichler (EUROHEAT & POWER/ DHC+ Technology Platform) – We should look at low temperature district heating. There is already research there – how to integrate all sources of heat? In Genève there is an example. However, it has many different challenges such as: not the same pipes and the distance one would need to transport it.

Zheng Zhangua (GEIDCO) - I would like to see more demonstrations and deployment. To upgrade the infrastructure takes a long time, 11 years, a lot of time. It is a challenge we are all facing. We make commitments to decarbonise our economies and must face two factors: decarb the generation and decarb the transportation. To decarb transportation, picture 1.1 million EVs in China. They will increase to 80 million by 2030. How can we transport the energy to them? We will need 80TeraWh! That puts a huge stress on the transportation of energy.
Also, after 2020, another important aspect must be considerate, the 5G – we will be able to transport data at higher speed and range. Which can help connection and cooperation for smart interoperability.

Venizelos Efthymiou – We need to look into the quality of common coupling while moving into IoT. These EVs are not only taking energy from the system, they are also active. To connect them we would need better common coupling. There is a lot of research needed. IoT is coming, we are already talking of nanogrid homes but they all bring problems. Which is the most efficient? We need to address a lot of research. The Point of Common Coupling is very important.

Carlos Navas (FCH JU) – You were asking for specific proposals in research. Hydrogen Europe last year had such a list, examples: deployment of larger fleets of vehicles, also in the industrial sector. This does not work without changing the current regulatory framework. There is also an awareness issue, politicians need to step up.
Concerning hydrogen and the electricity grid, there are studies that show you the variable renewable energy that will be produced by the system. 20-25% of energy is stored for major disasters, mostly as oil and gas. These need to be substituted by something else like hydrogen or others – this is a long-term storage for the resilience of the system. We must see what technologies could be used.

- DG ENER, Michela Marasco:

A lot of regulations will depend on how member states will embrace the changes. A lot of the challenges in energy transportation depend on it. Things like risk preparedness and how the member states will be dependent on each other. This will change the environment of how this innovation will happen.

- **1.2 MARKET**

Presentation of moderators: Norela Constantinescu, ENTSO-E and Fernando García, Naturgy.
They introduced this parallel session regarding the MARKET taking the following topics into account:

- **Cooperation among operators** (TSOs – DSOs trans-vector) wholesale market enabling cross-border exchanges of RES.
- **Subsidiarity, local markets enabling citizen involvement**, islanding, microgrids, VPPs, flexibility markets.
- **Regulatory framework, importance of innovation and demonstration** for innovation point of view.

To achieve the goal (decarbonization) an evolution from new user requirements and a technology progress are needed.

Afterwards, they explained the dynamic to be used and participants defined what they considered needed in terms of requirements from grid users for the future in the energy sector (taking the requirements of grid operators into account) and shared it:

- AIOTI/ENERCOUTIM, Natalie Samovich:

From Distributed Solar Generation side, Rolodex of grid services from operators (transmission and operators) for aggregators at regional level to develop platforms to meet these services (within the country and cross border).
Governance rules on market conditions and interoperability with operators and grid services (related to the flexibility demand) knowing which the needs are.

- ENEL, Lorenzo Rambaldi:

Remuneration mechanism for end users and business cases including the lowering of requirements to enable the participation of end customers in terms of responsibility. This means lower requirement in terms of qualification from the single market.
Final user should be able to participate with different technologies because connectivity technology to unable the participation of smart appliance, storage for fast ramping market.

- EERA JP SG/SINTEF ENERGY RESEARCH, Andrei Morch:

One question was launched openly: How do we interact with different energy carriers, which do not have a single market?

Natalie Samovich - we are entering a subsidy free market, we should be in interconnected networks and services. Market platforms will have to be integrated to ensure this.

- UNIVERSITY OF STRATHCLYDE, Ivana Kockar:

We need to gather information. Need of interfaces between transmission and distribution network, who plays role, what the conflicts are and how this can be managed. Need of having interconnected networks and services in interconnected markets (for example, DH).
Model the markets: forecasting, interfaces TSO-DSOs, charging (network charges)
Regarding charging methodologies, how network charges will work as it will influence the markets economically, it will influence the consumer. Are they done by each market on their own or will they be done in common?

On the second hand, three different markets were contemplated:

- **Markets for different timings (**from seconds to seasonal markets)
- **Markets for different volumes/variabilites**: Demand response vs networks reinforcement vs grids inter connection vs storagevs
- **Markets for different locations** Pan-European, National/Regional and Local.

A very interesting questions was launched: Do we need to develop/change the current markets or set up new markets?

- EDF, Jean-Francois Balmitgère:

Local services are interesting to be integrated in renewables by generation to show a kind of guarantee of generation. Local approach in terms of generation because integrated renewables are located at the same area.
Local level market management is essential to be able to manage the integration of decentralized generation.

Andrei Morch - Local integration of generation as DH can be provided only at local level

- AIOTI/ENERCOUTIM, Natalie Samovich:

We need to estimate the speed too and impact of decarbonisation, so there is a need of connectivity such as 5G for real markets to get to second level in terms of timings.
Look at development of peer to peer transaction and impact on infrastructure in terms of constrains, rules, safety.

Norela Constantinescu - Regarding local and global level, there is an issue of liquidity and certain solutions need to remain and compete.

In terms of peer-to-peer transactions, a question was launched: is it going to evolve at local of Pan-European level?

- UNIVERSITY OF STRATHCLYDE, Ivana Kockar:

We need to understand what it is going on and what it could do to infrastructure first to operate properly. For example, the physical trade in electricity: it can push infrastructure to operate in the wrong way. We might need rules to push back.

- TNO, George Huitema:

Local communities want to be involved in market, so infrastructures need to be adapted to allow peer-to-peer trading.

Ivana Kockar - I am coming from point of view of flexibility; how to avoid infrastructure enforcement and make it less expensive.

Fernando García: DSO – TSO need to intervene through right rules that ensure a safe traffic.

Natalie Samovich – a WG in BRIDGE is looking at this. For example, low voltage networks are being auctioned in Portugal.

Ivana Kockar – In UK this happens and if is not profitable, DSOs abandon it. Electricity networks are essential as black out is very serious. Aggregators should always remunerate consumer adequately no to lose its interest.

- ENEL, Federico D`Alberti:

Long term signals for new investments including for balancing markets, which can affect also the development of more flexible capacity. They need to be addressed this and how to integrate more a capacity mechanism in the market designed to allow operate more freely.
We miss the lack of signals in shorter term markets (for example in balanced markets)
We should introduce more new markets (for example in Italy there is not a market for FCR (Frequency Containment Reserves))
Moving down in a local level, we need to develop new regulation framework for operators to remunerate or incentivise flexibility.

The last part of this session was related to the regulatory sandboxes. Fernando García introduced this new concept that comes from FinTech industry from the idea of allowing to innovators to test some solutions in a limited time (when the regulation does not allow to) but, regulator is involved, so that they can change the rules depending on test results. This means that sandboxes, experimental regulatory supervised spaces in real market, to close the gap between innovation and regulation.

- EERA JP SG/SINTEF ENERGY RESEARCH, Andrei Morch:

In several countries, some tests have been done but EU regulation prevent implementation. So, the new concept of Sandboxes is a good idea.

Ivana Kockar – Another concept: low carbon network fund maybe is the name, was larger than sandboxes and allowed to develop what is not normally authorized in normal operation (for example, time of use tariffs), any customer not willing to participate could opt out.

Norela Constantinescu – the importance of transparency to allow all consumers participation.
Fernando Garcia – one of the best is peer-to-peer (example developed in UK PN sandbox)
Natalie Samovich – Sandboxes complement the Horizon 2020 projects to speed-up replication project. The sandboxes could be faster than research projects. The level of sandboxes should be defined. The question is who is the driver of sandboxes: regulator, innovator, market/commercial need?

George Huitema – Digital twins and energy sector – move for regulation.

Norela Constantinescu – we need regulation, governance and rules defined coming from digital side. How we can put together this and sandboxes?

Natalie Samovich – Level Pan-European on regional markets to test bigger ideas like digital twins. Variety of sandboxes: geography by country and by level of regulation (locally, nationally, Pan-European). Combine electricity with other energy sectors but also with ICT or transport in the future.
Fernando Garcia – There are different level of sandboxes depending of the company or project.

- **2.1 THE USER AT THE CENTRE**

Presentation of moderators: Michele de Nigris, RSE and Michela Marasco, EC DG ENER.

One of the objectives of parallel sessions are to debate about the impact and ways that we need to follow to reach the 2050 targets following the most appropriate path and roadmap.

They introduced this parallel session regarding THE USER AT THE CENTRE taking the following topics into account:

- **Engaging final consumer in energy discussions**: changing role of the energy operators
- **Local communities, energy conversion and flexible energy storage** - impact on the final user-
- **Flexibility markets** – empowering the final prosumer aggregation, peer-to-peer, prediction.

- RSE, Michele De Nigris:

The objective of this session is to understand which are actions, needs, developments, the new aspect to be tackled and to realize of the part of the vision of the user is located.

The end-use applications focused on the network/generation part.

There are some aspects highlighted in the ETIP SNET Vision 2050. Engagement of final user is brought to attention. Examples:

- Zero energy building, combined heat and power
- Peer-to-peer energy trading
- Vehicle-to-grid application & small-scale storage
- Air/water, solar thermal
- Demand response & industry park
- Interconnexion with the rest networks
- Small scale battery
- Etc…

Highlight different subject we think that are very initial proposal
Three main subjects: **ENGAGE THE USER**

- Inform/involve user in on different approaches to energy: opportunities (distributed PV, local storage), and tools
- Is there any role for the existing operators?
- How do we engage on complex aspects such as energy vectors integration (heating and cooling of buildings is powered by renewable energy sources? Electricity is the main energy source for new buildings and to a large extent for refurbished buildings)
- How are end-user are involved in the different energy vectors

- EC DG ENER, Michela Marasco:

In addition to this, we have been informing consumers of a number of years, but how can we engage them in a more meaningful way? We had smart solutions that we thought were great but when they finally arrive to the consumer, they did not really like them.

The point is that consumers need to be engaged earlier on. We need additional thinking on how this can be done. How can we create a system where consumers have the right level of engagement? How to accelerate the way to the engagement of users.

- RSE, Michele De Nigris:

The next subject is **EMPOWER**. The following question were launched:
How can end-users contribute in HANDLING IMBALANCES for shorter variations inside the network? Or a large-scale, SEASONAL BALANCING?
What research activities do we need to empowered the consumer?
Another consideration is the integration needs of LOCAL MARKETS: subsidiarity, end-user consumption needs, new market approach: peer-to-peer. The possibility of the end-user can contribute to the electricity network as centre of the energy system and how to activate end-user flexibility are other considerations, as well as role of regulation in terms of empowering.

- EC DG ENER, Michela Marasco:

Empowering consumers can also mean to think about what the drivers for them are and how are going to be remunerated (not only money remuneration)

- RSE, Michele De Nigris:

The last subject is the **PROTECTION of the user.**
The importance of Data Privacy and Identify Protection.
The protection against attacks (cyber) and the role of regulation.

- COGEN EUROPE, Francois Paquet

Regarding empowerment, there is an example of H2020 project to create a market for micro CHP, renewable gas and to engage consumers to be active.
Empowering rewards actors on different markets in the form of revenue.
The key to engage and empower is essentially leveraging of the possibility of being empowered by the projects by the rules of the game that are developed – provide a framework.

Michela Marasco – empowering, local self-production and self-consumption but we need to keep a reliable grid.

- UNIÓN FENOSA DISTRIBUCIÓN/UFD, Fernando Garcia:

We need to difference between different consumers and different motivations for different customers. There are two kinds of motivation:

  - One is the price – reduction of cost
  - The other – more engaged with ecology (more the emotional part of the energy not the economic)

The best thing to engage is to create right and clear markets and draw clear rules for their participation: design tariffs that make engagement more attractive.

- FOSS, Venizelos Efthymiou:

We have started doing in some projects is to develop hands on experience of the new technologies through well planned and accessible areas where is built these technologies reflecting actual use of technologies in every life and to have access to children, engage them from a young age, engage them in accepting technologies. Need of starting to learn what is the energy transition. We already have positive outcomes in schools.

- UNIVERSITY OF STRATHCLYDE, Ivana Kockar:

We need to make things “less engaging” people do not want to spend time making too many decisions – we need automation.

How to engage the customers. Typically, the customer needs some additional thing that is useful for them, like you can get fast internet if you participate in the project. Replacing the old storage heating for brand new good storage heaters. Make consumers apply more.
Pilot projects, protection of customers is very important. They are not that tech savvy and might be taken advantage of. We need to make sure that if something goes wrong, they are protected.

- RSE, Michele De Nigris:

The final user might not be bothered by the concepts of energy. For those users, we need to shif the concept from product to service
The consumer wants comfort, not bothered about gas in home. The consumer wants something that is closer to the user, no EV as such, but rather focus on “mobility”, no heating but comfort, etc.
Move away from idea that energy is centre or the world as this does not resonate with consumer.

- EERA JP SG/SINTEF ENERGY RESEARCH, Andrei Morch

Some questions were launched: What about new architecture for power market? Why not try new things?

Fernando García - We must produce easier solutions. We must do the easy way to engage the participation of users, if not there will be borders.

Michele De Nigris: aspects of interoperability is of great importance. On the other hand, it is important for technologists. We do not want standardization to kill the design and innovation of new applications. All have smart same box but may not allow market to bring the best.

Fernando García - We need standard protocol that everyone can work with. Make unified protocols. We need to define a basic protocol. For example: telephone companies. There are not problems in Europe because we have the same protocol. However, with EEUU there are delays.

Michela Marasco – We need to talk about data. Ownership of the data, distributed generation makes predictability an issue, remuneration of the data. Data is very important to predict and operate.

- FOSS, Venizelos Efthymiou

We do not expect users to be in front of their energy system (question of remuneration). How much will local empowerment help security of supply and how to correctly remunerate consumer for providing that service. We need research to establish the costs in order to empower correctly the end consumer.

- COGEN EUROPE, Francois Paquet

A question was launched: How do we decide what to remunerate and how do we reflect that? Cost element of investment. How do we build a system that helps the frontrunners?

- INTERNATIONAL ENERGY AGENCY, Simone Landolina:

The timing of the involvement of users is very important, what are the next generation needs of the consumers?

- EUROHEAT & POWER/DHC+TECHNOLOGY PLATFORM, Alessandro Provaggi:

We have a lot of interest in crowd funding aspects. Citizens would like to own part of the infrastructure, energy crowd funding. It’s quite difficult to have platforms (at national level). There is not much opportunity to invest in equity for renewables. In energy community, it is party of the processes, it´s included.

- RSE, Michele De Nigris:

What about data ownership and remuneration? – the value of the data gives the possibility of profiling our types of consumption, more sensitive then electricity.
What is the remuneration out of delivering our personal data?

A stable grid is a benefit, it is something we should consider as part of the remuneration.

- UNIVERSITY OF STRATHCLYDE, Ivana Kockar:

If you try to buy ticket for airplane, prices go up as you search more for the ticket. We need to be careful. Giving a high price when they know that you are not flexible is risky and could adversely affect the consumer. Do not need 100% flexibility.

Michele De Nigris - How to value the externality?

- EKOENERGY ECOLABEL, FINNISH ASSOCIATION FOR NATURE CONSERVATION, Merve Güngör:

Not ready to appreciate grid stability. Consumers are not disinterested, it´s about bridging the interests. Important to establish dialogue between different sectors and say that you are benefitting.

- **2.2 DIGITALISATION**

Rainer Bacher and George Huitema gave a brief presentation on the scope of the parallel session. They familiarised the participants with ETIP SNET's Vision to foster a better exchange of ideas.

The aim was to focus on 4 main areas:

- **Digitalisation for Business**
- **Digitalisation for the End-user**
- **Digitalisation Model**
- **Sector Coupling**

These areas were then analysed according to 3 frameworks: Deployment needs in the next 4 years, Demonstration needs in the next 4 years, and Research needs by 2030, 2040 and 2050.

After this introduction, the moderators gave the floor to the participants, following each topic separately. It began by focusing on Digitalisation for Business.

- AIOTI/ENERCOUTIM, Natalie Samovich:

There are smart readiness indicators for building – could we have it for smart grids?

Norela Constantinescu - There is a proposal to have one. This proposal came from the manufacturers. Not only for digital technologies but all new technologies. It does fall on the regulators.

Natalie Samovich (AIOTI/ENERCOUTIM) – There is no incentive for the next steps. We need a goal and new regulations.

- Circular Economy Jobs, Lizhen Xu:

There should also be an HR component. We are using AI to predict future jobs but based on past data.

The discussion then moved on to Digitalisation for the End-user.

- ENTSO-E, Cristina Gomez:

If we could choose the type of energy we would use – solar, wind, etc - it would make the user more active and engaged.

Marie Latour – So we should receive the information of the provider?

Cristina Gomez (ENTSO-E) – Not just that, mostly to choose the provider.

George Huitema – There are already demonstrations with blockchain, but no deployment.

Rainer Bacher – There are laws that allow the consumer to choose already.

Cristina Gomez (ENTSO-E) – Yes, but we do not have the practical means.

Natalie Samovich (AIOTI/ENERCOUTIM) – There still aren't the right tools for it. The grid needs to be there for the transportation.

Alexander Vanderberghe (ETIP WIND) – Sourcing renewable power, traceability is paramount. You need to be sure of the colour of the electron.

Natalie Samovich (AIOTI/ENERCOUTIM) – There is a project where you can see the intensity of production and the carbon impact of all sources. It is a transparent electricity map.

George Huitema – There are demonstration projects to the label the electricity. There are projects to certify the origin of electricity, such as in hydrogen.

The discussion then moved on to Digitalisation Model.

- Rainer Bacher:

A model of gas distribution could be an important action, how could we address it?

Cristina Gomez (ENTSO-E) – Should we review if the models we have are interoperable?

George Huitema – There are some projects to develop a kind of Esperanto of modelling, an energy system description language, would that be it?

Cristina Gomez (ENTSO-E) – Yes, if we want results by 2030 it would be needed.

Gianluca Gigliucci (ENEL) – In addition to interoperability it would also be important to focus on the flexibility and real-time knowledge of the different actors' role in the grid. Like hydrogen, is it really flexible enough? The digital aspect would be a key part.

Rainer Bacher – This is learning by demonstration.

Gianluca Gigliucci (ENEL) – This would be a real demonstration with a lot of money. We would need a hydrogen production unit in the field, for example. It would be a flagship project.

- DG ENER, Eric Lecomte:

Concerning research, we know where the renewable energy sources are or will be, geographically. The same is true for major consumers like steel factories. We could model where they would be.

George Huitema – At a regional level?

Eric Lecomte (DG ENER)– It could be, but also European. Would we need something like this?

Gianluca Gigliucci (ENEL) – We need to study that, from real data of existing plants, trying to clusterise them. We could start from there to then understand what kind of energy storage would be better for each situation (wind, PV, etc.). This would depend on the duration needed for the storage as well. Would we even need new storage types?

Marieke Reijalt (EHA)– The dutch TSOs are looking at the energy transition and doing this modelling already. We believe it is possible. How can we make sure at the EC level that these activities are being coordinated? The modelling is occurring but it needs coordination.

George Huitema – Yes there is an ambition to develop a Digital Twin at a European scale. In a way that we could also have a look at the local scale. It is a very ambitious project. Then we could compare the national and local level.

Norela Constantinescu –We should not fall into a centralised European planning.

Eric Lecomte (DG ENER)– Yes, it is not to tell each country what they should do but give examples of the optimal solutions.

The discussion then moved on to Sector Coupling.

- ENEL, Gianluca Gigliucci:

In Italy we have “real time” meters for electricity but for gas. We should deploy it in sector coupling for all customers. Electricity, heat and gas systems. For an integrated system we need different platforms to speak together.

3.3 Conclusion session – Next steps

This session presented the main conclusions from the 4 different parallel sessions held throughout the day:

1.1. Technologies and Tools.

Rainer Bacher and Michele de Nigris presented their main conclusions from the session they moderated

a) Upgrading of electricity networks:

- There is a need to research how our systems will be resilient to climate change and extreme weather conditions. For this, we must look at the threats, the vulnerabilities and what measures should be taken.
- Efficiency vs flexibility. It is easy to accept greater efficiency but flexibility might be important in other scenarios.
- With the growth of EVs, more energy will be needed – is the system ready for it?

b) Storage and energy conversion technologies:

- It is important to define how large our storage should be to fuel needs.
- We have to understand how we will handle future energy reserves. We now have 20-25% of our energy needs in reserves. What will we need in the future? Currently they are in oil and gas, they must change.
- We need to have a parallel deployment of solutions that will help to cope with long periods when renewables will not be available.

c) Efficient energy use:

- Thermal grids and districts. They are very implemented in Nordic countries but rarely mentioned elsewhere.
- We lack frameworks to achieve the future. We need frameworks across sectors.
- Important to act on the models we have now, not wait for the perfect model.

1.2. Market.

Norela Constantinescu and Fernando Garcia presented their main conclusions from the session they moderated**:**

a) Requirements from grid users:

- Rolodex of grid services for flexibility at regional level (within the country and cross border).
- Governance rules on market conditions, platforms and interoperability.
- Remuneration mechanism for end-users and business cases.
- Interconnected networks and services in interconnected markets (for example, DH).

b) Different Times, Sources, Locations:

- Speed and impact will need the use connectivity such as 5G for real markets.
- Look at development of peer-to-peer transactions and impact on infrastructure in terms of constrains, rules, safety.
- Local communities can also state requirements to the grids.
- Aggregators and customer relations – for profit taking.
- Long-term signals for investments including for balancing markets.

c) Regulatory Sandboxes:

- Sandboxes, experimental regulatory supervised spaces in real market, to close the gap between innovation and regulation.
- Complement the Horizon 2020 projects to speed–up replication projects.

- Faster than only Research & Demonstration projects.

2.1. The User at the Centre

Michela Marasco and Michele de Nigris presented their main conclusions from the session they moderated**:**

a) Engage the user:
- Need to start learning what is the energy transition.
- Engage consumers in a more meaningful way. The point is to be engaged earlier on to get an additional thinking.
- The concept from product to service.
- Different motivations for different customers (financial & emotional).
- Need of producing easier solutions to engage the participation of users.
- Tariff schemes that facilitate the engagement of the user.

b) Empower the user:
- Empowering consumers can also mean to think about what the drivers for them are and how are they going to be remunerated (not only financial remuneration).
- Empowerment of the user has to be facilitated so it is not demanding on the user.

c) Protection of the user:
- Ownership and value of data.

2.2. Digitalisation

Rainer Bacher and George Huitema presented their main conclusions from the session they moderated**:**

a) Digitalisation for Business:
- P2P business, the TSO model can be followed. It goes beyond the neighbourhood business.
- Digitalisation readiness – where do people know what? Where could certain projects be implemented? How can it be measured? Perhaps using indicators as in smart grids?

b) Digitalisation for the End-user:
- The origin of energy should be traceable. Traceability of flexibility should also be understood. There are green certificates for this, but it is still not scaled up. Empowerment of the user has to be facilitated so it is not demanding on the user.

c) Digitalisation Model:
- Creation of a model that will focus on where energy will be “produced -> stored -> consumed” to better plan networks.
- There must be more hybrid models, where we can see how different infrastructure and providers interact and depend on each other.

d) Sector Coupling:
- Interoperability between sectors.
- We need real-time metering of consumption – electricity, heat, gas. In this way we can better analyse the flexibility requirements and implementation.

Marie Latour closed the event, thanking all speakers, moderators for their contributions and participants for their active participation.

4. PRESENTATIONS AND PICTURES OF THE WORKSHOP

- **Presentations**

All presentations of the workshop can be found and downloaded on the following page:

https://www.etip-snet.eu/eu-energy-players-discuss-energy-sector-synergies-leverage-new-clean-energy-technologies-integrated-system/

- **Pictures**

All pictures of the event can be downloaded here: https://www.flickr.com/photos/etipsnet/

ETIP SNET

EUROPEAN TECHNOLOGY AND INNOVATION PLATFORM

SMART NETWORKS FOR ENERGY TRANSITION

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