Public Consultation for the Implementation Plan 2017-2020

January 2018

ETIP SNET
Public Consultation for the Implementation Plan 2017-2020

Contract H2020 731220 — IntEnSys4EU

"INTEGRATED ENERGY SYSTEM - A PATHWAY FOR EUROPE"

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January 2018

PLAN. INNOVATE. ENGAGE.

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1 INTRODUCTION

1.1 CONTEXT

Europe's Strategic Energy Technology Plan (SET Plan) addresses the 5th dimension of the Energy Union with 10 Key Actions identified in September 2015 that address the whole innovation chain, from basic research to market uptake – see https://setis.ec.europa.eu/. Europe's energy transition is key to the European and global goals of reducing greenhouse gas emissions and keeping global temperature increases well below 2°C. To ensure this, more renewable and other carbon-neutral energy sources will be introduced into Europe's electricity, heating and cooling, and transport systems. The energy networks, especially stronger and smarter electricity grids interfaced with heating, gas and transport networks, play a key role in the energy transition while supporting security of supply and affordability. ETIP SNET – the European Technology and Innovation Platform "Smart Networks for Energy Transition" aims to make sure Europe's research and innovation (R&I) facilitates all energy customers and market actors to rely on optimally integrated networks, systems and markets.

The present document presents the public consultation responses that helped to shape, challenge and complement the Implementation Plan 2017-2020 (IP 17-20). This public consultation was held from 3 July to 10 August 2017.

The IP 17-20 was released during the European Utility Week 2017 (3-5 October 2017) and presented by its chairman Konstantin Staschus. The IP 17-20 has been elaborated in a very close collaboration with the ETIP-SNET Working Groups and the INTENSYS4EU support team. The IP 17-20 aims at listing the short-term priorities for R&I in ETIP SNET's scope and as defined in the DoI (Declaration of Intent) for key action 4 of the SET Plan (*Increase the resilience, security and smartness of the energy system*). It is based upon the ETIP-SNET R&I roadmap 2017-2026 which specifies the long-term R&I activities for the evolution of the European energy system. The roadmap was approved during the 4th Governing Board meeting of the ETIP-SNET (December 9, 2016).

The IP 17-20 reflects the heterogeneity of the ETIP-SNET and the willingness of their members to achieve the European energy transition faster and more efficiently by enhancing their cooperation to do so. Therefore, the very first document drafted for the IP 17-20 by all the WGs of the ETIP-SNET has generated a very important participation in the public consultation exercise.

1.2 THE PUBLIC CONSULTATION IN SOME NUMBERS!

69 stakeholders have provided feedback to the different 39 topics of the IP 17-20. This very significant participation has generated over 530 comments (i.e. remarks, contributions, proposals, etc.) which have required a detailed assessment because of their value, pertinence, and high expertise level provided. Each one of these comments have been assessed by the ETIP SNET Working Groups (WGs) and the INTENSYS4EU support team aiming their better integration in the current IP 17-20.

For instance, the figure below shows in red the number of comments which have required special attention and a specific assessment in each of the 39 topics.

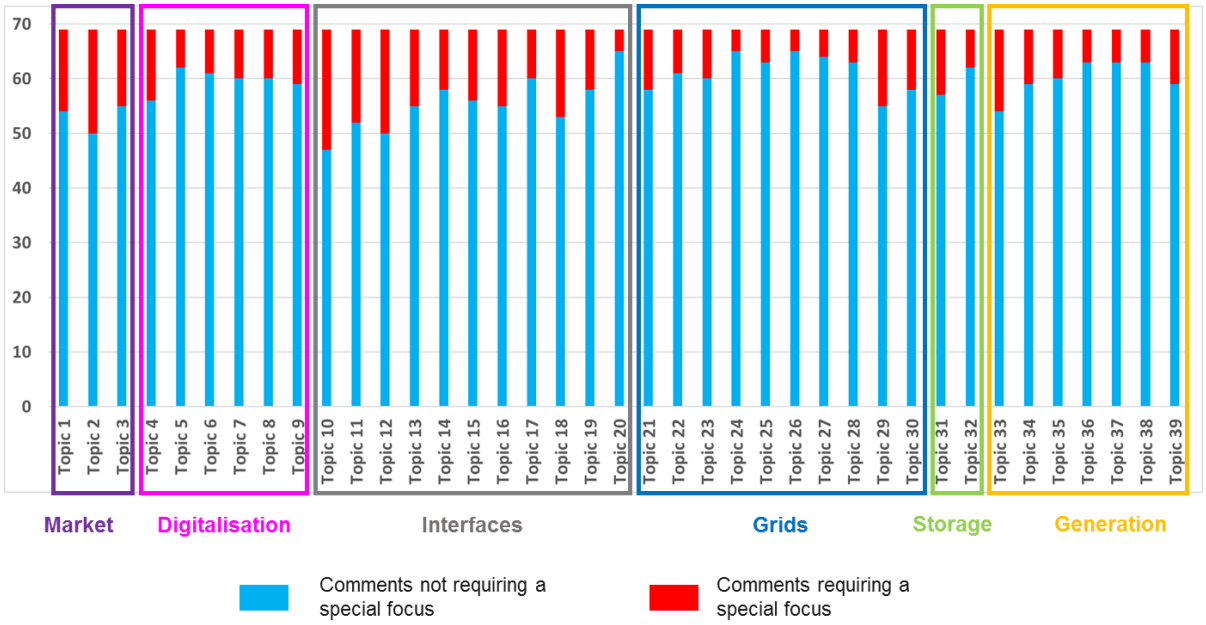

Figure 1. Number of comments per topic which would not impact the draft version of the IP 17-20 (in blue) and those requiring a special assessment from the ETIP SNET WGs and the Support Team (in red).

Furthermore, during the public consultation exercise, general questions about 4 main topics (Energy Markets [topics 1-3], Digitalisation [Topics 4-9], Sector interfaces [Topics 10-20] and Improved components [Topics 21-39]) of the IP have been made to the participants. The figure below shows the number of comments (in red) per main topic which have required a special focus and assessment from the ETIP SNET WGs and the Support Team.

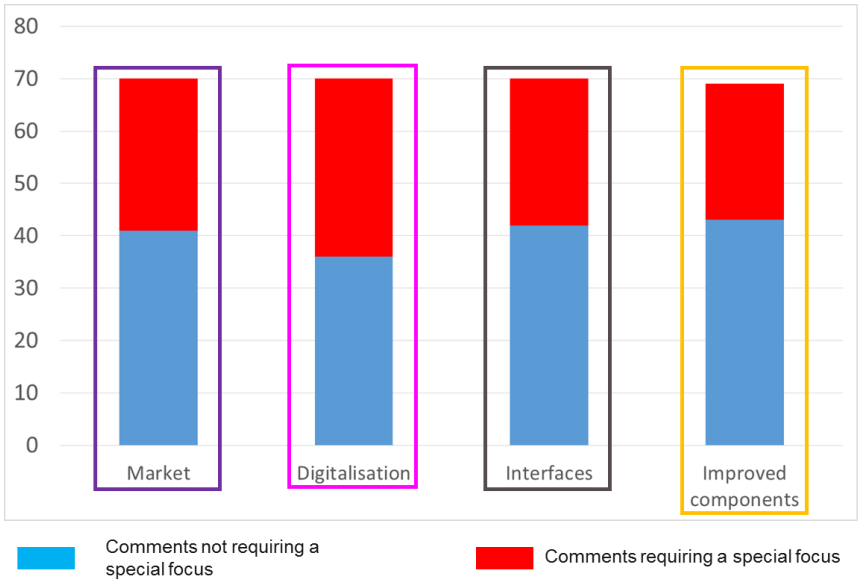

Figure 2. Number of comments per main topic which would not impact the draft version of the IP 17-20 (in blue) and those requiring a special assessment from the ETIP SNET WGs and the Support team (in red).

The following figures present the type and/or nature of the different stakeholders who have participated in this public consultation and also, the number of answers received per country.

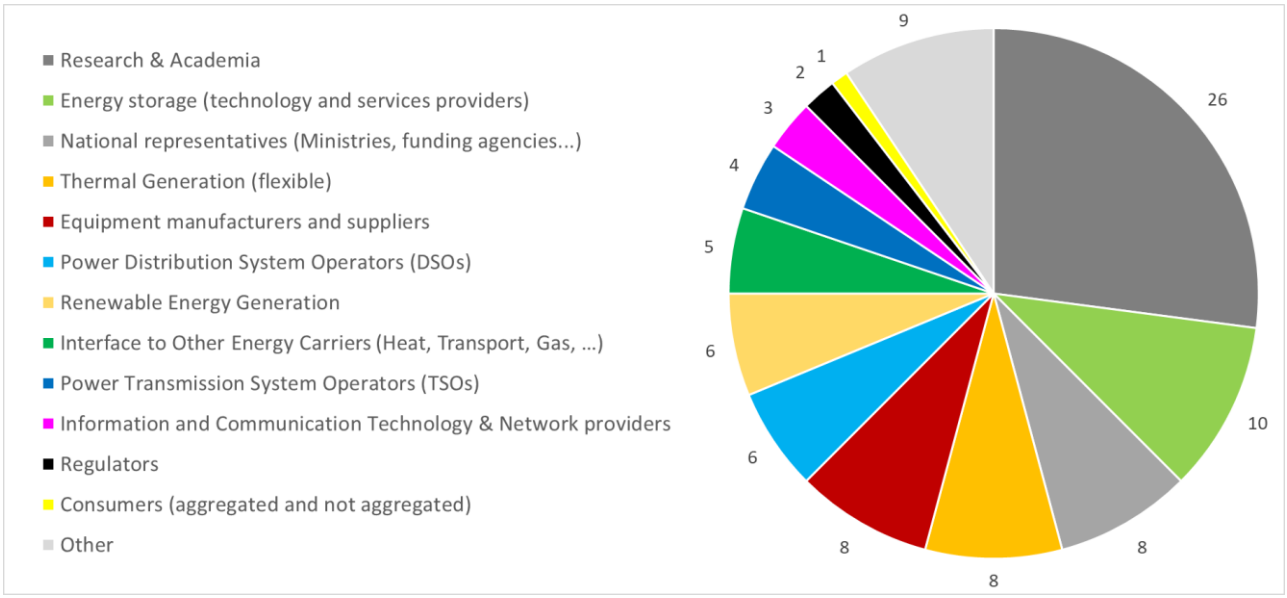

Figure 3. Number of responses per type of stakeholder.

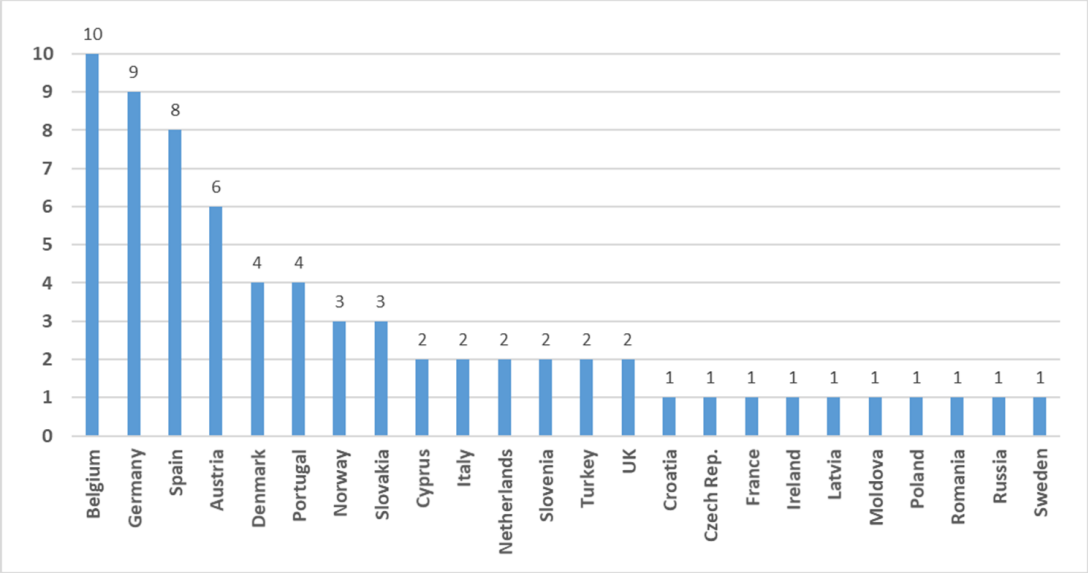

Figure 4. Number of responses per country.

1.3 STRUCTURE OF THE DOCUMENT

The present document[1] is organised as follows:

- For each of the 39 topics: three tables depending on the type of impact on the draft version of the IP 17-20 following the comments of each stakeholder:
  - A first table displaying the comments that would impact the structure or content of the topic in question;
  - A second table regarding comments that would be considered as inputs for the next ETIP SNET IP or Roadmap;
  - A third table for the rest of the comments (with no specific action proposed).
- For each of the 4 main sections (cf. sections 3.1 to 3.4 of the IP 17-20), the same three tables for general comments of each stakeholder.

[1] The present document contains the responses requiring a special assessment from the ETIP SNET WGs and the Support team.

2 COMMENTS RECEIVED DURING THE PUBLIC CONSULTATION

2.1 ANALYSIS OF HIGH-RES AND EMPOWERED END-USER ENERGY SYSTEM: GOVERNANCE AND MARKET DESIGN

2.1.1 TOPIC 1. FLEXIBLE MARKET DESIGN

Table 1. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Research & Academia)	"[…] would call it: Design of flexible markets (in order to avoid confusion)".	We agree. The title has been changes according to the remark of another stakeholder (ETIPWind).
Think Smart Grids (Association of promotion of the French Smart Grids sector)	The subject of the electricity market design is of major importance. One main issue is the economically sustainable design of the market, even more than its flexibility which should be a consequence. Three important aspects seem to be missing in the description. 1. The solutions developed should ensure an efficient risk-sharing between the stakeholders. 2. They should not be too "complicated" in order to be usable for the consumers. 3. They should keep the transactions costs as low as possible. Regarding the possible partners: the suppliers and energy service companies should be added in the stakeholders.	- The economic sustainability is mentioned: "*Test the new market design and tools/algorithms based on new energy system requirements and assess the social welfare for the customers".* - The three important aspects are indeed basic properties of any market design (point 3 is mentioned: *"[…] the economic rationale for cost allocation to the prices components needs to be defined*". For sake of clarity, we have introduced the proposed wording. - Energy service providers (retailers and ESCOs) have been added in the list of possible partners.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"[…] However we would like to see following changes: • Topic Title: preparing markets for flexibility. • […] Adapting market design to ensure the participation of renewables in the market."	The title has been changed to "Preparing markets for flexibility".
SINTEF Energi AS (Research & Academia)	"[…] We suggest adding the Market4RES EU-project to the list of reference projects. […]"	The Market4RES EU-project has been added as reference project for this Topic.

Table 2. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"[…] focus on local flexibilities and how they can be traded. In general the DSO-level as the main play field for distributed flexibility […]."	Local flexibilities are addressed in several Topics of this IP, e.g. in T10. It is also thoroughly addressed in the current ETIP SNET Roadmap (FO D3 and D4 for instance). Such R&I activities are indeed in line with the Clean Energy for all European package.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"[…] However we would like to see following changes:	-

Table 3. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Public Service of Wallonia	"Important topic; needs for new business models, including between European countries. This topic concerns also DSO and small customers. The estimated budget is however quite too important (50-100 M€) for such a subject."	The estimated budget is based on expert view. It is the result of a broad consultation. The market design should imply also the development of tools software which need to be integrated. The budget needs to reflect this.
University of Applied Sciences Aschaffenburg (Research & Academia)	"Importance / urgency: Confirmed Modification: Strive to unify differentiated markets (balancing power, reactive power, spot market) into one single market with transparent criteria and market functionality."	- This is not in line with the current regulation and directive, but could be interesting from the academic point of view.
Anonymous (Power Transmission System Operators (TSOs))	"[...] new technologies such as Blockchain could also be listed; improving cross-border congestion management could be mentioned; Reference Projects could also include SMARTNET; the "Reference Projects" could be included also in all other Topics; the 2021 timeframe indicated is not in line with the IP".	The Blockchain technology is mentioned in this Topic of the IP, and the improvement of cross-border exchanges as well. The SMARTNET project is not mentioned because it is an ongoing project as more could do. However, SMARNET will be reviewed during the Monitoring activities of the ETIP SNET and it would be included as a reference for the further ETIP SNET IP and Roadmap for its promising scope. - The timeframe 2017-2021 is an indication of the potential duration of the projects.
Anonymous (Information and Communication Technology & Network providers)	"Importance and urgency of the topic fully confirmed. Efficient use of locally generated energy at times when the energy is available from renewable sources of energy reduces both the need energy generation from non-renewable sources and the need for energy transportation over long distances.	- This suggestion is already contained in the topic description, more specifically in the Content/Scope section: "*Incentives for the market participants to react to system conditions according to the location and time. There is a need to consider different price components such as capacity and energy components and the various taxes*".

	Suggested modification of the description: use of flexible/dynamic tariffs, to incentivize load-shifting by the consumers, currently is strongly limited by regulation (which is tailored rather for an inflexible market).”	
PhD student in UPM (Research & Academia)	“The market design can contribute to deploy renewable energies if regulations are approached to distributed flexibility resources. Promoting local distributed resources with the support of local administration and local planning design to identify RES supply. Starting design in local urban planning will improve integration of variable RES and will avoid local and regional bottlenecks, first deploying retail market and after wholesale market to consider all the components.”	- We agree. However, the promotion of local distributed resources with the support of local administration and local planning design to identify RES supply is not in the objectives of T1.
University of Ljubljana (Research & Academia)	“Within Specific challenges peer-to-peer technologies are mentioned as a solution for the market design, however, within the Content section 'global modelling' is proposed as a tool. It seems like these are two different approaches: a peer-to-peer approach and a centralised approach. The Futureflow EU project also addresses similar issues.”	- As indicated in the challenges of the topic *“[…] Consumers should be empowered so that they can participate freely in all the markets, directly or through various market players*” thanks to the new technological development, however, in order to optimise the planning and improvement of the networks and their markets “global modelling” is needed to better take into account the functions and roles of the new entrants and how this would impact the general functioning of the system.
SINTEF Energi AS (Research & Academia)	“[…] We suggest to remove the last sentence of the challenge ("The new technologies…"), and potentially compensate by adding a sentence to the Content/Scope along the same line, but without explicit reference to selected technologies such as block chain. […] . The budget for this topic is very large and perhaps excessive, compared to the other topics in the draft implementation plan.”	- The reference made to the new technologies as it is already envisaged, we consider it could be part of the challenges to overcome where it is already taken into account and we highlight the importance of the peer-to-peer interactions. - Budget allocation comes out from a broad consultation.

2.1.2 TOPIC 2. MARKET DESIGN FOR TRADING OF HETEROGENEOUS FLEXIBILITY PRODUCTS

Table 4. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (National representatives (Ministries, funding agencies...))	“[…] It is not clear what is meant by "flex marker", it is probably some abbreviation for "flexible market", but it is not clear if it was supposed to be some technical term with defined meaning.”	It means flexibility markets. This has been amended.

Table 5. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"[…] Again the special focus on local (heterogeneous) flexibility products is missing. There is a big difference between flexibility providers (e.g. grid batteries operators) and small distributed flexibility providers (e.g. car batteries in the cloud) regarding technology, business models, connectivity etc. etc.."	- Cf. Table 2.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"Important topic; needs for new business models, including between European countries. This topic concerns also DSO and small customers. The estimated budget is however quite too important (50-100 M€) for such a subject."	- Cf. Table 3.
Technology Platform Smart Grids Austria (National representatives (Ministries, funding agencies...))	"Interoperability is a key factor for a successful transition of the energy system, which will lead to distributed interconnected ICT-networks. Interoperability is not explicitly addressed in the whole implementation plan and will not happen without a dedicated effort for it. In Austria there exists a project, which addresses this particular topic: "IES- integrating the energy system Austria" (www.iesaustria.at). The project leads to normative usage of existing standards which will ensure interoperability of data exchange. […] . This topic addresses the whole energy system: T15, T19, T20D3, D4, D7, 8, D9, D10, D11, D12	Interoperability (for instance D10) is a very important subject which is in the scope of the ETIP-SNET roadmap. It will certainly be more explicitly detailed in future Implementation Plans. - The reference FOs of this topic have been added accordingly.
Danish District Heating Association (Interest Organisation)	"The topic is important, and it is relevant to assess how other energy markets are affected. However, it is not enough just assessing this. The other energy markets (as the heating and cooling markets) must be adapted to this and new business models must be developed for those energy markets."	- Indeed, this could be taken into account in the future IP.
Anonymous (EC PPP)	"I confirm the importance. I would suggest to include hydrogen as one of the possible "energy markets" mentioned."	- Hydrogen markets are different from electricity, gas and heat markets but are expecting to play a role as an energy market. The compatibility of the existing H_2 market structure and interoperability with other markets needs further investigation. This could be subject of a new topic in the next IP.

Table 6. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
AIT Austrian Institute of Technology (Research & Academia)	"Also very important topic with a strong link to topic one. I would propose to merge the two, since the different flexibility products and there capabilities are strongly influencing the market design. If not, the difference between topic 1 and 2 should be explicitly mentioned."	It is explicitly mentioned in section 2.2.1 of the IP.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"[…] However, we would like to see following included in the topic text:	- Variable RES is one of the flexibility means. Topic 35 and 36 propose R&I activities for the technical integration of variable RES in future flexibility markets.

	• More emphasis on the access of variable Renewable Energy Sources to the flexibility market. This will increase the flexibility products market liquidity. Furthermore, we believe this topic could successfully merged with Topic 28 as they address similar issues."	- Topic 28 addresses the development of methods and tools to value flexibility products in flexibility markets.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"[…] The description of the topic should be reformulated making clearer the different sources of heterogeneity of the flexibility products, that should be considered, for instance: • heterogeneity between products provided through synergies between electricity, gas and heat sectors, • heterogeneity between the different technological solutions: demand response, storage, Electric Vehicles, interconnectors, advanced grid operation and components, etc. heterogeneity between the types of flexibility products needed and the associated market layers where they can be traded: energy, capacity, ancillary and network services, etc. […]"	- We prefer to be not too prescriptive so as to allow for diverse market designs in the projects to come.
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"[…] Maybe instead of "design" can be "guidelines" in order to give more free to the market construction."	- The title of the topic is the result of a broad consultation. In addition, the R&I activities are more focused on market designs than general guidelines.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"Market design must take into account the specific capabilities of each resource."	- This is well detailed in the challenges and the scope of the topic's description.
Anonymous (Equipment manufacturers and suppliers)	"[…] I believe flexibility needs to be differentiated between balancing products being effective on system level and such addressing local issues (e.g. local peak shaving or voltage support in distribution networks)."	- Both issues are being taken into account and the assessment tools and the prediction results would let know how these interaction at system and/or local level would take place in real use cases. This is part of the challenges addressed by this topic.
Anonymous (Power Transmission System Operators (TSOs))	"[…] include T9 in the main FOs […]"	- T9 is bout technical and regulatory aspects, it cannot be a main FO.
Anonymous (Information and Communication Technology & Network providers)	"Importance and urgency of the topic confirmed, but the combination of heterogeneous flexibility products might be considered as rather long-term more than short-term topic. Modification of the description: easy-to-understand motivation, why special focus is given to the trading of HETEROGENEOUS flexibility products"	- The real-life implementation of the combination of heterogeneous flexibility products can be considered as rather long-term more than short-term topic. However, it is necessary to start studies on the short term so as to be able to plan the possible coupling of the different energy networks and the associated markets.
Anonymous (Equipment manufacturers and suppliers)	"Our first focus here would be to develop the connection to network isolated from the Grid and to develop the integration with the energy storage. Second focus should be on the energy trading and prediction of the weather, productivity and energy costs."	- First focus: not in line with the coverage of the Topic. - Second focus: prediction of weather, productivity, etc. has been addressed in previous calls. Weather forecast is addressed in Topic 14.

PhD student in UPM (Research & Academia)	It is important integration at all levels, also heterogeneous products to improve the cooperation between the different energy markets. Integration of different energy like electricity, heat, cool, gas in the same urban infrastructure must be studied in urban planning stage first to achieve more efficient systems.	- These approaches are taken into account in the description of the topic.
University of Ljubljana (Research & Academia)	"There seems to be some overlapping with Topic 1. E.g. 'flex market' is mentioned in both topics."	- The difference between the two topics is clearly explained in section 2.2.1 of the IP.
ABIO Research Group, UPM (Research & Academia)	"It is important integration at all levels, also heterogeneous products to improve the cooperation between the different energy markets. Integration of different energy sectors like electricity, heat, cooling in the same urban infrastructure must be studied first in urban planning stage to achieve more efficient systems and integrate heterogeneous products."	- Indeed, but the development of energy networks in urban areas is not in the scope of the present topic.
SINTEF Energi AS (Research & Academia)	"We believe this topic is less important than topic 1, as it seems to rely on a wide-spread use of gas networks. We question the importance of gas networks in the future low-carbon energy system. This topic must be better aligned with topic 1. The relative budget size of topic 2 compared to topic 1 seems reasonable, as this must be understood as an extension of topic 1."	- Importance of gas networks in the future low-carbon energy system: the statement might be not true for all European countries. - The difference between the two topics is clearly explained in section 2.2.1 of the IP.
Anonymous (Power Transmission System Operators (TSOs), Power Distribution System Operators (DSOs), Research & Academia, Energy storage (technology and services providers), Renewable Energy Generation)	"[…] Developing a flexible market design leads to heterogeneous flexibility products and vice versa. One recommended tweak: Using HOMER Energy software for modelling hybrid systems of DERs. […]»	- The expertise of the different stakeholders and their tools will indeed be primordial to achieve the targets established.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"We agree that this topic is important and urgent. The combination of electricity, heat and gas networks is an interesting concept and the benefits could be huge for all parties, but a clear definition how the different networks will work together is urgently needed."	- The definition and guidelines about how the different networks will work together should be one of the outcomes of the projects answering such a call.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"This would require a holistic and sophisticated control & automations system for grid operation and whole/retail prize indicators as well as the prediction of gen and prices."	- This is why it is a topic to be addressed urgently.

2.1.3 TOPIC 3. HOLISTIC MODEL AND UNIFIED TECHNICAL / FUNCTIONAL ARCHITECTURE FOR SMART POWER SYSTEMS

Table 7. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
EUFP7 GARPUR consortium (Research & Academia)	"[…] Suggested modification of "Content/Scope" description: Replace "(N-1 criteria)" by "(N-1 criteria and the proposed probabilistic reliability management criteria)"	We agree. This has been changed. GARPUR being at its very final phase has been added as a reference.

	We suggest to add GARPUR as reference project."	
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"[…] the question of making important changes in the architecture of power systems must take into account the numerous steps that might be necessary to implement such changes starting from the present state. […] This architecture has to take into account the country specificities in order to be scalable and replicable. Regarding the possible partners: the suppliers and energy service companies should be added in the stakeholders."	Retailers and ESCOs have been added in the list of possible participants.
SINTEF Energi AS (Research & Academia)	"We believe this topic is very ambitious. We propose to modify it such that proposals may a) Rely heavily on developing interfaces between existing models and frameworks, and b) Focus on selected sub-topics (e.g. specific applications), rather than creating a single holistic model. We propose to replace "(N-1 criteria)" by "(N-1 and probabilistic reliability management criteria)". We suggest to add GARPUR as reference project."	- The development of interfaces is specifically mentioned in the Content/scope. - Regarding the existing framework and models, the purpose of Topic 3 is rather to unify the existing framework under a new model. GARPUR has been added as a reference project since ending in October 2017. For the N-1 criteria, see above the remark from the GARPUR consortium.
Anonymous (Research & Academia, Member of the ETIP – SNET WG5 "Innovation implementation in the business environment")	"Due to the expected target TRL level, T16 (Business model) must be considered in the Main or Supported FOs in order to exchange experiences between regions and help the stakeholders to envisage their roles and interaction."	T16 has been added in the list of supported FOs.

Table 8. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
		-

Table 9. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"ETIPWind acknowledges that the challenges outlined in this topic are important. However we would like to see following changes included in the topic text:	- A holistic model for smart power systems is developed on the assumption of a very high RES share; - Control strategies are implicitly included in demonstration of operation processes; - VPP and storage are explicitly mentioned in the description of the topic.

	• The overall aim of the challenge should be to achieve full integration of dispersed Renewable Energy in relation to electricity consumers. This means that the development of demand side management through Smart Grids should tackle the challenge of the growing share of variable dispersed renewable energy. Rather than a holistic model for smart power systems, the aim should be to develop a holistic model for a power system driven by variable & dispersed renewable energy as the EU is moving to a carbon-free energy system by 2050. • "Demonstration of operation processes" (in the expected impact) should explicitly include control strategies from both conventional generation and renewable generation. "All stakeholders" & "different stakeholders" (in the content/scope) should explicitly include Renewable Energy Sources aggregated in Virtual Power Plants, Storage and Prosumers."	
AIT Austrian Institute of Technology (Research & Academia)	"[…] Content/Scope: Virtual power plant, microgrids, cellular approaches are very general, well known and widely accepted approaches. Link-paradigm is a specific solution from a single entity and should not be mentioned among the general ones."	It is specifically mentioned that Link-paradigm is a solution among many others.
Anonymous (Equipment manufacturers and suppliers)	"[…] I would recommend to address more explicitly that this may not only alter existing market roles but could also result in new ones, (in my opinion in particular in the area of data handling). One more detailed remark: There is a reference to static stability represented by the (n-1) criterion. A research agenda addressing smarter systems should challenge this concept and consider more curative elements in network operation, by that making this criterion at least partly dynamic (and releasing additional network capacity today reserved for emergency cases)."	- New market roles will result from such R&I activities. - The reference to static stability has been addressed, cf. **Error! Reference source not found.** above.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"There can be several different holistic models each of them specific to a Region or a group of Regions or Countries. But the technique (devices) must be normalised and common."	The purpose is to have a single holistic model able to account for the specificities of different regions.
Anonymous (Equipment manufacturers and suppliers)	"Focus should be given as well to the development and integration of our renewable energy control systems to align with global architecture for smart power system."	Control strategies are implicitly included in demonstration of operation processes (cf. above).
University of Ljubljana (Research & Academia)	"It could be pointed out within this topic, that possibly different objectives (goals) of different market stakeholders (retailer, TSO, DSO, customer) present a big challenge. For example, a demand-response service may be beneficial for the retailer and/or TSO, but have a negative impact on DSO operation. Therefore, the service provider should be aware of the grid and of the market at the same time. The TRL level 2-7 is too wide. […]"	- As detailed in the scope of the topic "*proposals should focus on a reliable, secure and economical, environmentally friendly operation of smart power systems by putting all stakeholders - i.e. TSO, DSO, generation, storage, market players and prosumers - under the same umbrella.*" - The expected TRL to gives some degrees of freedom to the progress of this type of approaches.
EKONERG (Consultancy)	"It is important to make modelling on different levels in three dimensions perspective like in SGAM."	This would be taken into account properly while developing the holistic approach described in the IP.

Anonymous (Research & Academia)	"[…] Wish to stress that: Due limitation of fossil fuel usage needs true cost of GHG emissions, drawn from their correlation with mean global temperature shift, which has already been scientifically established. This has to prompt a new emissions evaluation as a solid stand for the desired common ground. "	- Correct in principle, but out of scope of R&D of power sector (indeed it as INPUT for power sector business calculations): it is a socio-economic calculation strongly dependent on governmental policies.

2.1.4 GENERAL COMMENTS ABOUT PART 1. GOVERNANCE AND MARKET DESIGN

Table 10. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
INESC TEC (Research & Academia)	"Capacity markets".	This topic has been added in the description of Topic 3 "Holistic model and unified technical / functional architecture for smart power systems".

Table 11. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
PhD student in UPM (Research & Academia)	"A Pan-European liberalised energy market required local market design: it is necessary to adjust local market design with local renewable resources in urban planning to integrate this in next territorial scales, metropolitan, province, regional, national, European and global world. Implementation by scales is important from neighbourhood and urban scale to integrate all local resources to supply."	- A decentralised approach and at district level is in the scope of the current ETIP SNET Roadmap aiming at providing recommendations for the flexibility market design at DSO level (FO D3 and D4). This topic would certainly be tackled in future IPs.
ABIO Research Group, UPM (Research & Academia)	A Pan-European liberalised energy market required local market design: it is necessary adjust local market design with local renewable resources in urban planning to integrate this in next territorial scales, metropolitan, province, regional, national, European and global world. Implementation by scales is important from neighbourhood and urban scale to integrate all local resources to supply. Governance design integrated in energy urban planning helps to achieve better energy efficiency and demand side response. The involvement of local bodies in the early stage of planning of the infrastructures to accomplish active customers in demand side management.	- Same comment as above.

Table 12. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (National representatives (Ministries, funding agencies...))	"Two general comments: 1. With regards the topic 1and 3, I would like to stress the need to reach scheduled levels of electricity interconnections cross-border. […] 2. Enable TSOs to give incentives to connected generators and DSOs to give incentives to connected consumers/devices and small scale generators, in both cases to improve predictability and anticipate problems"	- Interconnection issues are dealt with in several topics of the IP (for example 22, 25, 26 and 36). - Point 2 is a matter of regulation and is not in the scope of the IP.
Anonymous (Research & Academia)	"•The suggestion presented for Topic 3 above might more appropriate for a new topic altogether. "•"regarding both governance (how to organize the operations of the energy system and the associated interactions between the different stakeholders) and market design (market rules supporting the development of renewables and empowering prosumers)", along the whole IP document there are several references to the need of active end-consumer participation and public acceptance of certain aspects. It is noticeable that these tend to cluster around certain notorious concerns that made their way often through less educated opinion makers. This requires attention about how to raise educated public awareness. If the end customer feels his real needs are being harnessed towards some energy planning he barely understands, it is much more difficult to motivate his participation than if he is invited to help design a truly sustainable system. If he knows who he can hold responsible for guaranteeing the swift functioning of his energy networks, that he will receive clear and transparent info about the options he faces and how to manage them, that he pays but a fair share of its costs, that his main environmental concerns or the privacy and security of his data are duly taken care of, he may feel much more interested in participating. I think this does deserve an urgent topic."	Customer acceptance issues are well covered in other related Topics. These issues have also been largely covered by previous H2020 calls.
INEA d.o.o. (Information and Communication Technology & Network providers, Engineering – solution provider)	"We would emphasize in our opinion the importance of dynamic pricing of energy flexibilities which would be based on local balance/unbalance of demand and supply which would result in: i) increased local balancing of supply and demand, ii) take the load off dispersed RES production, iii) reduce the need to transfer the peak energy from TSO, iv) reduce congestion problems and the need for curtailment. Such dynamic price could be defined in the continuous market in 15 min tariff intervals, as close to real time as trading process allows it; with automatic trading	This is covered in Topic 1 (Flexible market design) and Topic 2 (Market design for trading heterogeneous flexibility products) and would form part of a possible approach that could be adapted to address the scope as described in these Topics. Dynamic pricing could be considered and evaluated as a possible solution. However, given the low TRL level associated with these topics, the challenges described in the topic could still be open to a range of possible approaches that would have to be evaluated and it is not preferred to specify any potential approach at this stage. WG1 does not recommend an update to the IP.

	of prosumers, the price change interval would depend on the (associated cost of) virtual energy storage reservoirs in processes. The balancing benefits obtained by DSO's should be fairly assigned to market participants. Compensation payments between DSO's and balancing responsible parties derived from avoided costs by DSO due to balancing by energy flexibilities (DR) should be allowed. DSOs should define products based on operational state (mode) of local grid, they should include cost of transfer of energy. The prices should be based on avoided costs if such services were provided by TSO. The DSO's should be remunerated by TSO based on avoided costs of TSO. The procurement of Balancing capacity (downward) can be performed jointly by TSO and by DSO. The part performed by DSO can be performed by local balancing and thereby reduce the need for the procurement of the downwards Balancing capacity and the associated congestion problems (avoided balancing capacity by TSO). " In the case of balancing capacity being procured by DSO, the capacity trading can be traded together with energy trading (implicit capacity trading), based on costs of energy transfer, provided that it be transparent to participants. »	
Anonymous (Regulators)	« Importance of electricity interconnections »	Same as previous comment
Anonymous (National representatives (Ministries, funding agencies...))	"We would like to underline that electricity interconnections are vital to accommodate increasing levels of variable renewables in a more secure and cost-efficient way. Interconnections are also essential to meet the EU ambition to be world leader in renewable energy, which is not only a matter of a responsible climate change policy but also an industrial and R+D policy imperative. This is of paramount importance for countries that are still far below the 10% interconnection target and will not be able to reach it by 2020, nor by 2025."	Same as previous comment
B.A.U.M. Consult GmbH (Research & Academia)	"There are two main approaches for the future energy system which are worth exploring further: 1. Everything is happening on the transmission level, European markets for flexibility (in parallel to eex) free data exchange etc. 2. The cellular approach, everything is happening on distribution level (generation, consumption, storage, possible islanding mode) and the transmission grid is more a safety net. The energy and flexibility markets become local (the platforms can remain international though). Both approaches have different implications, strength and weaknesses, which should be explored within the next years of ETIP SNET. What is also missing is research about possible business models supporting and empowering prosumers and their integration into the energy system. It is advertised everywhere but hardly any project or company gives answers how exactly that shall happen. At the moment self-sufficient use of energy for prosumers (without grid compliance) is the only model that is really pushed in the market"	- The transmission level issues dealing with flexibility are addressed in Topics 13 and 15 where it is aimed to have smarter and reliable interfaces between generation and transmission networks and to obtain recommendations for a new market design. In topics 1, 2, 3, 16, 17 and 28 for instance, flexibility issues at the distributed level are commented. The IP aims at enhancing the coordination and measurement of system flexibility mechanisms with profitable business models. - The ETIP-SNET's Roadmap and IP look for customer empowerment and its integration to the energy system via different recommendations and strategies, and principally, favouring living demonstration sites which would have a large number of stakeholders engaged and would test different kind of business cases in which the "prosumer" may play a significant role providing guidelines to set up more profitable business models.

Institute of Physical Energetics (IPE) (Research & Academia)	"I confirm importance of all topics, but in my opinion Topic 1. Flexible Market Design can be used as general topic and Topic2&Topic 3, as subtopics."	As the three topics are extremely related, they have already been categorised in the "*High-res and empowered end-user energy system: governance and market design*". We consider that the structure of the topic could be kept as it is.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"The integration of the European energy system in a context of electricity and heat, produced from renewables, must have different stakeholders and other goals like buildings and regulations in urban planning."	This is already the case as mentioned in the Topic 10 "Coupling of electricity and thermal sectors".
University of Applied Sciences Aschaffenburg (Research & Academia)	"Modification1: Strive to unify differentiated markets (balancing power, reactive power, spot market) into one single market with transparent criteria and market functionality. Modification2: Focus on standardization of interfaces (cf. network protocols) for fully automatic generation of architecture"	- Modification 1: The modification of the different markets would be a result coming from the different analysis aimed with the holistic version of the energy system and the market flexibility described in the IP. - Modification 2: The promotion of standards and its elaboration is targeted all along the current IP between different type of networks (Power-to-X, RES, storage, etc.) and between ICT systems.
Financial University (Research & Academia	"Continuous exchange of knowledge and continuous training of personnel".	These actions are already foreseen in the current IP and Roadmap.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"Governance and market design are two different things. Promoting sustainable energy can be done in different ways according to national legislations. It could be interesting to promote researches comparing the different laws concerning business, privacy, regulation, etc. in all the countries; these researches will compare the advantages and disadvantages of each other. As soon as flexibility is introduced, data management, cyber security and privacy must be carefully considered."	As explained in Topics 1-3, the holistic model for smart power systems would generate sustainable, secure, economic and environmentally friendly solutions for the system, its stakeholders and its market. Market design includes its organisation, e.g. the interactions between the different stakeholders. Governance (Clean Energy Package) is addressed at EC level.
Energy Regulatory Office (Regulators)	"Market project should be focused on the distributed and disseminated resources cooperation and development and its relationship to the incumbent business / Market position of energy storage as a market tool for the energy shift (on the generation/trade side) and for the power flows limitation (grid operator side). It is new role on the market, across "pure" unbundling, and it needs a new market mechanism."	The markets related to flexibility generated by storage have been already been taken into account in different topics and at different levels of the present IP.
Anonymous (Research & Academia)	"The emphasis here seems to be on a market-driven approach. But are there other models? Is there scope here for a Participatory Development approach which does not limit the public to the status of consumer/prosumer?"	The entrance of innovative tools such as block chain and peer to peer platforms for instance would strongly impact the market as we know it in the future. These tools would allow to different stakeholders, (i.e. prosumer/customers) to have a deeper participation in the different markets and energy exchanges in the upcoming years.
Danish District Heating Association (Interest Organisation)	"There is also a need for development of new business models and market designs for other energy markets than electricity, e.g. heating, cooling and gas."	This aspect is mentioned and detailed in Topic 6 "Customer participation and New markets and Business Models", also in Topics 10 and 12 related to coupling of electricity and thermal and electricity and gas sectors, respectively.

Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Changes in market design are difficult to make because the impacts of the changes are not so easily foreseen. Modelling different market designs and their possible consequences for the different stakeholders is very important and still lacking. In particular, the interaction and/or the integration between the different markets at wholesale and retail levels should be investigated, e.g. what will be the impacts of the evolutions seen at the retail level (peer-to-peer trading, local flexibility markets, etc.) on the wholesale level and which adaptations will be needed for an efficient integration."	Topic 1 aims at developing new tools and algorithms for market and network analysis. These tools target to analyse wholesale and retail markets integration.
Siemens AG (Thermal Generation (flexible))	"What about the topic to pay for flexibility in thermal generation? In general it creates more wear & tear and due to the preferential feed-in of renewables this generation technology is favoured at cost of others (Thermal generation) which suffer from oversupply."	This is partly covered by Topic 33.
EUTurbines - European Association of Gas and Steam Turbine Manufacturers (Thermal Generation (flexible), Equipment manufacturers and suppliers)	"[…] EUTurbines agrees that market design is an extremely important topic. Flexibility is the cornerstone to build a reliable and secure energy system that can quickly adapt to increasing challenges due to higher shares of variable renewable energy sources. We would like to stress the need to ensure that all measures considered and developed within this topic contribute to a reliable, efficient and affordable power supply. In the same way, all flexibility options, including flexible thermal power generation, need to be considered in the models. Any activities under this part also need to take into account the on-going discussions at EU level and reflect any decisions that are relevant within this framework.]	Topics 1 to 3 are based on the assumption of a very high share of renewables in the power system, which necessitates several flexibility options, including thermal power generation.
University of Ljubljana (Research & Academia)	"There is some overlapping among these topics."	Some of the specific R&I activities might slightly overlap, although the difference between the topics is clearly explained in section 2.2.1 of the IP.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"By 2030, renewable will represent 35% of the EU's power mix from 20% today. This means that we cannot rely on today's power mix to define tomorrow's solutions. In Part-1, ETIP SNET needs to ensure that the system governance and market design are adapted to the future electricity system, and make sure that the new protagonists, mostly renewable energy sources can participate fully."	The different analysis that would be performed to design the new market conditions and the guidelines to set up recommendations for the governance of the future power system would consider different scenarios in which, the EU goals (i.e. RES integration) for the next years will be taken into account.
Anonymous (Energy storage (technology and services providers), suppliers of electricity)	"Flexible market design: Yes […]. The process will require the establishment of training centres for prosumers."	This comment is in line with the scope of ETIP SNET IP and Roadmap aiming to empower the customer.
AIT Austrian Institute of Technology (Research & Academia)	"The differentiation between topic 1 and 2 should be better explained."	This is explained in section 2.2.1 of the IP.
EKONERG (Consultancy)	"Put accent on modelling and simulation with thorough analyse of all input and output variables that determines each element."	Modelling and simulation tool are a top priority of topics 1 to 3.
FOSS (Research & Academia)	"Empowered end users are critical in operating the system of the future with high penetration of RES and supporting technologies	As indicated in the challenges of the topic 1 *"[…] Consumers should be empowered so that they can participate freely in all the markets, directly or through*

	capable of trading their flexibility that is generated through their local generation, storage, EVs etc. singly or aggregated. Distributed resources should be utilised to their full service capabilities with active participation in the ancillary services market and the operators DSOs and TSOs in seamless communication for optimal use of the system." "Siemens agrees that market design is an extremely important topic. Flexibility is the cornerstone to build a reliable and secure energy system that can quickly adapt to increasing challenges due to higher shares of variable renewable energy sources. We would like to stress the need to ensure that all measures considered and developed within this topic contribute to a reliable, efficient and affordable power supply. In the same way, all flexibility options, including flexible thermal power generation, need to be considered in the models. Any activities under this part also need to take into account the on-going discussions at EU level and reflect any decisions that are relevant within this framework. The budget for market design (up to 170'0) is pretty high compared to other topics (e.g. digitalization 55'0). Moreover the spread between 50'0 and 100'0 is quite large. What is the reason for this large spread? He budgets for topics 1-3 spread very much (100'0 – 10'0 – 60'0). The targets for topic 1-3 are very generic and broad. Please add concrete targets for those topics, which should be reached. In general the proposed implementation plan must strongly interact with today's TSO/DSO strategy and future development plans Flexibility is the cornerstone to build-up a reliable and secure energy system considering the latest requirements from the liberalized market. So the "urgency" is confirmed."	*various market players*" thanks to the new technological development, however, in order to optimise the planning and improvement of the networks and their markets "global modelling" is needed to better take into account the functions and roles of the new entrants and new (ancillary) services provided and how this would impact the general functioning of the system.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)		Future projects addressing the R&I activities listed in topics 1-3 will of course consider the relevant EU framework (recast of the directive and the regulation). Related to comments about budgets the following is said: "The estimated budget is based on expert view. It is the result of a broad consultation." The answer to budgets comments should be aligned with what is mentioned above.

2.2 DIGITALISATION OF THE ENERGY SYSTEM

2.2.1 TOPIC 4. DIGITAL TECHNOLOGIES, REFERENCE ARCHITECTURES AND STANDARDS FOR A SCALABLE ENERGY TRANSITION

Table 13. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (National Technology Platform)	"There might be a mistake in the "content/scope" section: should it not say "role of centralized, versus decentralized/distributed"? Content wise would we suggest to integrate the Smart Grid Architecture Model (SGAM Model) in order to guarantee interoperability in the further development of European (electricity) networks."	- "role of decentralized, versus decentralized/distributed" has been changed to ""role of centralized, versus decentralized/distributed" - We have added a reference to the SGAM model in the "Additional information" section.
Anonymous (Power Transmission System Operators (TSOs))	"[…] Missing TRL; Budget seems too short for engaging multiple stakeholders in multidisciplinary simulations and demos; IEC61850 will play a fundamental role in digitalizing future power systems. As so, it should be explicitly mentioned in this bullet […]	- We have added a reference to IEC 61850 standard in the "Additional information" section.
Technology Platform Smart Grids Austria (National representatives (Ministries, funding agencies...))	"Within the framework of the M / 490 mandat, the Smart Grid Architecture Model (SGAM) presents a reference system, which is now widely accepted. A reference architecture developed in Europe today should refer to SGAM by definition. In Austria the Technology Platform Smart Grids Austria started an initiative called RASSA initiative ("RASSA – Reference Architecture for Secure Smart Grids in Austria", www.rassa.at) whose objective is to develop a reference architecture for smart grids in Austria coordinated with all relevant stakeholders. […]. Based on existing previous achievements a reference architecture as a model based description was developed […]. The development of the reference architecture is based on use cases and refers international standards […] such as SGAM, ENTSO-E, and the NIST Guidelines for Smart Grid Cyber Security."	- A reference to the SGAM has been added, cf. above.

Table 14. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
KTH Royal Institute of Technology (Research & Academia)	"Important, but the prosumers data protection needs to be taken into account"	- Data privacy/protection has already been addressed in EC-funded research projects and is accounted for in the current roadmap. This topic could be included in the next IPs.

Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"The forecast budget (5 M€) is too low for this important topic"	- This budget could be revised in the next IP.

Table 15. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Information and Communication Technology & Network providers)	"Not fully understood why this umbrella topic is stated as a topic of its own. It might be helpful to detail this in the (so far very short) description."	This topic provides overview of the development of "*a suitable ICT infrastructure, data availability and common standards for data exchange"* as stated in section 2.2.2 of the IP.
Anonymous (Equipment manufacturers and suppliers)	"I am not sure what is expected to be covered in detail here. In my opinion it is necessary to differentiate between an architecture addressing power system operation (i.e. remote control and automation) on one side and organisational aspects (including connectivity and authentication of distributed resources) on the other side. In general (i.e. not specific to ETIP SNET) I am observing much more focus on the first part. Therefore I want to raise the issue here, to be on the safe side."	We consider that both points are well covered in the present IP, for instance, issues as automation of the system controls, digitalisation of assets, integration of DER, IoT, etc.…
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Important points are the availability of data and the definition of interoperable standards for those data. The second will be close cooperation between the TSO and DSOs management system throughout Europe."	Standardisation of data is one of the principal targets of the IP. Interoperability is also another subject which represents a great interest and is risen in several topics as we aim at enhancing the collaboration/interactions between TSOs and DSOs (Topic 21).
University of Ljubljana (Research & Academia)	"Large scale demonstrators are mentioned, although demonstration is covered in Topic 5."	As Topic 4 ensures the coherence of Topics 5-7, it is normal that some of the outcomes and expected impacts would be quite similar.
EKONERG (Consultancy)	"Open standard and high level programming language development that will enable development of intelligent algorithms."	These issues are to be tackled in the current IP.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"While this topic is necessary its importance and urgency is not as high as topic 1-3."	The urgency level of each topic could be different depending on the nature of the stakeholder who has elaborated the level of urgency. The subjects in the IP are considered as urgent by all the involved stakeholders.

2.2.2 TOPIC 5. DEMONSTRATION OF INTEGRATED IT-SOLUTIONS FOR NEW MARKETS AND BUSINESS MODELS ACROSS THE SYSTEM

Table 16. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Information and Communication Technology & Network providers)	"Importance and urgency of the topic confirmed, the need of integrated IT-solutions for the listed functional objectives seems to be obvious - but what is the specific challenge seen here?"	The description of the specific challenge of Topic 5 has been added.
ABIO Research Group, UPM (Research & Academia)	"This topic has few proposals in its data and lack of scopes, without specific challenge and expected outcomes. Energy efficiency from integration with homes and buildings is a great challenge that must have new planning for integrated IT-solutions with construction regulations."	The expected outcomes of Topic 5 have been provided.
University of Ljubljana (Research & Academia)	"There should be some emphasis on the costs of IT solutions, especially in the case of customers in the LV grid. Namely, in such grids, the costs of IT can easily exceed the costs of network reinforcement."	It has been specified in the specific challenge that the development of the IT solutions must be performed at affordable costs.

Table 17. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
		-

Table 18. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (National representatives (Ministries, funding agencies...))	"I confirm the importance and urgency of the topic. Possible overlaps with topic 6."	The difference between the two topics is explained in section 2.2.2.
Anonymous (Equipment manufacturers and suppliers)	"As I am convinced that such solutions are hindered today by a lack of a suitable market model (which should be addressed in topic 3) and not by missing technologies, I do not see the same importance for this topic as for the previous ones."	This topics aims at implementing the IT-solutions and business models across the system in demonstration sites. As it is well pointed out in the comment, regulations issues are still to be solved, but at first, this technology and business cases should be implement and deployed in projects that would generate important conclusion that would provide significant recommendations, for instance, to policy makers and stakeholders of the entire system.

Public Service of Wallonia (National representatives (Ministries, funding agencies...))	These demonstration projects for new market design can include electricity but also heat networks and energy (batteries, heat) storage	Indeed, as indicated in the expected impact of the Topic, demonstration sites targeted are to be dealing with IT and energy issues, and not only electricity.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Important but should appear after a realistic market design has been settled."	Both activities are described in the current IP as priorities as they are closely related, the improvement of the IT-solutions in the different networks and the market which would be accompanying this energy transition, as highlighted in the first three Topics of the IP.
Anonymous (Power Distribution System Operators (DSOs), Energy storage (technology and services providers), Consumers (aggregated and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"We have seen a lot of demonstrations projects already."	Demonstration sites will continue providing valuable (technical and non-technical) guidelines and recommendations to the energy community.
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"Maybe this point is not necessary as a demonstration only as design."	As mentioned in the comment above, demonstration sites are needed to test new technologies that would be driving the path for the new IT integration and the market related to it.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"While this topic is necessary it's importance and urgency is not as high as topic 1-3."	The urgency level of each topic could be different depending on the nature of the stakeholder who has elaborated the comment. The subjects in the IP are considered as urgent by all the involved stakeholders.

2.2.3 TOPIC 6. CUSTOMER PARTICIPATION AND NEW MARKETS AND BUSINESS MODELS

Table 19. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"[…] Missing TRL."	The targeted TRL has been provided.
Anonymous (Power Distribution System Operators (DSOs), Energy storage (technology and services providers), Consumers (aggregated and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable	"Don't know what is in this topic?"	The description of the specific challenge has been enriched.

Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))		

Table 20. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
		-

Table 21. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
EC Power A/S (Energy storage (technology and services providers), Thermal Generation (flexible), Equipment manufacturers and suppliers, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"For consumers and prosumers: Aggregator systems basically reflect a "virtual power plant" type of approach that has long proved to be possible only for large con-/prosumers with substantial controllable loads. There is no need to repeat that experience once again. Instead, customer participation should be based on direct price response. To enhance distribution network utilization, efforts should be concentrated on generating relevant prices down to the actual customer connection node. […] To simplify the customer relation, elec meters should be able to count Wh and money in the same manner as a petrol pump. This way, prices could be changed at any interval down to the single Wh, and payment can be settled at any interval."	Customer participation based on direct price response is addressed in the ETIP SNET roadmap.
University of Ljubljana (Research and Academia)	"The difference between Topics 5 and 6 is not clear."	The difference between the two topics is explained in section 2.2.2.
Anonymous (National representatives (Ministries, funding agencies...))	"I confirm the importance and urgency of the topic. Possible overlaps with topic 5."	The difference between the two topics is explained in section 2.2.2.
Anonymous (Equipment manufacturers and suppliers)	"[…] I would strongly recommend to separate digital platforms enabling market players to offer new services (without even knowing them!) and the new services themselves. I see a significant risk that these two parts will be addressed by an integrated approach, resulting in missing scalability and replicability."	It will be difficult to provide the market with the platforms without having a minimum set of specifications based upon the needs of the market players. Here, the idea is rather to be as exhaustive as possible (all market players) so as to address scalability and replicability.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"Allowing the end-users' participation in energy markets is very important."	Indeed, customer participation would be enhanced with the technologic development and the new market conditions target in this IP.

Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Customer empowerment is a key success for Energy Transition. This part is a strong aspect of the Clean Energy For All Europeans Package. It is thus important and urgent to take it into account and to develop adapted business model and Human Machine interfaces."	This comment is in line with the present IP. Indeed, we could find common targets with the Clean Energy Package proposals.
ABIO Research Group, UPM (Research & Academia)	"Business Models with an approach cross sector and customer participation can involve all stakeholders in a common goal and improve efficiency, such as economic as energetic. Nevertheless, digitalisation of the energy system and customer participation is not an important topic in this stage, because digitalization decreases understanding of these processes."	Both subjects are important to achieve energy transition and are on the scope of the ETIP-SNET.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"While this topic is necessary it's importance and urgency is not as high as topic 1-3."	The urgency level of each topic could be different depending on the nature of the stakeholder who has elaborated the comment. The subjects in the IP are considered in the same level of need and urgency.

2.2.4 TOPIC 7. DESIGN AND DEMONSTRATION OF GRID DIGITALIZATION

Table 22. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"[…] This topic should have other main FOs. The need for design and demonstration of grid digitalization is not limited to the scope of T15. We suggest to upgrade T19 (at least) to Main FO. We also think that T21 and D11 (cybersecurity related) should be included as supported FOs. Missing TRL"	- FO T19 is already listed as a supported FO. T21 and D11 are relevant for all digitalisation topics. We have chosen to address cybersecurity in a dedicated topic (Topic 9). - The targeted TRL has been added.

Table 23. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
KTH Royal Institute of Technology (Research & Academia)	"Important, but the prosumers data protection needs to be taken into account"	Data privacy/protection is addressed in the current ETIP-SNET Roadmap and has already been covered in several R&I projects. It could be included again in future IPs.
EKONERG (Consultancy)	"Digitalisation in the form of visualization and advanced control."	Issues related to "visualisation and advanced control" of the system are addressed in the current ETIP SNET roadmap (e.g. T18). It could be included in future IPs.

Table 24. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Information and Communication Technology & Network providers)	"This sounds again like an umbrella topic - similar to topic 5. Hard to comment - description should be more specific."	The R&I activities specified in Topic 7 aims to specify and demonstrate for the future energy system the digital technologies ensuring system reliability.
Anonymous (Equipment manufacturers and suppliers)	"It is not sufficiently clear to me whether this will address real-time operation or asset management. In both areas new needs and opportunities are evolving, but they will be addressed differently and therefore should be addressed more explicitly here."	The new possibilities brought by the digitalisation of power systems, and in particular the electricity networks, is addressed in different Topics all along the current IP: e.g. real-time operation (Topics 4, 16, 19, 24, 31, 39 and in particular in Topic 25 "Enhanced grid observability and assessment of pan European system stability" and Topic 28 "Coordination and Measurement of System's flexibility mechanisms") and asset management (Topic 21 "Smart asset management using ICT technologies and Big Data").
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"[…] Open Source standards and interfaces of prosumers connected to the grid should be forced. RIA results should be published as Open Access data Special focus on demonstrating grids with various producers and consumers (Anaerobic Digestion, CHP, Power-To-X …) connected to district heating and electricity grids."	- It is up to the different players (academia, regulated, market) to decide whether they want to release foreground open source (software) on open access data (data). - Demonstrators involving Power-To-X are very well addressed and detailed in Topics 10, 11 and 12 related to Power-To-Heat and Power-To-Gas issues.
Anonymous (Power Distribution System Operators (DSOs), Energy storage (technology and services providers), Consumers (aggregated and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"We have seen a lot of demonstrations projects already."	Demonstration sites are a key tool that would help ETIP SET to achieve the goals towards the needed European energy transition.
PhD student in UPM (Research & Academia)	"Identify digital scenarios that will enable the energy transition with customer participation is not an important topic in this stage."	This is one of the main challenges addressed in the topic, as it would enhance the quality of the services to be deployed at different system levels and therefore, bringing significant economic benefits and for instance, favouring customer participation.

Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"[…] Maybe this point is not necessary as a demonstration only as design."	As mentioned previously, demonstration sites are needed to test new technologies and approaches related to digitalisation and not only. New demonstration sites deploying ETIP-SNET priorities would be driving the path for the new system functionalities with viable market conditions.
ABIO Research Group, UPM (Research & Academia)	"Identify digital scenarios that will enable the energy transition with customer participation is not an important topic in this stage. Firstly it must design energy transition grids and then incorporate grid digitalization to each energy technology."	Both issues should be tackled in parallel with the same degree of importance as both are considered as fundamental to lead the European energy transition.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"While this topic is necessary it's importance and urgency is not as high as topic 1-3."	The urgency level of each topic could be different depending on the nature of the stakeholder who has elaborated the comment. The subjects in the IP are considered in the same level of need and urgency.
Anonymous (Power Distribution System Operators (DSOs))	"It should be more concrete, otherwise it could be contained in Topic 8 and 9."	The difference between the digitalisation topics is explained in section 2.2.2 of the current IP.

2.2.5 TOPIC 8. DIGITALIZATION AND BIG DATA, IOT AND IIOT

Table 25. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"Missing TRL; timeframe is beyond the time frame of this IP. Proposals duration should avoid going beyond 2020."	- The targeted TRL has been added. - Time frame is relative to the possible project duration.
Alliander NV (Power Distribution System Operators (DSOs))	"In addition, FO's D8, D9 and D10 should be added."	D8, D9 and D10 have been added as supported FOs.

Table 26. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
KTH Royal Institute of Technology (Research & Academia)	"Important, but the prosumers data protection needs to be taken into account"	Data privacy/protection is addressed in the current ETIP-SNET Roadmap and has already been covered in several R&I projects. It could be included again in future IPs.

Table 27. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
University of Ljubljana (Research & Academia)	"The use of big data should be described more clearly."	Big Data is well described in several Functional Objectives of the ETIP-SNET roadmap, for instance, "T18-Big Data Management" and "D10-Smart metering data processing and other big data applications".
Anonymous (Information and Communication Technology & Network providers)	"Not sure why Big Data and IOT have been combined to a single topic. IOT is important/urgent to control consumption of energy consumers in a way that the potential for load shifting can be realized (e.g. via tariff-driven home automation / tariff-influenced control of industrial processes)." Big Data is a separate topic, specific relevance for the digitalization of the energy system should be explained in detail - rather as a separate topic.	IoT creates new sources of big data. IoT is connecting appliances, equipment and sensors with a cloud and collects data of behaviour. The use of appliances, equipment and sensors creates big data. Therefore, we need to see them combined although be studied separately.
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"Similar to Topic 7 RIA and IA should be carried out according to Open Access data standards, development of Open Source interfaces and standards."	It is up to the different players (academia, regulated, market) to decide whether they want to release foreground open source (software) on open access data (data).
VLAIO (National representatives (Ministries, funding agencies...))	"Highly relevant, should be standardized as much as possible to open up the European market."	This comment is in line with the current IP. Specifically, standards for digitalisation are addressed by Topic 4 which is an umbrella topic "Digital Technologies, Reference Architectures and Standards for a Scalable Energy Transition".
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"Yes. In fact it is important to link the technologies in other areas as industrial sector or service sector."	Different technologies targeted are to be adapted in the energy system across the value chain. This topic for instance prioritise the Industrial IoT (IIoT), as mentioned in its description. Moreover, customer services are to be improved as well thanks to the development of the described technologies.
ABIO Research Group, UPM (Research & Academia)	"Big Data is an important tool to manage energy demand but digitalization is not an important topic in this stage. Beforehand it must be define how data will be use, planning procedures of performance. Planning different data groups to each goal, data to energy efficiency, data to new markets and business models, data to energy sector."	Digitalisation and data issues are fundamental to achieve the targets of energy transition. It is as important as the other aspects reflected within the IP.
EKONERG (Consultancy)	"Visualization and advanced control."	Issues related to "visualisation and advanced control" of the system are addressed in the current ETIP SNET roadmap (e.g. T18). It could be included in future IPs.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"While this topic is necessary it's importance and urgency is not as high as topic 1-3."	The urgency level of each topic could be different depending on the nature of the stakeholder who has elaborated the comment. The subjects in the IP are considered in the same level of need and urgency.
Anonymous (Power Distribution System Operators (DSOs))	"Confirmed. To include more technologies associated with digitalization: how to make use of Digitalization technologies (IoT, new communication protocols, Virtual Reality, Augmented reality, data mining techniques (big data), etc. to	Different technologies are in the scope of the digitalisation of the network. This technologies would be able to enable the vision of the grid of the future. These new technologies

	develop smart asset management strategies and smart workforces operation solutions."	and tools, for sure, will change the operation strategies of smart grids. More and more technologies would be adapted progressively in order to modernise the whole system's value chain.

2.2.6 TOPIC 9. CYBERSECURITY OF CRITICAL ENERGY INFRASTRUCTURES

Table 28. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"Yes: Missing TRL."	The targeted TRL has been added.
Technology Platform Smart Grids Austria (National representatives (Ministries, funding agencies...))	"Within the framework of the M / 490 mandat, the Smart Grid Architecture Model (SGAM) presents a reference system, which is now widely accepted. A reference architecture developed in Europe today should refer to SGAM by definition. In Austria the Technology Platform Smart Grids Austria started an initiative called RASSA initiative ("RASSA – Reference Architecture for Secure Smart Grids in Austria", www.rassa.at) whose objective is to develop a reference architecture for smart grids in Austria coordinated with all relevant stakeholders. […]. Based on existing previous achievements a reference architecture as a model based description was developed […]. The development of the reference architecture is based on use cases and refers international standards […] such as SGAM, ENTSO-E, and the NIST Guidelines for Smart Grid Cyber Security."	- A reference to the SGAM has been added, cf. above.

Table 29. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Information and Communication Technology & Network providers)	"Importance and urgency of the topic fully confirmed. Data privacy is not mentioned here and might not fit in here, but is important as a separate topic (concerns about data privacy are a major issue for the rollout of smart meters, at least in Germany)."	Data privacy/protection has already been addressed in EC-funded research projects and is accounted for in the current roadmap. This topic could be included in the next IPs.

Table 30. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Distribution System Operators (DSOs), Energy storage (technology and services providers), Consumers (aggregated and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"Yes very much - but should cover more than Energy alone, economic transaction and other information too."	The R&I activities specified in the topic are relative to the cybersecurity of the whole energy system, including the IT systems of market players.
Anonymous (Power Distribution System Operators (DSOs))	"Confirmed. Include the resilient concept….system robust and resilient against…"	Resilience is also about interference with stakeholders as cities and other infrastructures. It is a separate subject and should be studied in wider scope.
Research Council of Norway (National representatives (Ministries, funding agencies...))	"Cybersecurity is such an important prerequisite for success in this area that the proposed funding should be increased."	The estimated budget has been amended accordingly.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"This topic is one of the most important and urgent. The estimated budget (8 M€) is much too low. We need to build a safe system, not to build defences after the system has been built."	Same as above.
Anonymous (Equipment manufacturers and suppliers)	"I am missing the concept of security and resilience by design, which in my opinion is one of the most important levers to ensure security in future power systems."	Security and resilience or security of supply, see remark above.
ABIO Research Group, UPM (Research & Academia)	"Cybersecurity is not an important topic in this stage. At this moment new grid systems are defining how they must be simultaneously to energy transition. A high level of cybersecurity blocks the possibility innovative development of new networks systems and new storages systems. Firstly it must define these new energy systems, afterwards it will be more convenient the cybersecurity implementation."	Cybersecurity is a key topic regarding the digitalisation of the system, as mentioned in the current IP and Roadmap. It is a priority in order to facilitate energy transition.

2.2.7 GENERAL COMMENTS ABOUT PART 2. DIGITALISATION OF THE ENERGY SYSTEM

Table 31. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Distribution System Operators (DSOs))	"An important aspect, which seems missing here and that should be addressed, is the performance that the communication infrastructure must	The IP has been amended following the comment.

	assure in terms of latency and reliability ("ultra-reliable") for critical applications for energy distribution networks (e.g. for automatic fault detection, isolation and restoration (FDIR) systems based on logic discrimination/zone sequence interlocking). These important aspects should be explicitly mentioned and addressed as a key target for the communication infrastructure and system as a whole."	
AIT Austrian Institute of Technology (Research & Academia)	"Compared to Topics 1 - 3 (and others) it is weakly described. The topic titles seem to be very important. Better explanations needed, not just bullet points."	The description of the topics has been improved.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"Siemens supports the topics identified in this part and confirms their relevance. Under this part, we would like to highlight the importance of questions on data ownership, potential users of data for analytics and responsibilities in terms of privacy and security. This should be taken into consideration in the different topics as appropriate. Budget for digitalization topics (55'0) is quite low compared to market design budget."	- Data ownership is covered by existing policies (cf. recast of the market directive and regulation). Data security is covered by Topic 6. - The budget has been increased (128 M€).

Table 32. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Institute of Power Engineering of Academy of Sciences of Moldova (Research & Academia)	"The PART 2 covering most important topics related to digitalisation of the energy system. I think one more topic can be addressed here: big data system of energy consumption where each body following some security rules can access energy consumption data of any country/station/substation in order to provide analysis and develop smarter grid solutions."	Some studies have already addressed this issue, cf. for example www.fp7-trend.eu. This remains an issue and it should be considered in the next ETIP SNET roadmap.
EKONERG (Consultancy)	"Add Augmented reality."	Augmented reality R&I activities could be considered in the next IP as a mean to improve HMI for network operators for instance.
University of Applied Sciences Aschaffenburg (Research & Academia)	"Modification: Empower prosumers to decide on protection of data privacy."	Consumers' (including prosumers) empowerment is an ambitious goal for the current IP, and the ETIP-SNET itself. As mentioned before, data privacy/protection has already been addressed in EC-funded research projects and is accounted for in the current roadmap. This topic could be included in the next IPs.
EUFP7 GARPUR consortium (Research & Academia) SINTEF Energi AS (Research & Academia)	"We propose to add a new topic in section 3.2 DIGITALISATION OF THE ENERGY SYSTEM as follows: Title: Implementation of probabilistic reliability management approaches in the multi-TSO/DSO ecosystem to leverage Storage, DSM and ICT to the benefit of Society.	The issues commented in the title and scope of the Topic proposed, are tackled in different sections of the current IP and ETIP-SNET Roadmap. For instance, the need of more efficient interactions between TSOs and DSOs is part of the expected impact of Topic 27 "Demand response engineering". Moreover, Topic 28 deals with the coordination of TSO/DSO activities and how to incentivise them.

	Specific challenge: to manage uncertainties and exploit flexibilities for the socio-economic optimization of the pan-European electric energy system while ensuring an acceptably low risk of unreliability, it is necessary to set up regulatory changes, data exchange mechanisms, software development, and pilot tests in a multi-TSO and DSO context, to enable efficient TSO-TSO and TSO-DSO coordination. A probabilistic reliability management approach shall be used in this context. Background: the European FP7 project GARPUR (http://www.garpur-project.eu) provides a set of principles, results, recommendations and a roadmap to deploy probabilistic reliability management in Europe, in the scope of System development, Asset management, and System operation. The public deliverables D9.1 and D9.2 of the GARPUR project (under preparation) document these in details."	This topic, especially the probabilistic approach, could be considered in the next IP.
KTH Royal Institute of Technology (Research & Academia)	"I believe that this section very much misses the data protection aspect of the consumers. In particular data mining techniques considered in topic 8 might be an active breach of privacy, but also just the collection and exchange of the data (topic 4 & 7) need to take privacy aspects into account. The new General European Data Protection Regulation (GDPR) is much stricter than the previous and advocates privacy-by-design approaches. Thus, I recommend to add an explicit topic on this where new privacy-by-designs approach for smart girds are developed and that in other related topics privacy is included."	As mentioned before, data privacy/protection has already been addressed in EC-funded research projects and is accounted for in the current roadmap. This topic could be included in the next IPs. The new General European Data Protection Regulation (GDPR) will certainly be used as an input for the next ETIP SNET roadmap.
EUTurbines - European Association of Gas and Steam Turbine Manufacturers (Thermal Generation (flexible), Equipment manufacturers and suppliers)	"EUTurbines supports the topics identified in this part and confirms their relevance. Under this part, we would like to highlight the importance of questions on data ownership, potential users of data for analytics and responsibilities in terms of privacy and security. This should be taken into consideration in the different topics as appropriate."	Cf. comment above.

Table 33. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Institute of Physical Energetics (IPE) (Research & Academia)	"Topic 6 is also actual to Part1."	Part 1 is about governance (how to organize the operations of the energy system and the associated interactions between the different stakeholders) and market design (market rules supporting the development of renewables and empowering prosumers). It is different from digitalisation issues, even though digitalisation is an enabler for part I.
Anonymous (Research & Academia)	"Regarding both governance (how to organize the operations of the energy system and the associated interactions between the different stakeholders) and market design (market rules supporting the development of renewables and	These issues are covered in Topic 6.

	empowering prosumers)", along the whole IP document there are several references to the need of active end-consumer participation and public acceptance of certain aspects. It is noticeable that these tend to cluster around certain notorious concerns that made their way often through less educated opinion makers. This requires attention about how to raise educated public awareness. If the end customer feels his real needs are being harnessed towards some energy planning he barely understands, it is much more difficult to motivate his participation than if he is invited to help design a truly sustainable system. If he knows who he can hold responsible for guaranteeing the swift functioning of his energy networks, that he will receive clear and transparent info about the options he faces and how to manage them, that he pays but a fair share of its costs, that his main environmental concerns or the privacy and security of his data are duly taken care of, he may feel much more interested in participating. I think this does deserve an urgent topic."	
Anonymous (Equipment manufacturers and suppliers)	"I would recommend to differentiate strictly between increased level of automation and digitalisation of business processes and value chains. In the general discussion digitalisation is primarily addressing the second one."	Digitalisation topics are addressing both IT solution for the monitoring and control of the network and the business development.
Anonymous (Research & Academia)	"Again, it seems we see the public at simply consumers. It may be better to discuss also wider public participation, and control, again within a Participatory Development framework. PV and other installations provide a huge potential to empower the public as producers, not simply consumers (i.e. prosumers), but how do we build on that and on the democratic potential of digitalisation (e.g. public access to Data etc.)."	The ETIP SNET roadmap and the present IP are building upon a future with very high share of renewables, both at distribution and transmission level. Distribution level includes prosumers.
Danish District Heating Association (Interest Organisation)	"Digitalisation is a very important subject in the entire energy system. It seems like it is only the electricity system that is covered but digitalisation plays an equal important role in other energy species like heating and cooling."	Digitalisation of the entire energy system is envisaged by the ETIP-SNET, and in the framework of this IP.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Digitalization of the energy system is one of the biggest challenge we have for the next decades. It will allow a complete change in energy management and operation, a real revolution is to be expected from digitalization applied in the field of energy. Exploitation of the synergies between multi-energy carriers is an important topic that has to be addressed. However this was already one of the topics of the Horizon 2020 LCE-05-2017 call. Therefore the selected projects (for instance the MAGNITUDE project) should be mentioned in the reference projects and their results must be taken into account."	We have chosen to refer to completed projects or projects near completion where results are available;
University of Ljubljana (Research & Academia)	"Part 2 would require some rewriting in order to prevent overlapping among topics, challenges, content and scope should be described more clearly and the state of the art should be briefly described within each topic."	The information required is given in the ETIP SNET roadmap. The IP is a document aiming at putting forward topics describing R&I activities to be launched quite urgently. Section 2.2.2 describes the differences between the digitalisation topics.
B.A.U.M. Consult GmbH (Research & Academia)	"What about the resilience of digital/energy systems? This should be mentioned extra, since the perspective of resilience outgrows the perspective of cyber-security because it influences ICT architecture directly. E.g. it explores how a system can quickly recover from an attack."	Resilience is well addressed in Topic 17 "Integrated management of MV and LV networks based on DER", also in Topics 25 and 31. For instance, "resilience" represents one of the key actions of the SET Plan, that's why it is a priority well covered in the current ETIP-SNET's

		Roadmap addressed at different levels in the system (from HV to LV levels).
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"In my opinion, digitalisation is under implementation in transmission networks and distribution networks but also for market applications."	Indeed, in the approach followed it is intended that digitalisation being developed at all system levels.
University of Applied Sciences Aschaffenburg (Research & Academia)	"Modification: Empower prosumers to decide on protection of data privacy."	Consumers' empowerment is a goal for the current IP, and the ETIP-SNET itself. It is foreseen that they can participate freely in all the markets, directly or through various market players, but for the moment
Financial University (Research & Academia)	"1.The problem of complexity and preservation of scientific literacy in the conditions of technological singularity 2. Human-computer systems for creation of interactive intelligent control systems in power engineering."	- The scope of the first item is very generic and does not specifically apply to the ETIP SNET activities. - This point is included in FO T17 of the current ETIP SNET roadmap.
PhD student in UPM (Research & Academia)	"Digitalisation of the energy system is not an important topic in this stage. Energy transition requires more involvement in renewable energy technologies and integration cross sector, for instance thermal system still needs to be decarbonised."	Digitalisation of the energy system is a key topic for the ETIP-SNET, as well as system integration.
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"In the introduction of the chapter is mentioned that the scope of the digitalisation is in the transmission and distribution system (mainly MV). It is important to introduce the LV, Low Voltage, due to the next automation steps will be done in this area."	No, the introduction mentions that "*As of today, digitalisation is under implementation in transmission networks and distribution networks (mainly MV) but also for market applications. Still, a lot of work remains to be done to achieve a full digitalisation of the energy system*". This includes of course LV (cf. D8 in the ETIP SNET roadmap).
Anonymous (Research & Academia)	"I find the digitalisation as a very good and useful tool for the grid operation's optimisation, but on the other hand I am a little bit worried too about the increasing role of ICT in the grid operation. Much less attention is paid to the improvement and passive reliability of grids' components, which at the end will care for grid's safety and reliability."	Digitalisation of the network would help to improve system's reliability and safety and would not be an obstacle to achieve them. In addition, technologies related to the grid itself would continue to be developed. But, it is certain that the combination of technologies at system level with digital and ICT tools together would bring important benefits to enhance the energy system in general.
ABIO Research Group, UPM	"Digitalisation of the energy system is not an important topic in this stage. Energy transition requires more involvement in renewable energy technologies and integration cross sector, for instance thermal system still needs to be decarbonised. It is convenient solving these structural problems: potential resources planning from urban scale to regional scale to know different types of intermittent generation. When structural problems are solved it can be implemented digitalisation matching different scales of networks and energy sectors."	Digitalisation of the energy system is a key topic for the ETIP-SNET. Involvement in renewable energy technologies and integration cross sector are clearly addressed both in the ETIP SNET roadmap and the current IP.
FOSS (Research & Academia)	"Digitalisation of the energy networks is critical for successful energy transition. However, digitalization is an enabling mix of technologies that require important other constituents to complete emerging business cases and market	Digitalisation allows new markets to arise. These new markets may have their own business case and behaviour. These are in scope of WG4 of the ETIP SNET. The energy transition is about these new markets and new

	models to function. Hence, let us restrict digitalisation of what it implies and have integrated solutions elsewhere."	market models. Within WG4 the digitalisation (TF1) and the use cases, new market models and customer participation (TF2) are separately addressed.
INEA d.o.o. (Information and Communication Technology & Network providers, Engineering – solution provider)	"We find cybersecurity very important in order to assure wide acceptance of new energy market. Any cyberattacks on energy systems in the early stages of new energy market implementation that would cause shortages of energy supply could drastically prolong its realization due to society non-acceptance."	Cybersecurity is one of the main topics regarding the digitalisation of the energy system. Indeed, it would help to reassure stakeholders and it would facilitate the public acceptance knowing that the system is safe and protected from such threats.

2.3 INTEGRATED GRID WITH IMPROVED INTERFACES BETWEEN ENERGY SYSTEM COMPONENTS

2.3.1 SYNERGIES BETWEEN ELECTRICITY AND GAS SYSTEMS

2.3.1.1 TOPIC 10. COUPLING OF ELECTRICITY AND THERMAL SECTORS

Table 34. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
DHC+ Technology Platform (Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"The topic is of crucial importance. Regarding the phrasing the line 'While the electricity system is transitioning to renewable generation, the thermal system still needs to be decarbonized.' makes a qualitative comparison without considering the numerical basis. Although the share (in %) of RES in the electricity grid is higher than in H&C, the absolute RES energy in H&C is higher than in the electricity grid. Nevertheless, far higher efforts are needed to decarbonise heating given the mere size of the sector compared to electricity and due to the high share of individual gas and oil boilers. We suggest to change the phrasing to: 'While the transition of the electricity system is on a good track, more efforts are needed to fully decarbonise heating & cooling."	We agree with this proposition. We have modified the sentence.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Synergies between multi-energy carriers is an important topic that has to be addressed. However this was already one of the topics of the Horizon 2020 LCE-05-2017 call. Therefore the selected projects (for instance the MAGNITUDE project) should be mentioned in the reference projects and their results must be taken into account. This coupling can only be the result of detailed local but global analysis of the resources and the demand. It's a major topic relevant for the local communities. But the emergency is to develop the tools that will help apprehend and optimise the local energy, its management and investments. Regarding the possible partners, energy service companies should be added in the list."	- The MAGNITUDE project will be monitored and the R&I activities will be assessed. - *the emergency is to develop the tools that will help apprehend and optimise the local energy, its management and investments*: this is covered by the specified R&I activities. We have added ESCOs in the list of participants.

Anonymous (Research & Academia)	"Due to the expected TR8 level, T16 (Business model) must be considered as Main FOs to address the associated business model challenge and the scope declared in the topic."	We have added T16 as supported FO. Business models are only a part of the challenges addressed by T10.
Alliander NV (Power Distribution System Operators (DSOs))	Confirmed. In addition, focus on open heat networks should be mentioned. Also FO D14 should be added.	D14 has been added as supported FO.
ADM Electricity Distribution Company (Power Distribution System Operators (DSOs))	Confirmed. We suggest to add D14 in related topic.	

Table 35. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Technology Platform Smart Grids Austria (National representatives (Ministries, funding agencies...))	"Interoperability is a key factor for a successful transition of the energy system, which will lead to distributed interconnected ICT-networks. Interoperability is not explicitly addressed in the whole implementation plan and will not happen without a dedicated effort for it. In Austria there exists a project, which addresses this particular topic: "IES-integrating the energy system Austria" (www.iesaustria.at). The project leads to normative usage of existing standards which will ensure interoperability of data exchange. The focus of the IES project is to adapt and implement an existing, vendor-neutral and cooperative method to achieve interoperability within smart grids. […] This topic addresses the whole energy system: T15, T19, T20, D3, D4, D7, 8, D9, D10, D11, D12"	Interoperability (for instance D10) is a very important subject which is in the scope of the ETIP-SNET roadmap. It will certainly be more explicitly detailed in future Implementation Plans.
AIT Austrian Institute of Technology (Research & Academia)	"Very important. I propose highlighting the importance of long term grid planning (jointly between electricity and thermal as well). Experiences from projects show it is very difficult to utilize cross domain flexibility if the systems have been planned completely independent from each other. Long term planning tools for joint electricity and heat Network development, considering the utilisation of synergies between the two domains (in terms of flexibility)."	We propose to consider this topic in the next IP. Joint planning of grid development is a very sensitive for DSOs.

Table 36. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Equipment manufacturers and suppliers)	"Although it is repeatedly stated that technologies are covered by other calls and thus should not be addressed here, there are many references to technologies. Therefore it is not clear to me what exactly shall be covered."	It is clearly stated in the IP (*Technologies, as long as the development focus is on cross-sectoral integration and not covered by other calls*) and the ETIP SNET DoI that the

		scope of the activities is system integration. Technologies are mentioned solely in the case when the R&I activities are not covered by other calls.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"The integration of the different energy, electricity, heat networks, etc., creates specific challenges in infrastructures in cities: urban regulations and urban planning have a new goal."	Indeed, infrastructure planning at different levels would be necessary to adapt the new interfaces that would be needed for the coupling of electricity and thermal (and gas) sectors.
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"Developing synergies is important. Additional to the economic optimization it's crucial to optimize the exergetic efficiency since electrical energy must be transferred into thermal energy with high exergy. Thus, high temperature Power-To-Heat system should be in the focus, which can store this energy with low losses. When this storage is unloaded it should provide steam, or other high temperature heat for processes or electricity production."	High efficiency, thermal storage technologies and techniques are already in the scope of the Topic.
University of Applied Sciences Aschaffenburg (Research & Academia)	"[…] Modification: More focus on efficiency factor"	The efficiency factor is already considered in the scope of the Topic. In addition, technological progress would be tackled as well for other European calls. It is a key point that it is going to be well addressed by different European instruments.
VLAIO (National representatives (Ministries, funding agencies...))	"Flemish companies are interested, but I would expect implementations rather on a medium term."	First, the priority would be to achieve successfully the R&I activities considered in the scope of the Topic and then, test them in demonstration sites for further development.
Anonymous (Energy storage (technology and services providers), Thermal Generation (flexible), Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"Considering exergy the power to heat approach might be less favourable than the power to gas approach."	All technical development will be carried out as best as possible to achieve successfully the coupling of the electricity and gas sectors through Power-to-X solution with a multicriteria analysis.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"Coupling electricity and thermal energy can be done only locally. Electricity can be send quickly and efficiently everywhere, not heat. Electricity is energy, heat is entropy. We must keep in mind this fundamental difference."	Indeed, but electricity and heat are also be coupled in large CHPs.
PhD student in UPM (Research & Academia)	"For the energy transition is important to integrate energy networks, electricity and thermal. Integration of the heat and electricity grid at local level can require regulatory issues at urban planning and local level to achieve better optimization of planning. Management between private and public stakeholders require further implication and definition."	This is in the scope of the Topic.
WIP Renewable Energies (Consultancy)	"Also the coupling with the transport sector (EV) should be included here"	The coupling between energy and transport sectors is addressed in the Topics 18, 22, 30 and more specific in Topic 32 "Coupling of electricity and transport networks".
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"ETIPWind confirms that coupling electricity and thermal sectors is important, however the topic should target more clearly its aim is to increase & facilitate the integration of Renewable Energy. Hybrid sector coupling systems are a must (wind and hydrogen, wind and thermal storage…)."	These issues are addressed, for instance, in many Topics in the following chapters: 3.3.3 Synergies between electricity transmission networks, generation and storage, 3.3.4 and 3.3.5 which are equivalent to 3.3.3 but related to distribution networks and flexible generation, respectively.

ABIO Research Group, UPM (Research & Academia)	"For the energy transition is important to integrate energy networks, electricity and thermal. Integration of the heat and electricity grid at local level can require regulatory issues at urban planning and local level to achieve better optimization of planning. Management between private and public stakeholders require further implication and definition working at local scale. Coupling these sectors requires changing urban infrastructures defined in urban planning. It is convenient integration both, energy planning and urban planning, matching their scales, buildings, neighbourhoods, districts, cities, regions."	Regulatory issues are mentioned in the content/scope.
Energinet (Power Transmission System Operators (TSOs))	"Confirm importance and urgency of the topic. Power-to-heat (heat pumps) are essential for this integration. A further R&I on large scale high temperature heat pumps (district heating, process-heat) is needed. R&I on system solutions incl. large scale heat absorbers from sea-water etc. is needed for a full realization of the huge potential for heat pumps in the future energy system. Storage of high temperature heat is essential for increased flexibility and there is a need for further R&I on this area."	"Active components for heat and cold generation at high efficiency" (heat pumps and absorbers included) are envisaged in the scope of the Topic.
Anonymous (Regulators)	"Not important. We have noted difficulties for companies to be involved and developed this kind of projects."	Some of the difficulties come from regulatory issues. It is therefore a key issue to be addressed.
ULUDAG ELECTRICITY DISTRIBUTION COMPANY (Power Distribution System Operators (DSOs))	"[…] Due to having considerably small information regarding the working principles of thermal systems, I would like to notify that there is need to go further in energy management of existing district heating and optimization techniques to reduce the consumption of heat in the building level."	As mentioned in the description of the Topic, energy management is envisaged.
Anonymous (Research & Academia)	"The aim "to reduce fossil fuel consumption in the thermal sector, even if the production of heat or cold from electricity means a downgrading of the theoretical energy value" is best served if the first bullet of my general comments about PART 1[2] are taken into account. Thermal energy storage in aquifers should be environmentally evaluated to avoid transparency concerns. Please see the second bullet of my general comments about PART 1[3]."	The question of externalities is included in the "Economics" item of T10. As stated customer acceptance issues are well covered in other related Topics. These issues have also been largely covered by previous H2020 calls. Environmental impacts of thermal energy storage in aquifers is not in the scope of the present IP.

[2] Due limitation of fossil fuel usage needs true cost of GHG emissions, drawn from their correlation with mean global temperature shift, which has already been scientifically established. This has to prompt a new emissions evaluation as a solid stand for the desired common ground.

[3] "regarding both governance (how to organize the operations of the energy system and the associated interactions between the different stakeholders) and market design (market rules supporting the development of renewables and empowering prosumers)", along the whole IP document there are several references to the need of active end-consumer participation and public acceptance of certain aspects. It is noticeable that these tend to cluster around certain notorious concerns that made their way often through less educated opinion makers. This requires attention about how to raise educated public awareness.

If the end customer feels his real needs are being harnessed towards some energy planning he barely understands, it is much more difficult to motivate his participation than if he is invited to help design a truly sustainable system. If he knows who he can hold responsible for guaranteeing the swift functioning of his energy networks, that he will receive clear and transparent info about the options he faces and how to manage them, that he pays but a fair share of its costs, that his main environmental concerns or the privacy and security of his data are duly taken care of, he may feel much more interested in participating.

2.3.1.2 TOPIC 11. INCREASE ENERGY EFFICIENCY BY UTILISING EXCESS HEAT FROM OTHER PROCESSES VIA HEAT NETWORKS AND THERMAL STORAGE

Table 37. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Alliander NV (Power Distribution System Operators (DSOs))	Confirmed. In addition, focus on open heat networks should be mentioned. Also FO D1, D2 and D14 should be added.	- A reference to open heat network has been made. - The focus of this topic is about excess heat and how to use it in heat networks with e.g. heat storage technologies. Therefore D1, D2 and D14 cannot be mentioned as supported FOs.

Table 38. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Research & Academia)	Here we should explicitly mention using Solar Heat for Industrial Processes (SHIP)	The topic is about excess heat from different sectors. Using Solar Heat for Industrial Processes (SHIP) could be considered in the next ETIP SNET roadmap.
Highview Power Storage (Energy storage (technology and services providers))	"The definition of heat could be extended to encompass cold and this could be explicitly mentioned in the description of the topic. LNG regasification terminals are very inefficient as the thermal energy that is used to liquefy gaseous natural is dispersed. Liquid Air Energy Storage system could take advantage of this thermal energy but currently there are regulatory barriers and no incentives to improve the energy efficiency of LNG regasification terminals."	Waste energy for cooling applications in combination with LAES is indeed a promising way to improve the overall efficiency of the energy system. This could be included in the next and IP and the future ETIP SNET roadmap.

Table 39. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
University of Applied Sciences Aschaffenburg (Research & Academia)	"[…] Modification: More focus on efficiency factor: inefficient solutions shall not be rewarded only because heat has been produced in abundance."	As stated in the expected impact of the topic, the purpose is to (among others) to "*Increase overall efficiency of energy system by reducing waste heat* ".
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"A lot of work has already been done in the industry to improve processes efficiencies. The work done in the temporary group N°6 (energy efficiency in industry) of SETPlan has to be considered."	Cf. above: system efficiency is addressed.
Danish District Heating Association (Interest Organisation)	This is also an important topic that is very welcomed. However, the budget for this topic is very low. Especially when it is compared to the large budget for the electricity related topics.	The estimated budget is based on expert view. It is the result of a broad consultation.

EUTurbines - European Association of Gas and Steam Turbine Manufacturers (Thermal Generation (flexible), Equipment manufacturers and suppliers)	"From EUTurbines perspective, the utilisation of excess heat from processes has an enormous potential. In some cases, however, it may be more efficient and economically viable when improvements are done at the heat source directly and contribute to the efficiency of a given process. Synergies to this topic can be found in the activities of the SET-Plan Action 6 Temporary WG (Energy Efficiency in Industry) – coordinated actions could be needed."	The ETIP SNET WG2 will check the activities of SET-Plan Action 6 Temporary WG (Energy Efficiency in Industry). If the scope includes applications covered by the ETIP SNET, it will be considered for the work to be carried out in the future (next IP and roadmap).
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"From Siemens perspective, the utilization of excess heat from processes has an enormous potential. In some cases, however, it may be more efficient and economically viable when improvements are done at the heat source directly and contribute to the efficiency of a given process. Synergies to this topic can be found in the activities of the SET-Plan Action 6 Temporary WG (Energy Efficiency in Industry) – coordinated actions could be needed."	Cf. above.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	The outcome of the work under topic 11 will help to determine the total energy generation demand is therefore also very important and urgent. A higher TRL level should be targeted.	The targeted TRL (4-6) is in line with the involved technologies, which includes storage technologies at different maturity level.
Anonymous (Power Distribution System Operators (DSOs))	"It's more an efficient topic. Not related with the electrical distribution. The topic should be changed to, for example, research to optimize the coupling process between both sectors…"	The connection with the power sector is made through the power plants, where excess heat is captured and put into the heat network.
Anonymous (Research & Academia)	"Natural gas is clearly mentioned among fossil fuels to be replaced, as the future use of gas network should be for biogas and synthetic gas fuels. Please see the first bullet of my general comments about PART 1."	This topic deals with excess heat and heat networks.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"Heat networks, thermal storage, power networks ..., a new District Energy Systems needs to be develop."	Indeed, this is in the scope of the IP.
Anonymous (Equipment manufacturers and suppliers)	"Although the term is not used, the main topic here seems to be co-generation - with all the challenges known from this area. This also means that I do not see that many new questions. I would recommend to add an assessment of the reduction of efficiency of primary processes in case of using the by-product heat for other purposes. As an example: Modern, highly-efficient power plants do not generate much excess heat any more. If one wants to get usable heat (i.e. with a significant temperature difference to the environment) out of these it means that electrical efficiency needs to be reduced."	No, this topic is not just about excess heat in electricity production. It also concerns industry, waste incineration, etc.
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"As a cogeneration process it will be necessary to include it."	This topic is in the scope of the Topic 10 and 11.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	The topic requires good cost/benefits analysis tools to be developed. The question of the energy recovery of the fatal industrial heat should be investigated. Thermal storage makes it possible to recover discontinuous fatal heat which is difficult to use without storage, and in a profitable way for operators when fatal heat profiles are attractive.	The economic feasibility of the solutions is mentioned in the Content/scope of the topic.
Anonymous (Power Distribution System Operators (DSOs), Energy storage (technology and services providers), Consumers (aggregated	"I think we are in the process already, but need some legislation changes in order to use it in full effect."	Regulation aspects are foreseen in Topic 10.

and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))		
ABIO Research Group, UPM (Research & Academia)	"Excess heat wasted in other process can implement in networks. Collecting these excess heats needs a preliminary study in urban areas to research about local energies in each neighbourhood or district. Integration of infrastructures will facilitate to exploit these waste energies. The lack challenge is built a heat network with necessary studies such as planning and capacity buildings. This is a priority topic because defines new networks necessary to define the achieve goals, and hence it is urgent."	Optimize planning is tackled in the scope of Topic 10 and Topic 11 (mapping tools for needs and sources and modelling tools for assessing the necessary -storage-infrastructure).
Anonymous (Regulators)	"Thermal storage more relevant than heat networks."	Both are relevant and in the scope of the ETIP-SNET as priorities.
EKONERG (Consultancy)	"Must be taken into account in the design phase and planning on local level like DER."	Optimised planning is in line with the scope of Topic 10.

2.3.2 ANALYSIS OF HIGH-RES AND EMPOWERED END-USER ENERGY SYSTSYNERGIES BETWEEN ELECTRICITY AND GAS SYSTEMS

2.3.2.1 TOPIC 12. COUPLING OF ELECTRICITY AND GAS SECTORS

Table 40. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"The coupling of electricity and gas networks is an important topic and requires good cost/benefits analysis tools and a global analysis of the resource and demand at a national or European scale. This is partially covered by one of the topics of the Horizon 2020 LCE-05-2017 call. Therefore as in Topic 10, the selected projects (for instance the MAGNITUDE project) should be mentioned in the reference projects and their results must be taken into account in the proposed work. An important aspect seems to be missing in the description. Most of the existing projects consider the coupling or synergies at the local level. This is indeed the right scale when considering electricity, gas and HEAT or COOLING. But coupling between electricity and gas sectors must also be investigated at a larger scale such as at the regional or even national level, and for instance for large generating plants and transport/transmission networks. The question of	- The MAGNITUDE project is a recent project having started this year. It would become a reference for this topic depending on its further outcomes achieved and conclusions obtained through time. - This is the main idea of topic 12: large-scale storage of electricity. - ESCOs have been added in the list of possible partners.

	the efficient combination between centralized and decentralized resources is also to be considered. Regarding the possible partners, energy service companies should be added in the list."	

Table 41. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Energinet (Power Transmission System Operators (TSOs))	"Confirm importance and urgency of the topic. See comments on topic 34.[4]"	Issues commented in Topic 34 (Novel solutions with integration of power-to-gas with bio-to-gas solutions (incl. thermal gasification), gas conditioning, etc.) are to be in constant progress and is definitely something that would be included in further IPs.

Table 42. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Distribution System Operators (DSOs))	"[…] To create a new topic or to include in the previous one. Topic 12.A research and demonstration on new materials and technologies to reduce costs and increase efficiency of the electricity-gas coupling mechanisms"	The scope addressed by the ETIP SNET is rather on system integration issues than on the technological development of specific components. As a result, H2 R&I activities are assessed from a systemic perspective. The development of specific components is covered for instance by the FCH-JU calls. In addition, it seems that such components using hydrogen to balance grids are considered mature since business plans are developed by CEF projects.
Hydrogenics Europe NV (Energy storage (technology and services providers), Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"[…] In fact, the scope is even broader than the topic description as this is all about the role of the gas grid in our future energy system, dominated by variable renewable power (mainly wind and solar). The question to be addressed is not whether this is technically feasible or not at a specific site (already demonstrated). The question to be addressed is in a	- Decarbonisation of >80% would require fully H_2 compatible gas grids, increased cost of a decarbonized system is a no-brainer, technical feasibility is given, open is the political decision to exit the fossil era (or not). This specific issue can fit within the description of the topic, cf. economic studies

[4] "Confirm importance and urgency of the topic. A large scale development of power-to-gas requires available carbon feedstock. Novel solutions with integration of power-to-gas with bio-to-gas solutions (incl. thermal gasification) are essential to deliver needed carbon for realizing the large potential for power-to-gas. These solutions could also be essential as novel solutions for very flexible thermal power plants.

A further R&I on thermal gasification/gas conditioning is essential to realize these novel solutions integrating power-gas/fuel-heat."

	system perspective: what would be needed if we wanted to use the gas grid to store large quantities of renewable electricity for seasonal storage? Should we target the direct injection of hydrogen in gas grids up to a certain percentage (relatively cheap, limited potential and technical challenges on the gas grid), should we encourage the combination of hydrogen with carbon dioxide to create synthetic natural gas (more expensive, vast potential, CO2 problem is partially solved, low technical challenge for the gas grid) or should we adapt the gas grid 100% pure hydrogen (100% clean and renewable option, vast technical challenge)? Different scenarios (participation of the gas sector to store renewable power) are possible with their own cost (+ societal cost) and benefits. In this topic there are in fact 2 sub-topics which are closely interrelated: how to use the gas grid to store renewable electricity and how to green the gas sector to meet COP21 objectives. This topic should also include the question of underground gas storage (different mixtures of H2/CH4) and large scale hydrogen storage--> link with HyUnder project. A final comment, this topic should also address the certification of renewable gases produced from renewable power, the potential business case implications and the regulatory environment in a global system perspective. --> link with CertifHy project."	- Gas storage and more especially H_2 is not directly in the scope of this topic and is financed elsewhere, cf. HyUnder project financed by the FCH. The large-scale storage of CH_4 has been performed for decades in the gas grid.
SINTEF Energi AS (Research & Academia)	"Relationship to topic 2 should be clarified. The topic seems to be based on the assumption that continued use of gas networks is desirable. Funding seems to be excessive."	- Topic 2 as described in the IP would "help to develop a flex market concept that allows the trading of 'heterogeneous' flexibility products (coupling electricity, heat and gas markets, both at the wholesale and retail level), taking into account the specific capabilities of each resource". Topic 12 explore all the dimensions of the coupling between gas and electricity sectors, from the technical point of view as well. - Gas networks could provide an alternative solution to perform large-scale storage and be used to promote green fuels for thermal or transport applications. - The estimated budget is based on expert view. It is the result of a broad consultation
Anonymous (Research & Academia)	"Here we should explicitly mention hybridisation of CSP and gas."	The topic is about coupling the two networks and not about the hybridisation of gas power plant with CSP.
WIP Renewable Energies (Consultancy)	""could be used to promote green fuels for thermal or transport applications." should be replaced by "could be used to promote green fuels for thermal, CHP, or transport applications."	CHP is included in thermal (TPG).
Institute of Physical Energetics (IPE) (Research & Academia)	"I would use word SYNERGY instead of coupling, as it is given in 3.3.2."	The activities of topic 12 focus on the coupling from the dimensions of the coupling, from the technical, economic, market and regulatory viewpoints.

Anonymous (Research & Academia)	"Please see the second bullet of my comments about Topic 11.[5]"	Cf. topic 11.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"The massive integration of wind, PV, solar thermal energies in the power system network is the goal."	The coupling with the gas sector would help in a significant way to integrate more and more RES in the power system through large-scale storage of excess RES electricity.
Anonymous (Equipment manufacturers and suppliers)	"The scenario described in the roadmap assumes a primarily electric world and is for sure a consistent one. Nevertheless, one could also imagine another scenario, at least on the countryside: Gas based micro co-generation could provide electricity during winter, while rooftop solar PV in combination with batteries could cover residential electricity demand during the more sunny seasons. In such scenario the gas distribution networks would continue to play a role. I would recommend at least discussing this."	Gas distribution networks are covered by topic 12.
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"This topic should be linked or extended by methane production from various CO2 sources. A special focus should be on carbon conversion. Thus, increasing the carbon efficiency by injecting hydrogen from excess electricity into Biomass-To-Gas systems, like gasification and FT-synthesis, or anaerobic digestion and biomethane production should be included. These sources provide a significant CO2 stream and if hydrogen from excess electricity is introduced this increases the overall carbon conversion."	This is already identified as the challenges of the Topic and expected impact with Power-to-gas solutions.
Anonymous (Research & Academia)	"Further in the future due to conversion inefficiencies."	Power-to-X and the coupling of the different networks are needed to optimize the energy system and make it more flexible. These subjects are a priority for the ETIP-SNET.
Anonymous (EC PPP)	"The use of the natural gas grid with hydrogen should be mentioned and explored in the topic."	This is already in the scope of the IP, not only of this Topic (also Topic 34).
Anonymous (National representatives (Ministries, funding agencies...))	"HIGH IMPORTANCE. There can be difficulties in implementing this topic if the gas and electricity operators are not the same company. New business models would be needed."	Economic feasibility is already in the scope of the subject. Business models will follow.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"We would prioritize the work under this topic below the two previous one, because we don't believe that we have achieved the level of RES generation which would require this technology at this stage and the efficiency of power to gas is lower compared to other storage methods."	Technical challenges are to be made to improve the aspect risen in this comment. RES integration would be more important overtime and the energy system would need to be optimised and ready to be flexible enough to let this happen.
University of Applied Sciences Aschaffenburg (Research & Academia)	"[…] Modification: More focus on efficiency factor: inefficient solutions shall not be rewarded only because electricity has been produced in abundance, e.g. by renewables."	Technical challenges and adjustments are targeted in the scope of the Topic. Indeed, technologies and different solutions are to be optimised in order to be more efficient and economically viable.
University of Ljubljana (Research & Academia)	"Could gas utilization for transport be mentioned within this topic?"	This is already described in the scope of the Topic 32 (Coupling of electricity and transport networks).

[55] Natural gas is clearly mentioned among fossil fuels to be replaced, as the future use of gas network should be for biogas and synthetic gas fuels. Please see the first bullet of my general comments about PART 1 (Part 1: Due limitation of fossil fuel usage needs true cost of GHG emissions, drawn from their correlation with mean global temperature shift, which has already been scientifically established. This has to prompt a new emissions evaluation as a solid stand for the desired common ground).

2.3.3 SYNERGIES BETWEEN ELECTRICITY TRANSMISSION NETWORKS, GENERATION AND STORAGE

2.3.3.1 TOPIC 13. SMART INTERFACES BETWEEN GENERATION AND TRANSMISSION

Table 43. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"ETIPWind strongly supports this topic to be addressed and regards it as very important and highly urgent. However, we feel that those technologies that are expected to, and will, make up the lion share of the energy mix of the future should benefit most of this topic. Flexibility should not be addressed only for conventional thermal generation. We would like to see following highlighted in the topic text: - Improved flexibility from thermal power generation AND variable renewable energy (pitch control, hybrid systems combined with battery storage…)"	We have amended the text as suggested. Both RES and Thermal power generation are also mentioned in the Expected Impact of the Topic.
University of Ljubljana (Research & Academia)	"The level of 'smartness' is already high at transmission level, therefore the target TRL could be higher, at least the low-end should be higher than 3."	We have amended the text as suggested.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"It should be noted that the sections "expected impact" and "expected outcome" can be very similar. Problem: unbundling- TSO/DSO in general not allowed to generate power/heat as a producer – needs EU wide solution, who own & operates storage systems"	- The sections "expected outcomes" and "expected impacts" have been completed. - Ownership and operation of storage systems is a challenge mentioned in the ETIP SNET roadmap (FO D5 for instance). The consultations around the Clean Energy package (articles 36 and 54 of the recast of the directive) should help clarify this issue.

Table 44. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Technology Platform Smart Grids Austria (National representatives (Ministries, funding agencies...))	"Interoperability is a key factor for a successful transition of the energy system, which will lead to distributed interconnected ICT-networks. Interoperability is not explicitly addressed in the whole implementation plan and will not happen without a dedicated effort for it. In Austria there exists a project, which addresses this particular topic: "IES-integrating the energy system Austria" (www.iesaustria.at). The project leads to normative usage of existing standards which will ensure interoperability of data exchange.	Interoperability (for instance D10) is a very important subject which is in the scope of the ETIP-SNET roadmap. It will certainly be more explicitly detailed in future Implementation Plans.

	The focus of the IES project is to adapt and implement an existing, vendor-neutral and cooperative method to achieve interoperability within smart grids. […] This topic addresses the whole energy system: T15, T19, T20, D3, D4, D7, 8, D9, D10, D11, D12"	
Energinet (Power Transmission System Operators (TSOs))	"Confirm importance and urgency of the topic. Increased R&I on use of converter based power production for delivery of virtual inertia etc. Further R&I on large scale connection of offshore wind power (novel solutions)."	More intermittent generation at different spatial scales (for instance, offshore wind power) sometimes far from the main consumption centres is already faced as an important challenge to be solved in the ETIP-SNET Roadmap (cluster 2, FO T6) at transmission level. Inertia is tackled as well in this same section of the roadmap. 60 M€ is allocated for this FO, it is something that would continue to be mentioned in further IPs.

Table 45. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"The main focus is to integrate more renewable generation backed by flexible thermal power. The title of topic 13 should be changed (something like : "integrating thermal power flexibility between TSO and DSO")"	This is already the case (*integrating thermal power flexibility between TSO and DSO*). Improving this integration (smart interfaces) is needed.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"to improve the flexibility from generation to achieve energy efficient"	This issue is covered by the scope of the Topic.
Anonymous (Equipment manufacturers and suppliers)	"I do not understand why the interface between generation and grids requires a separate topic. This should be covered by market rules."	The Topic is dealing also with the improvement of technical issues which go beyond market design, rules and mechanisms.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Important topic; with also major politic aspects."	Regulatory issues are taken into account in the scope of the Topic and in the scope of related Topics as well (Topic 31 about storage for instance).
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"Optimizing heat transfer stations and hydraulic integration into the grid should be included as well as the integration of low temperature (LowEx) units and prosumers. Seasonal and short term storage integration into the system also."	These solutions are taken into account in the scope of Topic 10 (related to thermal sector) and 31 (related to storage) for instance.
University of Applied Sciences Aschaffenburg (Research & Academia)	"[…] Modification1: More focus on efficiency factor: inefficient sector coupling solutions shall not be promoted only because energy is available in abundance, e.g. by renewables Modification2: More focus on power quality: What are the failure mechanisms of assets due to low power quality"	- Technical challenges and adjustments are targeted in the scope of the Topic. Indeed, technologies and different solutions are to be optimised in order to be more efficient and economically viable. - Power quality is tackled in different topics of the IP (16, 35, 36, for instance) and the ETIP SNET roadmap.

AIT Austrian Institute of Technology (Research & Academia)	"The topic is not that important. Flexible thermal power plants are already available and there is huge progress in flexibility from RES, demand and storage as well (e.g. topic 15)."	This subject needs to continue to be developed to improve grid stability, security of supply and allowing the integration of more RES without reliability issues.

2.3.3.2 TOPIC 14. IMPROVE RES AND DEMAND FORECASTING AND OPTIMAL CAPACITY OPERATION

Table 46. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"Yes: T12 is selected as Main FO and Supported FO. This should be avoided. We consider T12 should be included as Main FO and not as Supported FO. We believe T7 should be upgraded as Main FO due to its focus on decision-making support tools which are fundamental to improve RES and demand forecasting. In this topic there is no reference to the use of probabilistic approaches to improve RES and demand forecasting. The use (namely by system operators) of probabilistic forecasting is key to reduce their operational risk and is becoming an important tool that still needs to improve and dedicated R&D activities. We think it's important to promote and highlight the use of probabilistic methods in this topic. Moreover, T7 focuses on the importance of using probabilistic approaches in power systems which reinforces its relevance on this topic and the need to be upgraded as Main FO. • Specific challenge section "Improvements can be achieved applying generation forecasting models based on neural networks algorithms […]" We suggest that the challenge (and ETIP-SNET) to not commit to a particular algorithm and therefore erase the reference to the neural networks algorithms, because it seems that the challenge is to improving forecasting and not researching Neural Networks algorithms. • Content/Scope section "To improve forecasting accuracy, new ensemble models […] to improve the RMSE in at least 15%." Here, there is a reference to a particular methodology, in this case "ensemble models" limiting the scope of the research. Again, we would suggest erasing the reference to particular approaches. Also, the figure of 15% is ambiguous, as the reference value is not given. Is it 15% of the installed capacity, and is it per plant or for a set of plants in a control zone (e.g. a country)?"	- T12 has been removed from the supported FO list. - T7 is not a main FO since addressing a much wider scope (expert system for system operators). -Probabilistic approaches are addressed in Topic 22 taking into account climate patterns and RES integration to upgrade and smarten power system planning and increase its flexibility. - Probabilistic models are now mentioned. - Neural networks are given as an example (*can be achieved*) - The % figure for improvement, as well as its most useful definition and assessment, is part of the R&D projects to be carried out.

EUFP7 GARPUR consortium (Research & Academia)	"[…] - Suggested addition of an item to "Content/Scope": "In order to support informed decision making, in particular in the context of probabilistic reliability management, the forecasting models need not only to provide a 'best-guess' but also to express the residual uncertainties/correlations among demand, RES production, exogenous threats (contingencies), internal failures (of protections and control devices), as a function of weather and economic factors." - We suggest to add GARPUR as reference project."	-Probabilistic approaches are addressed in Topic 22 "Smart and flexible grid design and planning with probabilistic adequacy assessments in uncertain framework" including climate patterns and RES integration to upgrade and smarten power system planning and increase its flexibility. -GARPUR has been added as a reference project since ending in October 2017.
SINTEF Energi AS (Research & Academia)	"Suggested addition of an item to "Content/Scope": "The forecasting models need not only to provide a 'best-guess' but also to express the residual uncertainties, as well as the relationships between demand, RES production, exogenous threats (contingencies), internal failures (of protection and control devices), weather and economic factors." We suggest to add GARPUR as reference project."	Cf. above.
Alliander NV (Power Distribution System Operators (DSOs))	"Confirmed. In addition, FO's D1 and D2 should be added."	- D1 and D2 have been added as supported FOs.
ADM Electricity Distribution Company (Power Distribution System Operators (DSOs))	"Confirmed. We suggest to add D1 in related topic."	- D1 has been added as supported FOs.

Table 47. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 48. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Equipment manufacturers and suppliers)	"The topic description does not reflect state-of-the-art. In countries with high RES penetration day-ahead mechanisms are not sufficient already today and intraday trading plays an important and economically significant role in balancing renewable generation. This means that solutions are available already today (because they are in use), and the time horizon of this topic (2019-2021, meaning solutions would be available afterwards) does not at all reflect its urgency."	The Topic does not say that this technology is not already in use or that RES integration in some countries is not gaining in maturity and used in a daily basis. However, forecasting tools and data availability are still in progress in order to improve prediction models and gaining in accuracy and precision to favour even more RES penetration.
University of Ljubljana (Research & Academia)	"Is it not clear, why neural networks are emphasised. Big data analysis could be mentioned."	- Neural networks: cf. above.

		- Big Data issues and opportunities all along the value chain in the ETIP-SNET Roadmap and IP are referred in numerous topics and FOs.
University of Applied Sciences Aschaffenburg (Research & Academia)	"[…] Modification1: More focus, which infrastructure challenges due to bidirectional load flow (e.g. grid protection, grid operation, grid stability) are posed on primary technology (e.g. transformers, switchgear) to generate flexibility. One solution is the "controllable local grid distribution transformers" produced e.g. by Rheinhausen."	The Topic is more focused about advanced forecasting tools, however, Topic 25 "Enhanced grid observability and assessment of pan European system stability" in which part of the scope is to "operate the transmission system closer to its physical limits with high reliability and defer new infrastructure while absorbing more RES power" while reducing costs taking into account grid reliability. Also Topic 28 "Coordination and Measurement of System's flexibility mechanisms" deals with issues related to improvement of the utilization of existing grid infrastructure via real-time monitoring and DLR for instance.
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"Again, the outcomes should be published as Open Access data and the methods and standards should be built on Open Source Models."	It is up to the different players (academia, regulated, market) to decide whether they want to release foreground open source (software) on open access data (data).
Anonymous (Research & Academia)	"Here maybe we should mention the importance of DNI now casting for the CSP sector."	This is in the scope of Topic 20 "*Managing system flexibility with a smart balance between intermittent and dispatchable solar generation*": *-To enhance the existing solar resource forecasting techniques, decreasing the forecast time window to effectively manage the energy extraction from the storage tanks to achieve the production schedule.*
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"[…] the issue of Data Sharing for RES should be addressed as well for instance with regard to : - Data sharing of 100m high wind speeds with weather forecast institutes with non-disclosure agreements to preserve intellectual property - Energy generation through TSO transparency platforms"	- Data sharing: this very particular point is to be handled between the involved parties (data owners and entities promoting forecast tools). - Energy generation information is already provided by ENTSO-e Transparency platform (wind and solar included).
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"Also increasingly introduce AI (deep machine learning, neuro networks)"	Innovative technologies such as artificial intelligence (AI) (Topic 39) and neuro networks are already addressed in the IP (Topic 14). These topics make also part of the ETIP-SNET Roadmap for instance in FO T7 "Expert systems and tools: expert systems, decision-making support tools and advanced automatic control".

2.3.3.3 TOPIC 15. MULTISERVICE STORAGE APPLICATIONS TO ENABLE INNOVATIVE SYNERGIES BETWEEN SYSTEM OPERATORS AND MARKET PLAYERS

Table 49. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"Yes: Further investigation is needed on the business models that sustain the financial acceptance of multiservice storage to both investors and consumers. For that reason, T16-Business Cases should be included as Supported FO or even Main FO. In expected impact: Development and validation of new and innovative business models for multiservice storage applications should as well be an expected impact of this topic."	- T16 has been added as supporting FO; - The modification suggested to be included in the "expected impact" section is already envisaged in the first item of the "Additional information" section. This topic is also tackled in the scope of Topic 28 "Coordination and Measurement of System's flexibility mechanisms".
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Operation of storage is an important topic that has to be addressed. However this was already one of the topics of the Horizon 2020 LCE-04-2017 call. Therefore the selected projects (for instance the "EU-SysFlex" project) should be mentioned in the reference projects and their results must be taken into account. The possible partners are not specified in the draft. We suggest to quote: DSOs, TSOs, utilities and technology developers and system providers (storage, power electronics, ICTs, etc.) as well as academia (technological centres & universities). As additional information, the pilot demonstrations should favour ownership of storage devices to market players in order to enable to recover the full value of storage in both grid and market services."	- The EU-SysFlex project is a recent project having started this year. It would become a reference for this topic depending on its further outcomes achieved and conclusions obtained through time. - The list of possible partners has been amended as "DSOs, TSOs, utilities and technology developers and system providers (storage, power electronics, ICTs, etc.) as well as academia (technological centres & universities)". - Ownership and operation of storage systems is addressed in articles 36 and 54 of the recast of the energy directive. The future R&I activities including the projects funded under LCE-04-2017 should give answers regarding the most efficient way to recover the added-value of storage systems.
AIT Austrian Institute of Technology (Research & Academia)	"Very important topic and issues well covered. There will be a coexistence of multiservice applications at transmission and distribution level and both need to interact and synergies should be utilized. Link to Distribution System Topics and FOs should be mentioned (at least to topic 16). Suggestion to use continuous text instead of bullet point for Impact and additional information."	T16 has been added as supporting FO.
Alliander NV (Power Distribution System Operators (DSOs))	"Confirmed. In addition, FO's D3, D4, D5 and D14 should be added, as pilots are foreseen on MV and LV level."	D3, D4 and D5 have been added a supported FOs.
ADM Electricity Distribution Company (Power Distribution System Operators (DSOs))	"Confirmed. We suggest to add D3, D4 and D5 in related topic."	Cf. above.

Table 50. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 51. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Equipment manufacturers and suppliers)	"Although the topic description claims to be technology neutral, the topic obviously is storage centred. Many of the issues listed here should be covered by the market design topics (open and flexible market design)."	The Topic indicates on its title that it would be dealing with multiservice storage applications. On the other hand, the topic is not favouring any storage technology. Market design is already addressed by several Topics of the IP, for instance, market design Topics in section 1 among others.
University of Applied Sciences Aschaffenburg (Research & Academia)	"Modification: Focus on unified and transparent market mechanisms"	This is included in the topic "*Definitions of specific regulatory frameworks that would enhance storage distribution.*"
Anonymous (Energy storage (technology and services providers), Thermal Generation (flexible), Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"To my point of view there is a difference between a storage application in the electricity system and energy storage applications for seasonal storage and security of supply. All considerations about storage applications Need to face both dimensions: Installed power and the time span in which this installed power is retrievable."	These subjects are addressed by the challenges of Topic 31 "Advanced energy storage technologies for energy and power applications".
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"In the expected impacts, there is "Definitions of specific regulatory frameworks that would enhance storage distribution". The European Proposal for a Directive "on common rules for the internal market in electricity" denies the possibility for DSO to own and manage energy storage. The possibility for DSO to possess and manage energy storage capacities must be investigated (and promoted?). (see Topic 31)."	This is among others the purpose of the present topic, i.e. assess how the multi-services brought by storage could be valued in the most efficient way. According to article 36, DSO can own and operate storage devices but under very specific conditions.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"[…] When discussing "Storage for new market players" (in the challenge), it should be made abundantly that we are talking about variable renewable energy producers (instead of the more generic 'new market players'). In the scope/content we would like to see another goal included, namely to increase the capabilities of hybrid systems (e.g. wind + storage) to provide ancillary services. For example, using storage to enable power smoothing, frequency support, voltage support, black start, islanding operation and flexibility provision from wind power generation."	- New market players can be any player willing to invest and operate. - Variable RES with storage integration is analysed in Topic 19 for instance.
Anonymous (Power Distribution System Operators (DSOs))	"Confirmed, but to expand the storage concept to the distribution/final users and to all the possible services. I.E. (Multiservice storage applications) with the research and demonstration of bulk storage integration options trough the energy chain (generation, transmission, distribution and final user) in the different possible services (multi (ancillary) services, grid investment deferral, etc.)"	The assessment of storage integration through the energy chain is to be assessed in different Topics at many levels (sections 3.3.3 about transmission, generation and storage, 3.3.4. related to the same topics but with distribution issues, 3.3.5 flexible generation and storage, 3.4.2 storage units, etc.).

2.3.4 SYNERGIES BETWEEN ELECTRICITY DISTRIBUTION NETWORKS AND STORAGE

2.3.4.1 TOPIC 16. INCREASED CONTROL AND OBSERVABILITY OF MV AND LV NETWORKS INCLUDING STORAGE SYSTEMS

Table 52. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 53. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"Yes: In this topic could be interesting to address the increasing lack of observability from TSOs on MV networks. The topic is too much oriented on the observability of DSOs on their own networks, however it is necessary to increase observability of TSOs on MV networks with increasing amounts of RES. This is a challenge that seems to be ignored in this topic, but should as well be"	- This has not been directly addressed in the current roadmap and as a consequence in the present IP. Certainly, a topic for the future roadmap and IPs. Please note that D9 "Automation and control of MV network" of the ETIP-SNET Roadmap is considered as supported FO.
Anonymous (Power Distribution System Operators (DSOs))	"Are smart interfaces between generation and distribution are "implicitly" considered? If this is not the case, this topic would deserve to be added."	This has not been explicitly mentioned in the current roadmap and as a consequence in the present IP. Certainly, a topic for the future roadmap and IPs. However, the challenges and scope of Topic 17 are related to this issue.
Technology Platform Smart Grids Austria (National representatives (Ministries, funding agencies...))	"Interoperability is a key factor for a successful transition of the energy system, which will lead to distributed interconnected ICT-networks. Interoperability is not explicitly addressed in the whole implementation plan and will not happen without a dedicated effort for it. In Austria there exists a project, which addresses this particular topic: "IES-integrating the energy system Austria" (www.iesaustria.at). The project leads to normative usage of existing standards which will ensure interoperability of data exchange. The focus of the IES project is to adapt and implement an existing, vendor-neutral and cooperative method to achieve interoperability within smart grids. […] This topic addresses the whole energy system: T15, T19, T20, D3, D4, D7, 8, D9, D10, D11, D12"	Interoperability is a very important subject which is in the scope of the ETIP-SNET roadmap. It will certainly be more explicitly detailed in future Implementation Plans.

Table 54. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
University of Ljubljana (Research & Academia)	"The difference between Topics 16 and 17 is not clear. The topics of controllability and observability on distribution networks are already widely addressed, so the target TRLs should be high - aiming at market products. Storage is mentioned as an asset providing services for the storage owner, for the distribution and for the transmission grid. It should be emphasised that the goals of these entities may be different and that this is a challenge to be addressed."	- Topic 16 and 17 are different: topic 16 addresses methodologies, tools, and technologies to control and operate MV and LV networks and associated market structures including new stakeholders with a focus on the integration of distributed storage, while taking into account all other flexibility means. Topic 17 is similar to Topic 16 with a focus on DER (while taking into account all other flexibility means). - Storage ownership: cf. answers for topic 15.
Anonymous (Equipment manufacturers and suppliers)	"It is not clear to me whether storage behind the meter (i.e. on site, e.g. in combination with rooftop solar PV) is included in the scope. Additionally, I do not understand the particular focus on storage here. Observability of networks is not special for storage, and services such as frequency response could also be provided by other assets connected to distribution grids."	The Topic aims at focusing control and observability at distribution level with storage integration in appropriate conditions knowing that storage would be impacting the quality of the system. As demo sites are envisaged by this Topic, a special focus is made on methodologies/tools development to improve control and operation of distribution networks with a more important RES integration, for instance. Topic 17 would complement this Topic as it enlarges the scope dealing with the DER in general.
Anonymous (Energy storage (technology and services providers), Thermal Generation (flexible), Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"To my point of view there is a difference between a storage application in the electricity system and energy storage applications for seasonal storage and security of supply. All considerations about storage applications need to face both dimensions: Installed power and the time span in which this installed power is retrievable."	These subjects are addressed by the challenges of Topic 31 "Advanced energy storage technologies for energy and power applications".
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"In the expected impacts, there is "Definitions of specific regulatory frameworks that would enhance storage distribution". The European Proposal for a Directive "on common rules for the internal market in electricity" denies the possibility for DSO to own and manage energy storage. The possibility for DSO to possess and manage energy storage capacities must be investigated (and promoted?). (see Topic 31)."	Cf. answer for topic 15.
ABIO Research Group, UPM (Research & Academia)	"[…] Nevertheless, this topic have a diffuse definition for its challenges when said that "Proposal should focus on developing and demonstrating methodologies/tools to increase the control and observability by the relevant system operators of MV and LV networks integrating smart technologies in a large scale". In general the proposal doesn't specify its procedures to achieve these methodologies and tools."	The methodologies and tools are fully described in different FOs of the ETIP-SNET Roadmap, for instance: D8 Monitoring and control of LV networks, D9 Automation and control of MV network, D13 Asset Management, for instance.
Energinet (Power Transmission System Operators (TSOs))	"Confirm importance and urgency of the topic. More R&I on market solutions between TSO/DSO or common TSO/DSO market solutions is essential."	For instance, Topic number 2 would be a good example for a common solution between DSO/TSO in which,

		several stakeholders (not only network operators) would be taking part in the design of flexibility markets integrating heterogeneous products at different levels. Important coordination and synergies between network operators for instance are expected and described in the current IP.
AIT Austrian Institute of Technology (Research & Academia)	"Link to Topic 15 should be more specifically mentioned and included (in the text it is partly included). How do the controls at distribution and transmission level interact with possible synergies but also contradictions?"	The demonstration sites proposed for example, in Topic 15 and 16 are dealing with issues at HV, MV and LV levels. A deep collaboration between networks operators is needed and demanded to coordinate the reliability of the system respecting all the safety conditions and maintaining the system's efficiency and quality of service.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Major topic to develop together with new business model, adapted public policies and market designs, especially for the storage part. Cost Benefits analysis should be recommended in order to compare the different proposed solutions."	This comment could be related to the scope of Topic 16, expected impact Topic 17, and Topic 31 "Advanced energy storage technologies for energy and power applications".

2.3.4.2 TOPIC 17. INTEGRATED MANAGEMENT OF MV AND LV NETWORKS BASED ON DER

Table 55. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Technology Platform Smart Grids Austria (National representatives (Ministries, funding agencies...))	"Within the framework of the M / 490 mandat, the Smart Grid Architecture Model (SGAM) presents a reference system, which is now widely accepted. A reference architecture developed in Europe today should refer to SGAM by definition. In Austria the Technology Platform Smart Grids Austria started an initiative called RASSA initiative ("RASSA – Reference Architecture for Secure Smart Grids in Austria", www.rassa.at) whose objective is to develop a reference architecture for smart grids in Austria coordinated with all relevant stakeholders. […]. Based on existing previous achievements a reference architecture as a model based description was developed […]. The development of the reference architecture is based on use cases and refers international standards […] such as SGAM, ENTSO-E, and the NIST Guidelines for Smart Grid Cyber Security."	- A reference to the SGAM has been added.

Table 56. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

AIT Austrian Institute of Technology (Research & Academia)	"One missing topic is how to model low voltage networks and their operations (grid equivalent, simplified grid models etc.) to be included in both MV grid planning and operation (e.g. development and Integration of these LV grid models and equivalents, MV distribution management and SCADA Systems). Due to the high amount of LV networks in Europe I do not expect including each single LV feeder in SCADA or DMS)"	This topic is addressed by the ETIP-NET Roadmap in several FOs such as D3 DSO integration of small DER, D4 System integration of medium DER, D6 Infrastructure to host EV/PHEV – Electrification of transport, D8 Monitoring and control of LV networks, D12 New planning approaches and tools, D13 Asset Management, for example. This topic would be added in further IPs. For the moment, a holistic modelling approach of the system (macro vision) is more presented in the current IP.

Table 57. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

2.3.5 COUPLING BETWEEN FLEXIBLE GENERATION AND STORAGE

2.3.5.1 TOPIC 18. INTEGRATION OF STORAGE IN EXISTING THERMAL GENERATION FOR INCREASED FLEXIBILITY

Table 58. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"CO2- utilization and injection of hydrogen is fine, since it increases the carbon conversion, which should be an indicator again. Extension: Implementaion of Solid Oxid Cells into gasification plans in order to produce and absorb electrical peak power."	- The first item is in line with Topic 18. - SOFC (Solid Oxide Fuel Cells) are covered by the FCH-JU calls. The ETIP SNET considers H_2 from the system integration point of view.
EUTurbines - European Association of Gas and Steam Turbine Manufacturers (Thermal Generation (flexible), Equipment manufacturers and suppliers)	"While a similar topic is part of the latest seen draft H2020 Work Programme 2018-2020, EUTurbines would like to stress the importance to have a continuous, wide support for the development of solutions under this topic. The allocated budget under the EU's R&I funding mechanism is much lower than the estimations provided by the experts of the ETIP SNET WG3 – in the future, additional activities to increase the flexibility of thermal power generation will be needed in order to achieve the set-up targets and have the desired impact. In accordance with the title used in the explanation in p.17 and in the longer topic description in p.43, the word "existing" in Table 8 should be removed."	- The word "existing" in Table 8 has been removed. - The budget of 40 to 60 million Euros could be enhanced in the next IP.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	- "While a similar topic is part of the latest seen draft H2020 Work Programme 2018-2020, Siemens would like to stress the importance to have a continuous, wide support for the development of solutions under this topic. The allocated budget under the EU's R&I funding mechanism is much lower than the estimations provided by the experts of the ETIP SNET WG3 – in the future,	- Budget: cf. above - Table 8: cf. above. - The description of Topic 18 allows to choose between Multiple pilot projects and a large-scale demonstration project.

	additional activities to increase the flexibility of thermal power generation will be needed in order to achieve the set-up targets and have the desired impact. - In accordance with the title used in the explanation in p.17 and in the longer topic description in p.43, the word “existing” in Table 8 should be removed. - Multiple pilot projects for the different storage technologies should be preferred instead of considering one big demo project. - We see increasingly storage capacity in households in combination with PV, however more storage as grid services (power flow and voltage control and power quality) for TSO/DSO required.”	- These are complementary uses of storage in the energy system.
Anonymous (Power Distribution System Operators (DSOs))	“Explanation should be provided to explain why the introduction of decentralised thermal power generation, as described in D14 is an objective. D14 is referenced as a main FO. However, decentralised thermal power generation is not mentioned in the specific challenge or the scope of this topic. The focus instead seems to be on large thermal plants connected to the transmission network. I suggestion would be to remove reference to D14 in this topic.”	Topic 18 is about the coupling between TPG units and storage in order to improve their flexibility: D14 is therefore a relevant FO. We have added T22 for large-scale TPG.
Alliander NV (Power Distribution System Operators (DSOs))	“Confirmed. In addition, FO’s D1 and D12 should be added.”	D1 has been added as supported FO. However, D12 (planning tools) is outside the scope of this topic. How to account for the benefits brought by storage in system planning is addressed in Topic 22.

Table 59. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Think Smart Grids (Association of promotion of the French Smart Grids sector)	“The question of increasing the flexibility should be indeed investigated. But, as thermal storage makes it possible to make heat generation flexible, it should be investigated how to also achieve better economic trade-offs in the electricity market. Some commercial offers are already existing…”	CHP is clearly mentioned in that sense in the description of the Topic.
Anonymous (EC PPP)	“Large scale fuel cells should be included as a possibility as "new thermal plants". Hydrogen can also be a storage medium integrated in existing thermal generation.”	Cf. above.

Table 60. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

ADM Electricity Distribution Company (Power Distribution System Operators (DSOs))	"Confirmed. We suggest to add D12 in related topic."	Cf. above.
SINTEF Energi AS (Research & Academia)	"This topic can be seen as a complement to topic 19: they both address the inclusion of storage, either at thermal or wind power plant. Both topics should include a comparison with its counterpart. We believe the budgets between topics 18 and 19 should be balanced, or in favour of topic 19."	The challenges to be addressed (for the operators of the generation units) are very different even though the coupling is the same: generation unit with storage. We propose to keep these two distinct topics.
Anonymous (Equipment manufacturers and suppliers)	"It is not sufficiently clear to me where the particular benefit of integrating such storage into thermal power plants is coming from."	We find the explanation clear enough. As explained in the description of the topic, integrating storage into thermal power plants will bring more flexibility for the power system.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"It is written in the description of Topic 18: "thermal power plant must increasingly shift their role from providing base-load power to providing fluctuating back-up power to meet unpredictable and short-notice demand peaks". The first aim is to provide electricity. Storing the excess of energy into heat is only possible where and when heat is necessary. It is often difficult to store heat where a power plant has already been build; heat must be necessary; heat is not usable in the summer. It is better to promote energy storage in P2G or batteries, not in heat. Heat cannot be transported. Topic 18 must focus on P2G or battery storage. Many work has already been done in cogeneration."	The Content/Scope of Topic 18 clearly mention other options than heat storage.
University of Ljubljana (Research & Academia)	"Topics 18 and 19 could also include 'Multiservice storage applications?, i.e. storage providing more than just one task. Topics 18 and 19 could be merged in one topic."	- Multiservice applications are not excluded from the R&I activities specified in Topic 18. - Cf. above.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"ETIPWind does not believe this topic is important or urgent. Storage should go to where it is needed the most and where it can offer the greatest added value. Thermal power generation does not fit those requirements."	This topic has been identified as important by the WG3 of the ETIP SNET.
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"We would prioritize the work under this topic at a lower level, because we don't believe that we have achieved the level of RES generation which would require this technology."	Cf. above.

2.3.5.2 TOPIC 19. TOWARDS FULLY DISPATCHABLE RES: VARIABLE RES WITH STORAGE.

Table 61. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"[…] T12 - RES Forecast should be included as Supported FO as it is an important FO towards fully dispatchable RES. Supported FOs: Add T9 – Enhanced ancillary services Additional information: Refer link with ETIP-SNET Topic 15."	- We have added T12 and T9 as supported FO. - We find the link sufficiently clear in the expected impact section. Both topics address the integration of storage but at different levels (one for grid controllability, the other for generation units which are a part of the grid controllability).

Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Operation of storage and RES is an important topic that has to be addressed. However this was already one of the topics of the Horizon 2020 LCE-04-2017 call. Therefore the selected projects (for instance the "EU-SysFlex" project) should be mentioned in the reference projects and their results must be taken into account."	In the current IP, we have proposed to refer to projects which have been completed (or nearly completed) so that results and recommendations are available and not foreseen.
SINTEF Energi AS (Research & Academia)	"This topic can be seen as a complement to topic 19: they both address the inclusion of storage, either at thermal or wind power plant. Both topics should include a comparison with its counterpart. We believe the budgets between topics 18 and 19 should be balanced, or in favour of topic 19."	Cf. answer for topic 18.
Alliander NV (Power Distribution System Operators (DSOs))	"Confirmed. In addition, FO's D1 and D12 should be added."	Cf. answer for topic 18.
ADM Electricity Distribution Company (Power Distribution System Operators (DSOs))	"Confirmed. We suggest to add D12 in related topic."	Cf. answer for topic 18.

Table 62. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Distribution System Operators (DSOs))	""Local dispatching" at DSO level is an important topic also. It should be addressed."	This is clearly mentioned in the current ETIP SNET roadmap (cf. D3 and D4). It could be a topic in the next IP.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"Topic 19 concerns RES and energy storage while Topic 18 concerns thermal plants and energy storage. The budget of Topic 19 must be increased up to 60 M€ or higher while the budget of Topic 18 decreased (exchange the budgets)"	The budget of Topic 19 could be increased in the coming IP.

Table 63. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Equipment manufacturers and suppliers)	"Business cases for combing storage with RES with variable output should be enabled by a proper market design. Therefore I do not see the border line between this topic and the ones on market design."	The market design topics include all stakeholders of the energy system (and their respective business cases which outputs of the market design).
Anonymous (Energy storage (technology and services providers), Thermal Generation (flexible), Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"The mentioned solutions tend to be very expensive. Meaningful cost benchmark systems need to be developed. Those benchmark systems need to take into considerations again both dimensions: Installed power and the time span in which this installed power is retrievable (MW and MWh!)."	Topic 31 Cost competitive energy storage technology is addressed.
University of Ljubljana (Research & Academia)	"Topics 18 and 19 could also include 'Multiservice storage applications?, i.e. storage providing more than just one task.	Cf. answer for topic 18.

	Topics 18 and 19 could be merged in one topic."	
Highview Power Storage (Energy storage (technology and services providers))	"The specific challenge mentions high efficiency conversion systems. Whereas this is desirable, the focus in the short term should be in finding cost effective solutions to integrate variable RES. Li-ion batteries are efficient but these suffer from electrochemical degradation and need replacement, bringing the levelised cost of storage up when high plant capacity factors are considered."	This is the purpose of this topic: "*Finding and developing markets, business models and profit solutions for the combination of renewables and storage.*"
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"What is the power range –coupling RES & Storage demonstrated in HH"	There is no specific power range addressed. It should be an output of the R&I activities to be conducted. We are thinking about utility level plants.

2.3.5.3 TOPIC 20. MANAGING SYSTEM FLEXIBILITY WITH A SMART BALANCE BETWEEN INTERMITTENT AND DISPATCHABLE SOLAR GENERATION

Table 64. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"Topic 20 can be included in Topic 19"	Topic 20 is specific to solar energy and does not rely on storage only for enhanced flexibility. The coupling between PV and CSP is a subject of R&I per se.
University of Ljubljana (Research & Academia)	"The title is misleading. CSP should be mentioned somehow."	We find the title suitable: "*intermittent*" refers to PV whereas "*dispatchable*" (with thermal storage) refers to CSP.

Table 65. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"Maybe it will be necessary to extend to other RES such as wind... for example."	Topic 20 addresses the coupling of PV and CSP, possibly in the same extended plant.
Anonymous (Power Distribution System Operators (DSOs))	"Not interesting. Why to optimize only two components of the system (dispatchable and non dispatchable solar)?. It's better to consider whole market signal to optimize all the components dispatchable and non dispatchable."	Cf. above

Table 66. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

2.3.6 GENERAL COMMENTS ABOUT PART 3. INTEGRATED GRID WITH IMPROVED INTERFACES BETWEEN ENERGY SYSTEM COMPONENTS

Table 67. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
AIT Austrian Institute of Technology (Research & Academia)	"There is a strong interdependency among the topics. I suggest to include more references between topics, which are influencing each other."	More references of projects and FOs of the ETIP SNET Roadmap are to be added as indicated previously all along this chapter.

Table 68. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (National representatives (Ministries, funding agencies...))	"In addition to the topic 20: Demonstration of hybrid RE plants integrating CSP/PV/wind plants and electrochemical batteries to reduce consumption of hydrocarbons and energy costs. Creation of monitoring/control tool to guarantee firmness of power supply to the grid, prioritizing the use of each technology according to its cost/availability in real time."	This could be considered in the next IP.
KTH Royal Institute of Technology (Research & Academia)	"RES and energy storage a the prosumers can be used to protect the prosumers privacy by shaping their energy profile. This privacy-by-design approach is very promising and low cost once storage and RES are available at the prosumer side. Perhaps one might include this aspect here. Topic 14 might lead to a privacy breach if the demand forecasting becomes too detailed."	Data privacy/protection has already been addressed in EC-funded research projects and is accounted for in the current roadmap. This topic could be included in the next IP.
ABIO Research Group, UPM (Research & Academia)	"All topics in part 3 are important and have a good description. Nevertheless, it would consider in urban areas other infrastructures like energy system components: buildings such as other urban networks can integrate to manage the inertia of building thermal loads, energy generation and storage potential. Hence, achieving more flexibility with a better integration strategy in urban areas to consider built environment."	Anticipate and plan the impact of the electrification of the building and transport sectors on the electricity network (new equipment at distribution level especially in urban areas) is considered as a major challenge for network operators. This kind of issues are taken into account within the ETIP-SNET Roadmap for instance (FOs D2 and D6). More emphasis on this subject could be added for next IP.

Table 69. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"I prefer the view that transmission grid and distribution grid perform the same function though they start from a different technical level (e.g. regarding monitoring) So I suggest to use the same headlines for TSOs and DSOs."	We propose to keep the titles as they are since referring to R&I activities typical of TSOs and DSOs.
Highview Power Storage (Energy storage (technology and services providers))	"An additional topic that could be included is the development of an adequate reporting methodology for the assessment of GHG emissions associated with storage."	Analysis of life cycle, safety, reliability, efficiency, etc. of storage technologies are to be assessed in the scope of the IP (Topic 31 for instance).
Institute of Physical Energetics (IPE) (Research & Academia)	"I would propose topic TRANSMISSION PLANNING for Part 3, to integrate all mentioned components at early stage."	We prefer to keep the text as it is: transmission planning is by far not only related to components, there are a lot of system issues. This is also mentioned in Topic 22.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"Integration of renewables in construction could achieve more flexibility, therefore a new option to integration technologies in building can enhance District Energy Systems"	The coupling of different networks would bring a new architecture of the energy system as it is conceived nowadays. Results obtained from the topics of part 3 would help to better anticipate and planning new energy district systems with more efficient interconnections between the cross-coupling sectors for instance, always maintaining the reliability with the support of digitalisation and ICT tools.
Energy Regulatory Office (Regulators)	"Divided markets of electricity, gas and heat, according current manner, should be replaced by markets of crucial (from customer's point of view) services: thermal comfort, civilisation needs (mainly by electricity powered) and transportation. Integration of different grids and resources is necessary to achieve this target in economical (and ecological) manner. Agenda of this part seems properly. "	The current issue is how to couple technically, market unification will be a later issue, if any.
Institute of Power Engineering of Academy of Sciences of Moldova (Research & Academia)	"The PART 3 is well designed in my opinion and includes very important topics. But still beside topic 20 I think it should be addressed wind generation as well."	Cf. answer above.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"All the topics concerning flexibilities are important. Al the different form of flexibility (RES, storage, DR, digitalisation, V2G, etc.…) must be taken into account and introduced according to their own characteristics (reaction time, capacity, life time, easiness to address…). The technologies and their optimisation can be studied independently, but their interaction within the energy system must be taken into account together depending on local resources, typology of demand, structure of the grids, etc. Thus modelling, new business models and adapted public policies must be studied and developed."	All these subjects about forms of flexibility and their respective economic and regulatory framework are addressed all along the IP and ETIP-SNET Roadmap as mentioned before.
Anonymous (Power Distribution System Operators (DSOs), Energy	"Cooling is as important as heating systems."	Cooling is implicitly taken into account when referred to heat.

storage (technology and services providers), Consumers (aggregated and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))		
WIP Renewable Energies (Consultancy)	"General comment: It is not clear what is meant with "Coupling generation units (thermal and RES)" as thermal is heat and RES is renewable energy systems. It is two different levels that are compared here. Furthermore it seems that with "storage unit" heat storage is meant here, however this is not clear. What about other storage units, such as batteries, innovative storages or storages in electric cars? This could be included here."	The complete phrase mentioned is "Coupling generation units (thermal and RES) with a storage unit can help improve the flexibility provided by these units under satisfying techno-economic performances" meaning that coupling thermal+storage and RES+storage "can help improve the flexibility provided by these units under satisfying techno-economic performances". By storage, every technology could be electrical, thermal, mechanical or chemical, as mentioned in Topic 18, for instance.
University of Ljubljana (Research & Academia)	"In terms of integration of different systems I am missing the integration with the transport system. In case of a large share of EVs a substantial share of energy will move from fossil to electricity. EVs will become a big consumer and, moreover, a flexible provider of services for the grid and the market."	This subject is described in Topic 32 "Coupling of electricity and transport networks".
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"The title of part 3 should not use "flexible generation", but "generation". Storage needs to be coupled to systems that need it the most, that is to say, variable renewable energy generators."	Storage would be assessed with every generation mean, at different levels (from HV to LV) and the economic and regulatory aspects would be part of the analysis as well in the ETIP-SNET.
Anonymous (Energy storage (technology and services providers), suppliers of electricity	"The possibility of interconnection of individual types of technologies into the single energy system as a whole, the alignment and adjustment of the individual energy systems in terms of interoperability increases the demands on the range of expertise in several types of technology, and the phenomenon of technology merging requires closer co-operation. This process can affect the emergence of new companies with a more types of portfolios."	Indeed, to succeed obtaining the needed flexibility of the system, it is expected higher interfaces between different energy networks, an enhanced cooperation among all the stakeholders in the whole energy value chain and then, economic aspects would need to be optimized and adapted in order to achieve this integration.
EKONERG (Consultancy)	"More study on real projects and more demonstration sites that will enable access to real data."	Many Topics in this chapter are expecting demonstration sites with different and innovative functionalities and business cases. Then, it is up to the different players (academia, regulated, market) to decide whether they want to release foreground open source (software) on open access data (data).
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"Non dispatchable RES with distributed storage Distributed non dispatchable RES with storage"	- The combination of storage with non-dispatchable RES is addressed already in Topic 19 ("Towards fully dispatchable RES: Variable RES with Storage"). - Distributed non dispatchable RES with storage is not addressed in the present IP.

SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"Siemens welcomes this part on improved interfaces. For a well-functioning system in the future, the integration of the different sectors as well as components will be key success factors. Please state the power and voltage level in each topic – storage technology (electrochemical like Li-Ion, redox-flow, chemical like H2 or other."	Regarding the voltage level, Topics have been categorised by HV and MV/LV levels. On the other hand, when referred to storage, the ETIP-SNET mentions in some cases if it is about electrical, thermal, mechanical or chemical, and when it is not specified, it would mean that different technologies are would be welcomed to be tested and to probe their benefits to the system.
FOSS (Research & Academia)	"Integrated energy systems are key for the energy transition but for optimal use of resources we need to bring in the equation two additional dimensions: life cost as compared to initial capital cost and effective use of EV storage in the integrated energy mix for managing intermittency, flexibility, security of supply, efficient use of energy, optimal use of resources and sustainability objectives."	These subjects are well addressed in the IP, for instance for storage in Topics 31 and 32.

2.4 IMPROVED COMPONENTS OF THE ENERGY SYSTEM

2.4.1 ELECTRICITY NETWORKS

2.4.1.1 JOINT TRANSMISSION AND DISTRIBUTION ISSUES

TOPIC 21. SMART ASSET MANAGEMENT USING ICT TECHNOLOGIES AND BIG DATA

Table 70. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"Yes: Internet of Things will likely affect the way assets will be managed in the future. In that sense this topic should be oriented to include concepts related with IoT which currently is not the case. Suggest to include FO T20 as supported FO."	We propose to add T20 "Internet of things" in the list of supported FOs. We also propose to add in the "content/scope" section a new bullet point: "To use Internet of Things (IoT) concepts"
Anonymous (Power Distribution System Operators (DSOs))	"Key topic. To add "advance analytics" concept."	We propose to modify the second bullet point in the content/scope section as follows: "To extract the maximum information out of the data using advanced analytics and Big Data technologies"
Anonymous (Information and Communication Technology & Network providers)	"Importance and urgency of the topic fully confirmed. The title of the topic however covers only part of what is explained in the description which mentions also new devices needed for monitoring (ICT technology and "big data" analysis alone will not be sufficient!), like sensors and drones. This aspect is critical, because for such new monitoring devices a non-interruptive installation is mandatory."	We propose to modify the title as follows so as to be generic enough to cover all asset management technologies: "Smart asset management using innovative hardware and software technologies"

B.A.U.M. Consult GmbH (Research & Academia)	"[…] I would discriminate between hardware (sensors etc.) and software (management systems, algorithms= "Big Data")."	See previous comment: we propose to make the title more generic "Smart asset management using innovative hardware and software technologies"
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	Please specify: ICT means more data from sensors on grid equipment to cope with new operation requirements and challenges, also include edge computing and data analytics	This comment is already addressed by our proposed answers to the two previous comments.
SINTEF Energi AS (Research & Academia)	"[…] We suggest to modify the introductory sentence as follows: "Assets are aging, are operated to the limit of the capabilities, and are exposed to new operating conditions and patterns than what they were originally designed for." Suggested addition of an item to "Content/Scope": "Development of a system approach to define maintenance and replacement budgets and to coordinate the resulting activities of replacement and repairing with System expansion and System operation, by using suitable probabilistic reliability management approaches." We suggest to add GARPUR as reference project."	We agree with this proposal for the specific challenge section: "Assets are aging, are operated to the limit of the capabilities, and are exposed to new operating conditions and patterns than what they were originally designed for." The following item has been added: "To develop a system approach to define maintenance and replacement budgets and to coordinate the resulting activities of replacement and repairing with System expansion and System operation, by using suitable probabilistic reliability management approaches." We agree to mention GARPUR as a reference project as it is ending in September 2017 (by adding a row in the table).
EUFP7 GARPUR consortium (Research & Academia)	"[…] Suggested addition of an item to "Content/Scope": "Development of a system approach to define maintenance and replacement budgets and to coordinate the resulting activities of replacement and repairing with System expansion and System operation, by using suitable probabilistic reliability management approaches." - We suggest to add GARPUR as reference project."	See previous comment.

Table 71. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 72. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

Anonymous (National representatives (Ministries, funding agencies...))	"This is in our opinion especially important topic. Duplication with Topic 8?"	There is no duplication between topics 8 and 21. Topic 21 deals with smart asset management, i.e. how to use data generated by sensors (IoT, IIoT) to improve the proper performance of existing assets (operating sometimes at the limit of their capabilities as a consequence of high-RES penetration). Topic 8 deals with the necessary developments needed to ensure smooth integration and interoperability of the sensors to be used in the smart grids, among others for smart asset management.
ETIP Wind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"[…] "asset management" should clearly include RES technologies in its scope. Digitalisation of the asset management will be particularly challenging for dispersed energy sources, especially in distribution networks such as small hydro, wind, solar PV, small diesel generation etc.…"	Here "asset management" refers to grid assets (transmission and distribution). The management of non-regulated assets is not covered by the ETIP SNET.
Public Service of Wallonia (National representatives (Ministries, funding agencies...)	"The budget (14 M€) seems low..."	The budget has been estimated by ENTSO-E based on expert views and analysis of past and ongoing projects. We propose to maintain this figure.
University of Applied Sciences Aschaffenburg (Research & Academia)	"[…] Modification: continue focus of research on primary technology / assets themselves (e.g. transformers, CT/VT) instead of putting a multitude of added functionality on top."	We believe that a mix of hardware and software technologies are needed.
KTH Royal Institute of Technology (Research & Academia)	"interesting, but privacy aspects need to be included"	Since consumer data are not addressed here, we believe that privacy aspects do not need to be mentioned here.

2.4.1.2 TRANSMISSION NETWORKS

TOPIC 22. SMART AND FLEXIBLE GRID DESIGN AND PLANNING WITH PROBABILISTIC ADEQUACY ASSESSMENTS IN UNCERTAIN FRAMEWORK

Table 73. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"There is a mistake in page 18 of the draft. The tittle is different (Increased control and observability of MV and LV networks including storage systems). This topic is more appropriate."	This mistake has been corrected on page 18. The title of the topic indeed is "Smart and flexible grid design and planning with probabilistic adequacy assessments in uncertain framework"
Anonymous (Power Distribution System Operators (DSOs))	"MV/LV are not Transmission topics"	The mistake on page 18 has been corrected (see previous comment).
EUFP7 GARPUR consortium (Research & Academia)	"- We confirm the importance and urgency of this topic. - Suggested modification of title to: "Smart and flexible grid design and planning, asset management and system operation, with probabilistic reliability assessments in uncertain framework"	It is preferred by ETIP SNET members to separate asset management aspects (topic 21) from grid planning aspects (topic 22). The suggested paragraph in the Content/Scope section has been added to topic 21. The title is not changed.

	- Suggested addition of an item to “Content/Scope”: “Explicit modelling of asset management and system operation to consider the impact of grid design on future reliability and socio-economic performances (including expected market surpluses and costs of service interruptions). A probabilistic approach coherent over all time frames needs to be deployed.” - We suggest to add GARPUR as reference project.”	
SINTEF Energi AS Norway (Research & Academia)	“[…] Suggested modification of title to: "Smart and flexible grid design and planning, asset management and system operation, with probabilistic reliability assessments in uncertain framework" Suggested addition of an item to “Content/Scope”: “Explicit modelling of asset management and system operation to consider the impact of grid design on future reliability and socio-economic performances (including expected market surpluses and costs of service interruptions). A probabilistic approach coherent over all time frames needs to be deployed.” We suggest to add GARPUR as reference project. We suggest to increase the budget of this topic.”	See above comment from GARPUR. The budget has been estimated by ENTSO-E based on expert views and analysis of previous projects. We propose to maintain this figure.

Table 74. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	“yes, same applies for DSOs”	This has not been considered by DSOs as a priority R&I topic for this Implementation Plan, but it might be for the next one.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	“Grid design and planning must integrate in neighbourhoods and cities.”	This topic is focused on Transmission Grids. Within the next Implementation Plan, more local aspects, at distribution level, might be addressed.
University of Applied Sciences Aschaffenburg (Research & Academia)	“[…] Modification: more focus of effects of a smarter grid on assets, e.g. mixed AC/DC field stress on insulation, continue research on primary technology.”	This might be addressed within the next Implementation Plan.
Anonymous (Power Distribution System Operators (DSOs))	“New methods for network planning, based on probabilistic methods is a key topic for distribution networks also.”	This has not been considered by DSOs as a priority R&I topic for this Implementation Plan, but it might be for the next one.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	“Topic should include advanced research on digital twin technologies”	Digital Twin technology is addressed by Digitisation Topic 6 for power plants, DER, TSO and DSO networks. It is also addressed by Generation Topic 39 for flexible power plants

Table 75. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Equipment manufacturers and suppliers)	"Interference with new ways to operate grids closer to the limits should be pointed out explicitly"	This has been taken into account in Topic 21: "Assets are aging, are operated to the limit of the capabilities, and are exposed to new operating conditions and patterns than what they were originally designed for."
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"ETIPWind considers this topic to be important and urgent. Oversizing grid can trigger important costs and variable renewables' contribution to grid security should be assessed with more precision."	RES contribution to grid security is addressed by Topic 14 "Improve RES and demand forecasting and optimal capacity operation"

TOPIC 23. PUBLIC ACCEPTANCE AND STAKEHOLDERS PARTICIPATION

Table 76. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
EUTurbines - European Association of Gas and Steam Turbine Manufacturers (Thermal Generation (flexible), Equipment manufacturers and suppliers)	"The description of this topic lacks a lot of details and should therefore be better explained. It is suggested that the topic is not restricted to transmission networks only; public acceptance and stakeholders' participation is an important matter for all system contributors."	The missing elements within the Topic have been completed as suggested ("expected outcomes" and "possible partners").
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"The description of this topic lacks a lot of details and should therefore be better explained. It is suggested that the topic is not restricted to transmission networks only; public acceptance and stakeholders' participation is an important matter for all system contributors."	
Anonymous (Research & Academia)	"Confirmed. Funding scheme could be EC, national or local funding."	The funding scheme section has been completed.

Table 77. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"yes, but this issue is not only important for transmission networks. It is especially important for distribution networks."	This might be considered within the next Implementation Plan.
University of Applied Sciences Aschaffenburg (Research & Academia)	"focus on risk communication: how to achieve solutions with the public in a lose-lose situation, e.g. when new OHL become necessary (cf. EMF studies at ICNIRP)"	This might be considered within the next Implementation Plan. Deepening studies on human and animal exposure to EMF, as well as proposing new tower and stations designs with less visual impact, audible noise and EMF, is foreseen in the ETIP SNET Roadmap.

Table 78. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Research & Academia)	"Why is public acceptance only a topic under distribution/transmission? It should be a recurring theme in all sections. Also, the term Public Acceptance has negative connotations, implying that we want to convince the public to accept decisions that have already been made, rather than genuinely consult with the public. Also, there seems to be no budget here, which casts doubt on the genuine interest in public participation."	"Public acceptance" is the wording widely used in the context of grid development. For other matters (generation plants for instance), public acceptance does not fall in the scope of the ETIP SNET. The budget has been defined based on TSOs' expert views and on the monitoring of previous projects' outcomes on the subject (Best Grid, Inspire Grid…).
Public Service of Wallonia (National representatives (Ministries, funding agencies...)	"Public acceptance is vital for the development of RES. There are two problems: -the forecast budget (5 M€) is very low. -The behaviour of people and the acceptance of new processes, ideas, rules vary according to the regions. As a consequence, there must be several R&I programs in several regions/countries. -Public acceptance and stakeholders' participation do not directly pay back in cash or in money. European budget must be increased."	The budget has been defined based on TSOs' expert views and on the monitoring of previous projects' outcomes on the subject (Best Grid, Inspire Grid…).
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"Maybe this topic have to be a general topic."	For matters other than grid development (generation plants for instance), public acceptance does not fall in the scope of the ETIP SNET.
Anonymous (Information and Communication Technology & Network providers)	"Importance and urgency of the topic confirmed in general, but the topic seems to be too unspecific. Is this about public acceptance of new transmission lines, of new power plants or even of installation of smart meters? All these are very different topics which cannot be combined reasonably to a single one."	The focus is on public acceptance of new transmission lines, the topic being included in the section "Transmission Networks" of the IP.
KTH Royal Institute of Technology (Research & Academia)	"important, here privacy might be a key aspect for the public acceptance"	Here public acceptance does address transmission grid development.

TOPIC 24. ICT SYSTEMS AND DATA HANDLING FOR CONTROL CHAIN

Table 79. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Public Service of Wallonia (National representatives (Ministries, funding agencies...)	"-To be linked with Topic 9 (cybersecurity)"	Cross-references between topics 9 and 24 have been added.

Table 80. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"yes, same applies for DSOs"	This might be considered within the next Implementation Plan.
EUFP7 GARPUR consortium (Research & Academia)	"- We confirm the importance and urgency of this topic. - Suggested addition of an item to "Content/Scope": "Defining and exchanging required data to model weather-climatic and socio-economically dependent threats and performance indicators: fault-rates, market conditions, costs of service interruptions." - We suggest to add GARPUR as reference project."	This might be considered within the next Implementation Plan.
SINTEF Energi AS (Research & Academia)	"[…] Suggested additions to "Content/Scope": 1. "Defining and exchanging required data to model weather-climatic and socio-economically dependent threats and performance indicators: fault-rates, market conditions, costs of service interruptions." 2. Assessment of changes in reliability resulting from the coupling of power and ICT, and the resulting increased complexity in the overall system. We suggest to add GARPUR as reference project."	
Technology Platform Smart Grids Austria (National representatives (Ministries, funding agencies...))	"Interoperability is a key factor for a successful transition of the energy system, which will lead to distributed interconnected ICT-networks. Interoperability is not explicitly addressed in the whole implementation plan and will not happen without a dedicated effort for it. In Austria there exists a project, which addresses this particular topic: "IES-integrating the energy system Austria" (www.iesaustria.at). The project leads to normative usage of existing standards which will ensure interoperability of data exchange. The focus of the IES project is to adapt and implement an existing, vendor-neutral and cooperative method to achieve interoperability within smart grids. […] This topic addresses the whole energy system: T15, T19, T20, D3, D4, D7, 8, D9, D10, D11, D12"	Interoperability is considered as a key challenge for TSOs and DSOs in the ETIP SNET roadmap. A topic focused on interoperability aspects might be included within the next Implementation Plan.

Table 81. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

Anonymous (Research & Academia)	"Considering the description, this topic could be possibility merged with the Topic 21"	No, because topic 24 addresses system operation while topic 21 is focused on asset management only.
FOSS (Research & Academia)	"I am not convinced that this theme adds anything that is missing or not covered elsewhere"	Such self-standing topic has been considered necessary by ENTSO-E.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"The description of this topic lacks a lot of details and should therefore be better explained."	We consider that topics in the IP should not be too detailed to leave some flexibility to the projects answering such a call.
University of Ljubljana (Research & Academia)	"Should be addressed within the Digitalisation of the energy system."	Within this topic some aspects are specific to TSOs (for instance real-time data exchange) while digitisation topics are more generic.

TOPIC 25. ENHANCED GRID OBSERVABILITY AND ASSESSMENT OF PAN EUROPEAN SYSTEM STABILITY

Table 82. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"[…] It is important to highlight the role of co-simulation techniques to allow the evaluation of ICT impact in power systems. Studies joining ICT and power systems expertise are fundamental to allow a reliable digitalization of future European Energy Systems. This should be further highlighted in this bullet, such as: "- To explore the role and impact of existing and emerging ICT for grid observability and controllability. In this matter, the use of co-simulation techniques able to simulate ICT impact in power systems is key to ensure a reliable digitalization of pan European system""	We have amended the text as suggested.

Table 83. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"yes, same applies for DSOs"	Such a topic for distribution grids might be considered within the next Implementation Plan.
FOSS (Research & Academia)	"Confirmed but this is a common theme for T&D"	
EUFP7 GARPUR consortium (Research & Academia)	"[…]- Suggested addition of an item to "Content/Scope": "To implement a coherent probabilistic approach balancing socio-economic impact and system reliability to justify the investment targets of 'smartification' of the system." - We suggest to add GARPUR as reference project."	This might be considered within the next Implementation Plan.

SINTEF Energi AS (Research & Academia)	"[…] Suggested addition of an item to "Content/Scope": "To implement a coherent probabilistic approach, balancing socio-economic impact and system reliability, to justify the investment targets of 'smartification' of the system." We suggest to add GARPUR as reference project."	

Table 84. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
ABIO Research Group, UPM (Research & Academia)	"Assessing with a new uniform methodology is important to achieve a pan European System and stability in the network and local grids. Achieving an effectiveness methodology requires to define goals and procedures to reach the goals. This needs to separate planning stage, operation stage and decision support stage, since each stage needs different methodological parameters. For system planning must integrate assessment with urban planning to enhance grid observability at local scale. This requires to integrate data of energy buildings, urban generation and urban storage."	Within this topic the purpose is to improve the observability of pan European transmission grid rather than at local scale.

TOPIC 26. CROSS-BORDER USE OF ANCILLARY AND FLEXIBILITY SERVICES

Table 85. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 86. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
SINTEF Energi AS (Research & Academia)	"We believe it is important to align and coordinate this topic with topics 1 and 28, in order to address not only cross-border use of flexibility, but also TSO/DSO interaction w.r.t. flexibility resources at the MV and LV levels."	This might be considered within the next Implementation Plan. It has been preferred to have a specific topic on cross-border interactions which pose different challenges that TSO/DSO interactions (different regulatory environments, etc.)

Table 87. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"yes, same applies for DSOs"	Here the focus is on cross-border interactions, which are by nature a TSO topic.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"Very important R&D need, this topic should be addressed more strongly, on HV and MV level, foster cross border initiatives"	The budget for this topic has been proposed by experts, and also takes into account arbitrages with other topics.
Anonymous (Equipment manufacturers and suppliers)	"Cross-border coordination of ancillary services definitely offers opportunities to increase efficiency. However, it is not clear to me why this needs to be addressed separately from market design topics."	Topic 1 "Flexible market design" and Topic 2 "Market design for trading of heterogeneous flexibility products" are more general and have lower TRL than this topic, which should allow TSOs to deliver an implementable solution to exchange ancillary and flexibility services.
University of Ljubljana (Research & Academia)	"Partially addressed within Topics 1 and 2."	
ABIO Research Group, UPM (Research & Academia)	"This issue has ancillary important so is not urgent. Interconnections with other transmission system, dealing with the intermittency to increase share of RES requires firstly works at local urban scale. Beforehand it is necessary to solve interconnections in distribution system between buildings and urban local areas."	We believe that improving cross-border interactions is key to address the challenges of the power systems.
Anonymous (Research & Academia)	"Merge this topic with Topic 28. It seems they are complementary and based on the same FOs."	Topic 28 is not focused on cross-border interactions.

TOPIC 27. DEMAND RESPONSE ENGINEERING

Table 88. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"Yes: • Supported FOs Add T9 – Enhanced ancillary services • Specific challenge Add the following challenge: Adequacy assessment and expansion planning considering demand-side resources. • Budget seems too short for demonstrator projects."	- We agree to add T9 – Enhanced ancillary services for network operation in the list of supported FOs. - "Adequacy assessment and expansion planning considering demand-side resources" has been added.

Table 89. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 90. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"yes, same applies for DSOs"	Many recent and ongoing R&I projects are addressing demand response at distribution level.
Anonymous (Information and Communication Technology & Network providers)	"There seems to be a mismatch between title of the topic and the description. DSR has a lot to do with (financial) incentives and behavioural changes, but the description does not mention this but talks about ancillary services by prosumers."	Financial incentives and behavioural changes are addressed by many recent and ongoing R&I projects at distribution level. Topic 27 is rather focused on technical aspects of DSR from the TSO's point of view.
Anonymous (Power Distribution System Operators (DSOs))	"Confirmed. Always in coordination with DSO. This topic should be under "Joint Transmission and Distribution Issues" category."	Coordination with DSOs is mentioned in the topic. The focus however of Topic 27 is on technical aspects of DSR from the TSO's point of view.
University of Ljubljana (Research & Academia)	"This is not a transmission-specific task. Should be included in other topics."	See above comments.
FOSS (Research & Academia)	"Confirmed but this is a Distribution theme or at best for the integrated grid."	See above comments.

TOPIC 28. COORDINATION AND MEASUREMENT OF SYSTEM'S FLEXIBILITY MECHANISMS

Table 91. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Transmission System Operators (TSOs))	"[…] Specific challenge In the second bullet add: iv) Demand-side response	We agree to add "(iv) of demand-side response" in the specific challenge section (second bullet point)

Table 92. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 93. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Distribution System Operators (DSOs), Energy storage (technology and services providers), Consumers (aggregated and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …)	"Yes and standardization."	We propose to leave this to projects answering such a call.
ABIO Research Group, UPM (Research & Academia)	"This issue is important and have a good description. Complement rules are active demand response implementing measures at the local scale, homes, buildings and districts: large refurbishment programs integrated with new zero or positive energy homes, buildings and districts to change the load characteristics. Besides this, deploying energy efficiency in urban areas with the involvement of end customers, taking into account the interactions with the other urban networks and pushing for lower energy consumption."	Topic 28 is rather focused on transmission grids.
B.A.U.M. Consult GmbH (Research & Academia)	"yes, same applies for DSOs"	Topic 28 is rather focused on transmission grids.
Anonymous (Equipment manufacturers and suppliers)	"I would appreciate a stronger focus on the difference between this topic and the one on flexibility markets."	Topic 28 is focused on technical aspects (modelling, measurement, etc.) to support the development of flexibility markets.
University of Ljubljana (Research & Academia)	"Covered in Topic 25."	No, topic 25 is focused on observability of the transmission grid.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"ETIPWind feels this topic should be combined with Topic 2."	Topic 2 is a lower TRL topic which addresses market design in a general manner.
SINTEF Energi AS (Research & Academia)	"We confirm the importance and urgency of this topic, under the condition that it is modified to avoid overlap and be well aligned with topics 1, 14, 26, and potentially other similar topics."	Overlaps between topics are unavoidable: each topic has however its own focus and TRL level.
Anonymous (Research & Academia)	"See topic 26"	See above comments.
FOSS (Research & Academia)	"Similar to topic 27"	See above comments.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"The description of this topic lacks a lot of details and should therefore be better explained."	We consider that topics in the IP should not be too detailed to leave some flexibility to the projects answering such a call.

University of Applied Sciences Aschaffenburg (Research & Academia)	"[…] Modification: What could a real laboratory look like which could test this in real, not in simulation?"	This is not the purpose of the topic. The expected outcomes are "*models that can value (need, market size and requirements) flexibility products and their added values and competitiveness*". Demonstrations should be implemented following the outcomes of the future R&I activities, cf. item 4 in the expected impact section "*use cases for setting up and exploiting real-time monitoring schemes for increased flexibility; respective pilot project to implement the method*".

2.4.1.3 DISTRIBUTION NETWORKS

TOPIC 29. INNOVATIVE APPROACH FOR GRID OPERATION

Table 94. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
PhD student in UPM (Research & Academia)	"[…] in this topic lacks definition of expected outcomes and specify procedures."	The comments received during the Public Consultations have been taken into account accordingly in the specifications of this topic (TRL, expected outcomes and possible partners for the Topic) cf. current IP. The budget expressed is in line with the scope and the outcomes expected.
University of Ljubljana (Research & Academia)	"The topic is relevant. However, is poorly specified. Similarly to Topic 22, the probabilistic approach to network planning and operation should be included."	
SINTEF Energi AS (Research & Academia)	"We believe this topic is not sufficiently well specified to justify the proposed budget."	
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"40'0 pretty much for proposing R&I activities for the development and demonstration of integrated innovative approaches"	
AIT Austrian Institute of Technology (Research & Academia)	"Very weakly described. Need to be further elaborated. Topic 29 also included in Topic 17 (integrated management of MV and LV grids). What is the exact difference? »	
Anonymous (Information and Communication Technology & Network providers)	"Importance of the topic not fully understood. Handling of smart meter data may be a challenge for the utilities (who are still used to deal with one meter reading per residential customer per year), but cannot be considered as topic of "big data" in general. Maybe a more detailed description can make the relevance more clear."	
Anonymous (Power Distribution System Operators (DSOs))	"Confirmed. Wide topic. To add: … supporting new relations with the customers"	
Alliander NV (Power Distribution System Operators (DSOs))	"Confirmed. In addition, as market developments and customer expectations are influencing innovation in grid operations, all DSO FO's (D1 – D14) should be added to this topic."	The reference FOs for the topic have been improved accordingly cf. current IP. For instance, FO D10 - Smart metering data processing and other big data applications has been added.
ADM Electricity Distribution Company (Power Distribution System Operators (DSOs))	"Confirmed. We suggest to add D10, D11 and D12 in topic 29."	

Table 95. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Distribution System Operators (DSOs))	"Not only operation, but also planning. New methods for network planning, based on probabilistic methods is a key topic for distribution networks."	This might be considered for the next IP. Developing new planning approaches and tools for the distribution grids is indeed part of the ETIP SNET roadmap.
University of Applied Sciences Aschaffenburg (Research & Academia)	"Importance/urgency: confirmed Focus: find solution for DC grid operation (cf. frequency control in AC grid)"	The scope of the topic is about the existing assets, i.e. how to better operate the distribution network with the data brought by the digitalisation and the enhanced functionalities of PE-interfaced devices. The issue of operating a distribution network which includes DC links is addressed in the ETIP SNET roadmap, cf. D3 (LV DC grids). This topic could be included in the next IP.

Table 96. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"Publication of the results on an open source and open data basis."	Modalities of access to data shall be proposed by project answering such a call.
Anonymous (Power Transmission System Operators (TSOs))	"Grid Operation should be addressed at an integrated level."	We consider that TSOs and DSOs have different role to play, even though coordination between TSOs and DSOs can still be improved (as mentioned at many occasions in the ETIP SNET roadmap).
ABIO Research Group, UPM (Research & Academia)	"Innovative approaches to enhance grid operation that facilitate integration of renewable energy generation on distribution networks are the goals of the majority of the topics: the expected impacts are better use of available data and safer grid operation. Beside this, in this can improve specifying procedures: improving grid operation from buildings and deploying micro grids in urban districts facilitate the integration of renewable generation if these procedures have regulations in urban local planning. Coupling energy planning and urban planning will fulfil better grid operation and energy efficiency."	Specifying procedures shall be done by projects answering such a call.
EC Power A/S (Energy storage (technology and services providers), Thermal Generation (flexible), Equipment manufacturers and suppliers, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"[…] The core issue must be generation of costs (and what is the cost of losing a kWh at negative price?) […]"	The purpose of the topic is to estimate the VOLL but address technical issues so as to make sure that there are no LL.

TOPIC 30. EV/PHEV CHARGING INFRASTRUCTURE AND INTEGRATION IN SMART ENERGY SYSTEMS

Table 97. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
ADM Electricity Distribution Company (Power Distribution System Operators (DSOs))	"We suggest to add D3, D5, D6 D8 and D9 in topic 30."	D3 (System integration of small DER), D8 (Monitoring and control of LV network) and D9 (Automation and control of MV network) have been added in the list of supported FOs. D5 and D6 were already mentioned.

Table 98. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 99. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (EC PPP)	"Hydrogen refilling stations could be included alongside the fast charging infrastructure to increase the flexibility of the system. If on site production is included, the ling with smart energy systems is clear."	The scope addressed by the ETIP SNET is rather on system integration issues than on the technological development of specific components. In addition, it seems that such components using hydrogen to balance grids are considered mature since business plans are developed by CEF projects.
University of Ljubljana (Research & Academia)	"Much more emphasis should be given to: influence of EV charging on networks operation, possible services offered by EVs and synergies between DER/storage/EVs."	Topic 30 is mainly focused on the impact of EV charging infrastructure on the distribution grid. Topic 32 addresses V2G services.
PhD student in UPM (Research & Academia)	"Implementation of EV in cities and routes is a secondary goal, first it is necessary achieving energy renewable generation in cities and integrating it in networks. If have EV charging with fossil fuel generation of electricity the problem of pollution will continue. Energy transition requires better energy infrastructures in cities that exploit local energy generation."	Topic 30 is mainly focused on the impact of EV charging infrastructure on the distribution grid.
ABIO Research Group, UPM (Research & Academia)	"Implementation of EV in cities and routes is a secondary goal, first it is necessary achieving energy renewable generation in cities and integrating it in networks. If have EV charging with fossil fuel generation of electricity the problem of pollution will continue. Energy transition requires better energy	

	infrastructures in cities that exploit local energy generation. Achieving renewable energy in cities requires specific urban planning and local regulations. Creating a charging infrastructure starts matching energy planning with urban planning, analysing urban renewable potential and then developing this potential to obtain generation to use in suitable urban places."	
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Improving smart and fast charging is a key factor for the EV development, as the impact on customers' acceptance and energy system are both determinant and must be addressed altogether. Convergence with item 32"	Indeed, some overlap with topic 32 exists, however topic 30 is mainly focused on the impact of EV charging infrastructure on the distribution grid rather than on services provided by EV battery storage.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"30'0 pretty much for proposing R&I activities for the speed-up of EV roll-out Important, but already ongoing in many EU member states"	The budget for this topic has been proposed by experts, taking into account past and ongoing projects.
Hydrogenics Europe NV (Energy storage (technology and services providers), Interface to Other Energy Carriers (Heat, Transport, Gas, …)	"Fuel Cell Electric Vehicle charging infrastructure with onsite hydrogen production (through water electrolysis) should be clearly included in the scope of this topic. FCEV's will play an important role next to BEV's, especially for medium to heavy duty applications (buses, lorries, trains, ships...). Interaction dynamic with the power sector is completely different as the moment of production of the hydrogen can be decoupled from the recharging (or refuelling moment) allowing a greater balancing capability of renewable power. Interaction of both types of infrastructure (fast chargers and hydrogen refuelling stations) should better understood."	We propose not to include this topic since at a very early an embryonal stage.

2.4.2 STORAGE UNITS

TOPIC 31. ADVANCED ENERGY STORAGE TECHNOLOGIES FOR ENERGY AND POWER APPLICATIONS

Table 100. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Important and with strong priority. Modelling the best size and localisation, as well as business models of storage Not only major issues have to be addressed on the storage technologies' performances but also on the inverters' performances and costs, which is crucial in the profitability of a complete storage system. If possible, "European made" technologies should be favoured. As possible partners, energy utilities may have a great contribution."	- Modelling and economic issues related to storage are described in Topic 16, so as to assess the impact that storage would have on the system. - Technologies such as inverters are tackled in Topic 36 "Enhanced smart RES flexible solutions and control strategies for Power Electronic Converter (PEC) dominated grids". - Energy utilities have been added to the list of possible partners.

Table 101. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"30'0 pretty low for validation of technology Consider H2 storage for large scale and long-term storage which include electrolysis (existing) and conversion either electrification or chemical routes (synfuel)"	- The estimated budget is based on expert view. It is the result of a broad consultation. - Cf. answers above for topic 12, 18 and to some extent 30.

Table 102. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Energy storage (technology and services providers), Thermal Generation (flexible), Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"A pan-European assessment of underground gas storage facilities would help to get access to this existing storage option. Basically the hydrogen tolerance of the existing facilities is not known yet, even though projects like "Underground Sun Storage" delivered promising results."	Underground gas storage facilities are not in the scope of Topic 31 but it is in the scope and description of Topic 12.
Exide Technologies (Energy storage (technology and services providers))	"Development of Hybrid technologies Lithium Ion & Supercapacitors"	These technologies are of course included in the present topic.
Anonymous (Equipment manufacturers and suppliers)	"Time scale of the storage solutions to be developed here is not sufficiently clear to me. At one point "long term storage" is mentioned - does this mean that energy storage with a volume beyond several days are in focus here?"	Yes, long-term storage is well foreseen in the scope of this topic.
University of Applied Sciences Aschaffenburg (Research & Academia)	"Focus on holistic LCA for different technologies"	This is envisaged in the scope of the Topic and also explicitly addressed in the description of the FO D5 "Integration of storage in network management" in the ETIP-SNET Roadmap".
Energinet (Power Transmission System Operators (TSOs))	"Confirm importance and urgency of the topic. There is a need for further R&I on storage solutions with high temperature heat, non-methane gasses as H2 and synthesis gas"	These technologies are tackled in the scope of the Topic.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"Written in Topic 31: "Long term energy storage should be available to industry and regulators as an effective option to resolve issues of grid resiliency and reliability". The European Proposal for a Directive "on common rules for the internal market in electricity" denies the possibility for DSO to own and manage energy storage. The possibility for DSO to possess and manage energy storage capacities must be investigated (and promoted?). (see Topic 15)"	According to article 36, DSO can own and operate storage devices but under very specific conditions. In any case, the economic viability and business case of the solutions developed need to be investigated, including of course different possible owners and operators.
Anonymous (Research & Academia)	""operators propose a real-life scenario for an energy storage solution ii) R&D institutes and industry develop the energy storage solution iii) The whole consortium test and evaluate the technological viability and reliability from a technical and economical point of view." - this sequence of approach appears in several Topics and sections, and seems to put Research Institutes, which	This is the proposed sequence for this topic. R&D institutes are of course free to imagine new energy solutions that may not represent the current market situation but would have long-term socio-economic benefits.

	are funded by taxpayer money, at the service of the for-profit sector. While Public-Private partnerships are to be encouraged, one should not forget the ability of R&D institutes to imagine new energy solutions that may not represent the current market situation but would have long-term socio-economic benefits."	
ACTARON (Research & Academia, Energy storage (technology and services providers))	"The investment in energy storage technologies for grid stabilisation and storing energy because of fluctuations is risky, because the power regulation fees are set weekly. For that reason, the investment itself can't be calculated or only with a lot of unsure assumptions that increase the risk value of the investment."	These subjects are in the scope of different Topics of the IP, for instance, Topic 16, 17, 31, 32, etc. just to mention some. On the other hand, projects' demonstrators would generate new outcomes and conclusions that would serve as guidelines and recommendations.
Anonymous (EC PPP)	"Hydrogen can be a long term storage technology to be included in the topic."	Hydrogen is not explicitly mentioned in this Topic but is addressed in the IP and mentioned targeting different type of technologies.

TOPIC 32. COUPLING OF ELECTRICITY AND TRANSPORT NETWORKS

Table 103. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 104. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 105. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Energy storage (technology and services providers), Thermal Generation (flexible), Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"Additionally power to methane should be mentioned to provide fuels for heavy duty vehicles and to get access to already existing storage options. Compared to hydrogen for methane major parts of the needed infrastructure is already there."	This is covered by Topic 34.
Anonymous (Equipment manufacturers and suppliers)	"I do not understand where fuel cell electric vehicles are coming from in this topic. Are there scenarios on the development of electric transportation used as basis for the roadmap?"	Integration of fuel cells can be part of the scope of the Topic as they could provide different benefits to integrated energy systems other than EVs. The FO in the Roadmap

		dealing with electrification of transport is the D6 "Infrastructure to host EV/PHEV – Electrification of transport".
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Modelling will be necessary to determine the real benefit of such solutions, and especially what should be the optimum electricity only range of hybrid vehicles. In a first step, the "grid to vehicle" sense should be favoured in order to ensure that the charging phases of the electric vehicles not only do not create new constraints in the power systems but on the contrary propose flexibility services to the power systems."	- Modelling tools are described and expected by Topic 16 and 17 of the IP, as they are funding demo projects dealing with these issues taking into account integration of DER and storage systems. - Indeed, V2G would be oriented to bring new services which would improve power system operations.
PhD student in UPM (Research & Academia)	"The EV potential to integrate in grid networks will need be developed in a second stage, now is not urgent this topic. First it is necessary planning integration of energy renewable sources in networks."	These topics are to be developed simultaneously as both are priorities for the ETIP-SNET due to the benefits they may bring to the energy system as they are correlated. V2G would be improving system's flexibility which would allow a better integration of RES.
University of Ljubljana (Research & Academia)	"Should be moved to 3.3 INTEGRATED GRID."	It is related to storage as well. Topics as 16 and 17 mentioned and tackled issues related to these subjects.
Hydrogenics Europe NV (Energy storage (technology and services providers), Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"Fuel Cell Electric Vehicle charging infrastructure with onsite hydrogen production (through water electrolysis) should be clearly included in the scope of this topic. FCEV's will play an important role next to BEV's, especially for medium to heavy duty applications (buses, lorries, trains, ships...). Interaction dynamic with the power sector is completely different as the moment of production of the hydrogen can be decoupled from the recharging (or refuelling moment) allowing a greater balancing capability of renewable power. Interaction of both types of infrastructure (fast chargers and hydrogen refuelling stations) should better understood."	The development of the charging infrastructure for Fuel Cell Electric Vehicles is in the scope. For instance, onsite production of H2 for this kind of structures and their possible benefits to the system would be welcomed to be developed in pilots.

2.4.3 GENERATION UNITS

2.4.3.1 THERMAL GENERATION

Topic 33. Developing the next generation of flexible thermal power plants

Table 106. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
EUTurbines - European Association of Gas and Steam Turbine Manufacturers (Thermal Generation (flexible), Equipment manufacturers and suppliers)	"EUTurbines welcomes the topic and agrees with the need to continue building on the findings of the projects under H2020 funding calls LCE-17-2015 and LCE-28-2017. Increasing the flexibility of thermal power generation is imperative to have a well-functioning future energy system. Areas that present the biggest challenges when increasing flexibility – which means a different operation mode – include the efficiency levels both at full and part-load and maintaining low	- We have amended the fourth item under Content/Scope as suggested. - Expected impact and expected outcomes are different section. Expected outcomes refers to specific results of the expected R&I activities whereas expected impact refers to the main impact which can be expected onto the power system.

	emissions. In the same way, the robustness of specific components and of the entire power plant can be compromised. In this sense, we suggest complementing the fourth bullet point under Content/Scope as follows: "Robustness of thermal power plants for increased cycling (materials, lifetime estimation maintenance and repair costs reduction)" It should be noted that the sections "expected impact" and "expected outcome" can be very similar. Given the fact that the topic describes numerous possibilities on how to address the topic (under the Content/Scope section), at this point, it is difficult to predict what would be the specific outcome – It is therefore suggested to remove the "expected outcome" part. Possible partners under this topic would include component/technology providers, utilities, research centres and universities, etc."	- The possible partners have been listed as suggested.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	Siemens welcomes the topic and agrees with the need to continue building on the findings of the projects under H2020 funding calls LCE-17-2015 and LCE-28-2017. Increasing the flexibility of thermal power generation is imperative to have a well-functioning future energy system. Areas that present the biggest challenges when increasing flexibility – which means a different operation mode – include the efficiency levels both at full and part-load and maintaining low emissions. In the same way, the robustness of specific components and of the entire power plant can be compromised. In this sense, we suggest complementing the fourth bullet point under Content/Scope as follows: "Robustness of thermal power plants for increased cycling (materials, lifetime estimation maintenance and repair costs reduction)" It should be noted that the sections "expected impact" and "expected outcome" can be very similar. Given the fact that the topic describes numerous possibilities on how to address the topic (under the Content/Scope section), at this point, it is difficult to predict what would be the specific outcome – It is therefore suggested to remove the "expected outcome" part. Possible partners under this topic would include component/technology providers, utilities, research centers and universities, etc.	Cf. above.

Table 107. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
SINTEF Energi AS (Research & Academia)	"We suggest some of the budget from this topic is moved to topic 34."	The estimated budget is based on expert view. It is the result of a broad consultation. The budget of this topic could be further increased in the next IP.
Energinet (Power Transmission System Operators (TSOs))	"Confirm importance and urgency of the topic. See also comment on topic 34"	Cf. topic 34.

Table 108. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Power Distribution System Operators (DSOs))	"More important is the refurbishment of the existing plants to add more flexibility. The topic could have the two goals, new plants and optimization of the current ones."	The specified R&I activities include "*component improvements*" for existing thermal power plants.
European Turbine Network (Research & Academia, Thermal Generation (flexible))	Centralised Thermal Power Generation The Topic 33 and 34 give a very good overview of the R&D strategies of the Thermal Power Generation Utilities, OEMs and Research Institutes part of ETN, who consider flexibility performances, emission requirements and energy efficiency of utmost importance in future R&I activities. Complementary items could be: • Large scale demonstration (TRL7) of hyperflexibilisation of existing CCGT plants through local integration of optimised combination of Thermal & Electrical storage. • Development of new families of small size integrated hyper-flexible (open cycle) thermal power plants for better integration into local needs. The challenge is to break the paradigm size & temperature <-> efficiency. • Investigate routes for retrofitting of (ex-service) shaft-lines into valuable rotating inertial reserve for valorisation on ancillary. • Desalination (south of Europe). Decentralised Thermal Power Generation The description of the topic doesn't cover appropriately the challenges and R&I needed in the decentralised thermal power generation (from 0.5kW to 1MW), for which a dedicated topic should be added in this roadmap, as it was in the "Final 10-year ETIP SNET R&I roadmap covering 2016-2025" approved by the ETIP-SNET Governing Board in December 2016. While some of the challenges on components development and improvement may be similar for decentralised and centralised TPG technologies, this is not the case regarding the integration in the future energy systems. Decentralised TPG technologies need to overcome challenges of different nature, as they will interface with the DSOs rather than TSOs. This should be reflected also in the list of the generation topics discussed in the WG 3 Flexible Generation, where no topic was selected, among the ones submitted, on the decentralised thermal power generation. The projects funded under Horizon2020 calls LCE-17-2015 and LCE-28-2017 are related to centralised TPG. By making references to these calls in the IP, the R&I activities foreseen for decentralised TPG are very limited.	Regarding the four suggested complementary items: - The first item is included in the topic, e.g. "*Component improvements*" or "*adaptation of the existing combustion technologies*"; - For the second item, cf. answer below regarding decentralised TPG; - One of the main purposes of the topic is about retrofitting, including this specific issue. - Desalination is not in the scope of the present topic. Regarding decentralised TPG: - The topic covers decentralised TPG (D14 is a main FO). For the very specific power range (from 0.5kW to 1MW), we have added an item in the Content/scope section. - We have deleted the reference related to centralised TPG (projects funded under Horizon2020 calls LCE-17-2015 and LCE-28-2017).

EC Power A/S (Energy storage (technology and services providers), Thermal Generation (flexible), Equipment manufacturers and suppliers, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"For mCHP: Potential synergy car industry – mCHP is obvious. "Range Extenders" for hybrid elec. vehicles are basic power plants suitable for mCHP, especially as typical operational hrs. for mCHP in a smart hybrid system will be limited - avg. could easily be 1,000 hrs/year with high elec. prices."	This is not in the scope of the present topic.
Anonymous (Research & Academia, Renewable Energy Generation, Regulators)	"I can agree, perhaps all improve with District Energy System, a new concept and integration to cities and megacities."	This is not in the scope of the present topic. Planning issues are addressed elsewhere.
Anonymous (Equipment manufacturers and suppliers)	"No comment - except the question why power plant technology shall be covered in an ETIP on networks. But this applies to storage technologies as well and has been discussed within the ETIP."	Power plant technology is covered because these (specific) issues are strongly related to flexibility and therefore integration issues.
Anonymous (Energy storage (technology and services providers), Thermal Generation (flexible), Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"Thermal power plant which deliver pure CO2 for methanation purposes (oxyfuel, chemical loop combustion). Technologies like that are necessary to establish a closed and sustainable carbon cycle economy."	Methanation processes are not directly in the scope of the present IP. Carbon dioxide is indeed needed to obtain methane from hydrogen. The coupling (and interface) between electricity and gas network is dealt with in Topic 12.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"There is a risk that the best innovations will come too late and for a too small market, at least in Europe."	At present, there is an urgent need for more flexible TPG to ensure the stability of the power system. The need for such innovations goes beyond the market uptake.
PhD student in UPM (Research & Academia)	Integration of variable renewable sources allowing multi fuel operation is a generic objective and doesn't specify real procedure, therefore this will be a future objective and is not urgent.	Multi-fuel operation is key when it comes to flexibility and GHG emissions.
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	"Yes. Maybe it will be necessary to consider the storage."	The coupling between generation (TPG) and storage is already covered by topic 18.
WIP Renewable Energies (Consultancy)	""Thermal power plants" sounds like large-scale power generation units (using traditional energy carriers such as e.g. coal, oil or gas. This impression is also supported by the description "the main challenges are the adaptation of the existing combustion technologies." In order to increase overall energy efficiency, only combined heat and power generation (CHP) should be developed under this topic, is (1) it is renewable (e.g. using biomass) and (2) if also the heat is really used and not wasted."	CHPs alone cannot provide the need for flexibility required by TPG. In addition, CHPs are not always designed to be flexible in their electricity production (rather heat production).
Anonymous (EC PPP)	"Fuel cells can be considered as "next generation thermal power plants"."	Fuel cells are not in the scope of topic 33.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"ETIPWind does not believe this topic is important or urgent. New thermal power plants represent only a small fraction of the net growth in power capacity in Europe."	The topic covers not only new power plants but also (and more importantly) the refurbishment existing facilities.
ABIO Research Group, UPM (Research & Academia)	"Integration of variable renewable sources allowing multi fuel operation is a generic objective and doesn't specify real procedures. At this moment, implementation of thermal power plants at urban scale developing district heating and cooling is an option to ensure flexibility and efficiency. This technology, district heating, cooling and power are flexible thermal power	Cf. above. Flexibility required by TPG is for the stability of the power system (electricity production).

	plants that facilitate integration of renewable energy generation from homes, buildings and neighbourhoods. These district energy systems are better efficiency thermal power plants to many density cities with a great energy demand. Besides, these District Energy Systems DES facilitate integration with other urban infrastructures such as electricity, water and communications developing a new energy transition urban infrastructure. The implementation of DES integrated with local urban planning improves operational flexibility, efficiency, lowest emission levels, modifications to allow multi energy resources and renewable energy generation."	

TOPIC 34. ADAPTATION AND IMPROVEMENT OF TECHNOLOGIES TO NOVEL POWER-TO-GAS AND POWER-TO-LIQUID CONCEPTS

Table 109. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
EUTurbines - European Association of Gas and Steam Turbine Manufacturers (Thermal Generation (flexible), Equipment manufacturers and suppliers)	"EUTurbines highlights the importance of this topic, as it complements other topics identified in this Implementation Plan. While the necessary network for Power-to-Gas/Liquid solutions is ensured through other topics, specific technologies that use the fuels resulting from these options also need to be adapted and improved to reach their full potential. It should be noted that the sections "expected impact" and "expected outcome" can be very similar. Given the fact that the topic describes numerous possibilities on how to address the topic (under the Content/Scope section), at this point, it is difficult to predict what would be the specific outcomes – It is therefore suggested to remove the "expected outcome" part. Possible partners under this topic would include component/technology providers, utilities, research centres and universities, etc."	- Expected impact and expected outcomes are different section. Expected outcomes refers to specific results of the expected R&I activities whereas expected impact refers to the main impact which can be expected onto the power system. - The possible partners have been listed as suggested.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"Siemens highlights the importance of this topic, as it complements other topics identified in this Implementation Plan. While the necessary network for Power-to-Gas/Liquid solutions is ensured through other topics, specific technologies that use the fuels resulting from these options also need to be adapted and improved to reach their full potential. It should be noted that the sections "expected impact" and "expected outcome" can be very similar. Given the fact that the topic describes numerous possibilities on how to address the topic (under the Content/Scope section), at this point, it is difficult to predict what would be the specific outcomes – It is therefore suggested to remove the "expected outcome" part. Possible partners under this topic would include component/technology providers, utilities, research centers and universities, etc."	Cf. above.

Table 110. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Energinet (Power Transmission System Operators (TSOs))	"Confirm importance and urgency of the topic. A large scale development of power-to-gas requires available carbon feedstock. Novel solutions with integration of power-to-gas with bio-to-gas solutions (incl. thermal gasification) are essential to deliver needed carbon for realizing the large potential for power-to-gas. These solutions could also be essential as novel solutions for very flexible thermal power plants. A further R&I on thermal gasification/gas conditioning is essential to realize these novel solutions integrating power-gas/fuel-heat."	Further R&I on thermal gasification/gas conditioning could be considered in the next IP.

Table 111. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Güssing Energy Technologies GmbH (Research & Academia, Renewable Energy Generation)	"Integration of the mentioned PtL, or PtG technologies with Aqueous Phase Reforming, Hydrothermal Liquefaction, or Carbonisation in order to establish a biorefinery. These concepts could be fuelled by various Anaerobic Digestion and thermal biomass gasification plants via a pipeline (BioCrude Gas) that connects all these producers. Indicator must be the carbon conversion, which should be increased significantly. Conversion technologies to transfer the BioCrude Gas into syngas must be included in this topic, like Chemical Looping Reforming."	The purpose of the topic is not to address the conversion (Power-to-x) technologies, but to make sure that TPG units will be able to use fuels generated from Power-to-x technologies for electricity (and heat) production.
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	"This Topic 34 is looking for "technological developments ensuring that thermal power generation – including existing capacities- is ready to optimally use the gases generated under novel Power-to-Gas concepts, where alternative "green" fuels are provided". It is very ambitious, like changing a diesel engine into a petrol engine to drive a car. Results won't come within 3 years. Moreover, bio-methane or biofuels from biomass will not be sufficiently produced; it is better to focus on hydrogen (fuel cells)"	This is why the launching of these R&I activities is urgent. Hydrogen is included in the topic.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"To be studied, technically and in terms of cost/benefits analysis, but with a holistic approach of the whole energy system -> modelling."	This is included in topic 12, at least for "green gas".
Hydrogenics Europe NV (Energy storage (technology and services providers), Interface to Other Energy Carriers (Heat, Transport, Gas, …))	This topic is important and urgent. Fuel flexibility will become essential (methanol, ammonia, hydrogen, SNG...)	Topic 34 addresses fuel flexibility.

ACTARON (Research & Academia, Energy storage (technology and services providers))	"Since the energy is infinite if we talk about renewable energies in theory, the power to gas / power to liquid concept can be used to produce gas that can easily be stored, even if the efficiency of the production is not good. With the current electricity prices, the production of gas/liquid has no profit to gain, but if there would be a subvention or it is used to flat the grid peaks, a business case arises"	The economics of power-to-gas are addressed in topic12.
EKONERG (Consultancy)	"Promising field that need additional simulation and demonstration."	Simulation and demonstration are covered by topic 34.
University of Applied Sciences Aschaffenburg (Research & Academia)	"Importance/urgency: confirmed Modification: Put efficiency of energy conversion even more in focus"	Efficiency of energy conversion is mentioned: "*[…] combine the advantages of efficient and dispatchable thermal power plant technology and […]*"
Anonymous (Energy storage (technology and services providers), Thermal Generation (flexible), Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"flexible methanation concepts (stochiometric availability of H2 and CO2 is not given all the time)"	Cf. answer above. The goal of the topic is not to develop flexible methanation concepts.
University of Ljubljana (Research & Academia)	"Should be moved to 3.3 INTEGRATED GRID."	This topic should remain a generation topic since addressing the development of TPG units (use of specific fuels).
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"We see the importance and urgency of this piece of work lower than the other topics. Power-to-Gas and Power-to-Liquid are technologies amongst a number other potential solution like electrical and thermal storage or connection of electrical and thermal grid which will make the electrical grid more flexible. We think all options should be progressed at the same level."	All options are considered at the same level in the ETIP SNET roadmap. The selection of topic 34 in the IP is linked to the urgency of the topic. In addition, Power-to-Gas solutions allow the large-scale storage of excess electricity with different coupling options.

2.4.3.2 VARIABLE RES

TOPIC 35. IMPROVED FLEXIBILITY AND SERVICE CAPABILITIES OF RES TO PROVIDE THE NECESSARY ANCILLARY SERVICES IN SCENARIOS WITH VERY LARGE PENETRATION OF RENEWABLES

Table 112. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 113. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 114. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Equipment manufacturers and suppliers)	"Very relevant point and increasingly urgent point. However, I would recommend to add a discussion on how future power systems should be stabilized. (To give one concrete example: There may be alternatives to run systems with the very stiff frequency we are used to, and this may have significant consequences on the requirements for ancillary services to be provided by RES.)"	There are already ongoing projects addressing this issue, for instance www.h2020-migrate.eu from the TSO point of view. The topic addresses also other points of view like, RES operators and manufactures, and how these changes could affect the operation and the equipment design.
University of Ljubljana (Research & Academia)	"Old topic. E.g. the question of RES capable of providing ancillary services was addressed even in FP5 (e.g. DGFACTS). The relevant topics should be identified. e.g. interaction between controllers of different RES, influence on power quality levels, protection... The TRL should be higher."	Cf. above.
Anonymous (Power Transmission System Operators (TSOs))	"This seems to be a subset of Topic 19. I suggest merging these topics into Topic 19."	No, topic 19 is about the coupling between RES generation and storage. In addition, topic 19 does not specifically address ancillary services.
SINTEF Energi AS (Research & Academia)	"We confirm the importance and urgency of this topic. We suggest that the relationship between topics 35 and 36 is clarified."	Both topics are addressing the same problem but in a complementary way. Topic 35 deals with a systemic approach whereas Topic 36 focusses on design and equipment for solutions and also addresses distributed elements like smart inverters, etc. New innovative solutions and philosophy are incorporated in topic 36, like RFM (Renewable Flexible Modules).

TOPIC 36. SMART RES FLEXIBLE SOLUTIONS AND CONTROL STRATEGIES POWER ELECTRONIC CONVERTER (PEC) DOMINATED GRIDS

Table 115. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
University of Applied Sciences Aschaffenburg (Research & Academia)	"Importance/urgency: confirmed Modification: Assess feasibility of active PFC, PQ correction, reactive power compensation also for medium/small inverters"	These aspects are inherently considered in the topic but not specifically mentioned as there are very concrete technical concepts which would increase too much the length of the proposed text (available space).
Alliander NV (Power Distribution System Operators (DSOs))	"Confirmed. In addition, FO's D9, D12 and D13 should be added."	- D9 has been added as supported FO. - D12 (New planning approaches and tools) and D13 (Asset management) are not in the scope of this topic.

Table 116. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 117. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Equipment manufacturers and suppliers)	"No more comment in addition to the one on topic 35."	Cf. answer for topic 35.
University of Ljubljana (Research & Academia)	"Very similar to topic 35. The relevant topics should be identified. e.g. interaction between controllers of different RES, influence on power quality levels..."	Cf. answer to the same comment for topic 35.
Anonymous (Research & Academia)	"C4(Economic) could be included as supported FOs due to the expected TRL level"	This is not directly in the scope of the topic, if reference is made to C4 (Economic efficiency of power system) of the ETIP SNET roadmap.

2.4.3.3 HYDRO PLANTS

TOPIC 37. REFURBISHMENT AND UPGRADE OF EXISTING HYDROPOWER WITH THE PURPOSE OF INCREASED FLEXIBILITY AND EXPANDED STORAGE CAPACITY

Table 118. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
INESC TEC (Research & Academia)	"Very important also. Variable speed generation / pumping units should be addressed in a very detailed manner."	We do not think that specific technical solutions like variable speed units shall be given priority in this topic. Although such approach is certainly among the "innovative methods and solutions", giving it a special attention would be an unnecessarily prescriptive approach and thus could be counterproductive.

Table 119. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 120. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Research & Academia)	"C4(Economic) could be included as supported FOs due to the expected TRL level"	Cf. above.
ABIO Research Group, UPM (Research & Academia)	"Existing hydropower must have a maintenance and upgrade plan to work in security conditions that these types of constructions have. It is key issue, maintenance and regulations of existing hydropower insist on security conditions, refurbishment and upgrade. Accordingly, this topic is not important here."	Refurbishment and upgrade solutions will of course comply with the existing safety regulations.

TOPIC 38. ENVIRONMENTAL IMPACT ASSESSMENT OF HYDROPOWER PROJECTS

Table 121. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 122. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Research Council of Norway (National representatives (Ministries, funding agencies...))	"The environmental impacts is such an important stumbling block for realisation of hydropower storage and balancing that increased funding might be warranted."	As the topic does not include any special test or research facility, ETIP-SNET does believe in adequacy of the estimated budget. It is based on expert view and the result of a broad consultation. However, should further demand for research and/or special facilities arise from the experience of activities in the course of the current IP, the topic shall be revised and its budget could be further increased in the next IP.

Table 123. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Anonymous (Research & Academia)	"C4(Economic) could be included as supported FOs due to the expected TRL level"	Cf. above.
Anonymous (National representatives (Ministries, funding agencies...))	"This is in our opinion especially important topic. Questionable it is research and development topic, further explanation might be helpful."	EIA studies are a key issue for each project to be successfully implemented. R&I activities are needed.
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"Of course important but no emergency as new projects are limited in Europe."	The number of refurbishment projects is not limited in Europe. The flexibility provided by hydro will be key for the power system stability (increasing share of RES).
PhD student in UPM (Research & Academia)	"Environmental impact assessment of hydropower projects is an issue that all these type of projects must do because Europeans and local regulations demand it. If this topic focuses on tools (methods and models) for environmental impact assessments, it must be more specific as existing hydropower and hydropower projects could be different regulations. Besides this hydropower projects have environmental impact but in this ETIP the focus is the components of renewable energies and impact environmental would be in other focus, no here."	The focus of the ETIP SNET is system integration, including hydro power plants. EIA is a key component of this system integration.

2.4.3.4 CROSS-CUTTING TOPIC

TOPIC 39. DIGITALISATION OF FLEXIBLE, DISPATCHABLE GENERATION TECHNOLOGIES

Table 124. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
EUTurbines - European Association of Gas and Steam Turbine Manufacturers (Thermal Generation (flexible), Equipment manufacturers and suppliers)	EUTurbines agrees with the relevance of the topic. It is suggested to rephrase the reference to "digital twin" in the first bullet point under Content/Scope as follows: "Simulation and design systems for plant machine components (e.g. digital twin), including…"	We have implemented the suggested change.
SIEMENS AG Power and Gas division (Equipment manufacturers and suppliers)	"Siemens agrees with the relevance of the topic. It is suggested to rephrase the reference to "digital twin" in the first bullet point under Content/Scope as follows: "Simulation and design systems for plant machine components (e.g. digital twin), including…""	Cf. above.

Table 125. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 126. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
Think Smart Grids (Association of promotion of the French Smart Grids sector)	"This topic should be included in the Part 2: it present the same importance and is complementary to the other topics of Part2."	This topic is very different from what is targeted in part 2:
Anonymous (Power Distribution System Operators (DSOs))	"Related with topic 33 "	Indeed, but not addressing the same issues.
ETIPWind (Renewable Energy Generation, European Technology & Innovation Platform for Wind Energy)	"ETIPWind considers this topic to be very important and highly urgent. However, we would suggest following changes: -The title does not reflect the challenges correctly and suggest a change to include all generation capacity: "Digitalisation of generation technologies". -The "cross-cutting" aspect is not clearly defined within the text. -Wind, Solar PV & Hydropower should all benefit equally from this topic and should all be mentioned as such."	- The title is suitable since limited to dispatchable generation technologies. - The cross-cutting aspect lies in the application to all dispatchable generation technologies. - Wind and PV have already benefited from such a digitalisation since they are much recent technologies. Hydropower is included as dispatchable generation.
Anonymous (Information and Communication Technology & Network providers)	"not fully understood how this topic covers a cross-cutting aspect which is not covered by the other topics"	Cf. above.
INESC TEC (Research & Academia)	(Important also to better monitor and simulate the operation of these units.)	This is the purpose of item 1 in the content/scope section.
Anonymous (Power Distribution System Operators (DSOs), Energy storage (technology and services providers), Consumers (aggregated and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"Is included in other topics above"	No, not exactly. The digitalisation of (dispatchable) generation units is key to improve design methods and tools and operating conditions.

ABIO Research Group, UPM (Research & Academia)	"This topic is secondary because digitalisation is treated in a generic way and without specific procedures. Hence, it is not urgent. The approach is generic and similar to traditional energy system, namely talk about three points that are traditional problems in energy management. Nowadays it is a moment to energy transition that require a methodology bottom up, from consumer to building, to district, to city, to distribution, to region, to transmission, to global, and digitalisation must follow this same diagram."	The topic is not about digitalisation solutions as in part 2 but rather how to use the possibilities brought by digitalisation so as to improve design methods and tools and operating conditions.
Anonymous (Power Distribution System Operators (DSOs))	"Does "Digitalisation" mean equipping the generator with standardised control interfaces, communicating with DSOs' control systems?"	Digitalisation means e.g. HPC (high-performance computing), IoT (new sensors), big data (data mining techniques and data analytics), etc., that will allow the development of simulation methods and tools to assess the future techno-economic performances and improve operating conditions, as well as monitoring systems for optimised maintenance.

2.4.4 GENERAL COMMENTS ABOUT PART 4. IMPROVED COMPONENTS OF THE ENERGY SYSTEM

Table 127. Position of the ETIP-SNET regarding comments which would impact the current Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET

Table 128. Position of the ETIP-SNET regarding comments which would impact future Implementation Plans and/or Roadmaps

Stakeholder	Missing topic	Position of the ETIP-SNET
Financial University (Research & Academia)	"1. Prospects for the use of HPPs and PSPs for power dumping in emergency regimes of nuclear power plants and superconducting magnetic energy storage SMES 2. Collect heat capacity of reservoirs and convert heat into other types of energy 3. Evaluation of the feasibility of reconstruction of HPPs in PSPPs"	This might be considered for the next Implementation Plan
Public Service of Wallonia (National representatives (Ministries, funding agencies...))	Topic 40: Interconnecting European hydropumped storage capacities in order to ensure grid's stability and interseasonal storage. TSO already manage European network very efficiently. But it could be interesting to use hydropumped storage to insure energy storage at a European level. This will need political acceptance of sharing energy between countries, new laws, new business models.	This might be considered for the next Implementation Plan

WIP Renewable Energies (Consultancy)	"The role of bioenergy should be specifically addressed in this part."	This might be considered for the next Implementation Plan
Anonymous (Power Distribution System Operators (DSOs))	As a general comment there appears to be a relatively small number of calls dedicated to the distribution system. In response to new challenges and the integration of renewable energy generation and new technologies, the distribution system is undergoing major change, what would amount to almost a redefinition or what could be described as a paradigm shift in terms of its functionality and the way it is operated. To facilitate this evolution and optimise the impact on power distribution systems, continued research and innovation activities should continue at European level. Other DSO topics that could be considered and that are relevant to DG integration would include: Monitoring and automation of LV network New network planning rules to exploit benefits from flexibility services. It is also necessary to develop and test probabilistic methods for network planning. This is necessary due to the high level of uncertainties introduced by the increasing penetration of DG, storage systems, etc. In a scenario where the consumption profiles are becoming almost unpredictable, the challenges that the distribution networks will face in terms of operation and planning, will be very relevant and must not be overlooked. TSO-DSO coordination schemes revision. This is a very important topic that should be addressed specifically. While the benefits of system integration and creating synergies is recognised, there will still be cases where there are potential benefits from research and innovation activities that are only applied to the distribution network. Some examples would include network monitoring and automation, island detection, HMI (Human Machine Interface) for control centres with increasing levels of data due to increasing levels of DG and the necessary increased levels of generation forecasting and network monitoring. Moreover, the introduction of resources' dispatching at DSO level (i.e. "local" dispatching managed by the DSO) is an important topic that should be assessed more in depth, likewise the impact –at DSO level– of the potential participation to the balancing and ancillary services markets of some resources. This could be aggregated (Some DSOs manage and operate the "sub-transmission" network) or singularly) connected to the distribution network (at HV , MV and LV level). The impact of aggregation at distribution network level (in terms of power quality and congestions) should not be overlooked.	This might be considered for the next Implementation Plan
Energinet (Power Transmission System Operators (TSOs))	"See topic 39. Novel solutions on flexible power generation and polygeneration as integration of power-to-gas, bio-to-gas (thermal gasification), bio-to-fuel and heat is essential for realizing needed flexibility for the low-carbon energy system."	This might be considered for the next Implementation Plan
Glen Dimplex Heating and Ventilation (Energy storage (technology and services providers))	"We believe that distributed storage on a dwelling level should be added. The storage component could be a electrical battery or a thermal store in form of SETS (Smart electrical thermal storage electrical heaters) or water cylinders. a	This might be considered for the next Implementation Plan

	vast number of housings across Europe have these products already installed and they could form a large distributed storage capacity."	
PhD student in UPM (Research & Academia)	"Components of the energy system are urban infrastructures. Improving urban energy infrastructures require coordination with local regulations and urban planning, so that integration of energy transition system in local regulations and urban planning needs a new methodology to approach this transition with new urban structures."	This might be considered for the next Implementation Plan
ABIO Research Group, UPM (Research & Academia)	"Components of the energy system are located at different territorial scales, global, regional, urban infrastructures, buildings and homes. Energy transition is developing a new infrastructure system that requires a methodology bottom up, from building scale to global scale. Improving building and urban energy infrastructures require coordination with local regulations and urban planning, so that integration of energy transition system in local regulations and urban planning needs a new methodology to approach this transition with new urban structures. Considering this new methodology it is necessary to change traditional planning strategies top down to another new planning strategies bottom up. Nowadays it is necessary firstly implement components in local scales, these are all components that are close to end user, home level, then building level, neighbourhood level and city level, afterwards regional and global level. Planning of components must have similar structure to work in same direction, but always thinking that flows are in two both directions, home to global and global to home."	This might be considered for the next Implementation Plan
FOSS (Research & Academia)	Aggregated flexibility, smart distributed control and advanced features of power electronics are not as pronounced as required. Moreover, issues related to observability, demand response, active EV, storage behind the meter, DC synergies at building level are primarily distribution but can be collectively seen as solutions of the integrated grid with complementing hierarchical control for optimum use of infrastructure. The required smartness, digitalisation and data handling with the required latency and granularity are not addressed as common issues of the integrated grid with active participants throughout.	Many of the topics mentioned in this comment are actually covered by the IP. Others might be considered for the next IP.

Table 129. Position of the ETIP-SNET regarding comments that did not result in an amendment of the Implementation Plan

Stakeholder	Missing topic	Position of the ETIP-SNET
B.A.U.M. Consult GmbH (Research & Academia)	"Again, why the distinction between transmission and distribution grids. They need to perform the same functions. The distribution grid is not represented enough in the topics."	The respective roles of transmission and distribution grids are described in the EU legislation.
KTH Royal Institute of Technology (Research & Academia)	"Big data (topic 21) if dealing with consumer data is again privacy sensitive. If so, then privacy preserved data analytics should be considered. Public acceptance (topic 23) can be significantly improved if one can show that the system is designed to preserve the prosumers privacy. Nowadays, there is limited awareness of the privacy problem, but since the privacy issue is growing with more powerful data analytical tools due to more computation	Privacy aspects should be considered by the projects answering such calls.

	power this will change in future. It would be therefore wise to be prepared for this change and develop the technology."	
Anonymous (Power Distribution System Operators (DSOs), Energy storage (technology and services providers), Consumers (aggregated and not aggregated), Thermal Generation (flexible), Information and Communication Technology & Network providers, Renewable Energy Generation, Interface to Other Energy Carriers (Heat, Transport, Gas, …))	"Must focus on different storage technologies and not only hydro and batteries."	Topic 31 addresses advanced energy storage technologies.
Anonymous (Research & Academia, Equipment manufacturers and suppliers)	Maybe it will be necessary to introduce a point to ensure the power quality and stability in the network.	This is addressed by Topics 25 and 29.
Ministry of Education, Science, Research and Sport of Slovak Republic (National representatives (Ministries, funding agencies...), Research & Academia)	"Part 4 IMPROVED COMPONENTS OF THE ENERGY SYSTEM missing the topic of research and development in the field of nuclear energy, nuclear power safety and R & D in the area of the 4th generation of fast nuclear reactors. Slovakia has substantially depleted possibilities to increase the performance and capacity of hydroelectric power plants without negative impact on the environment. With regard to the profile of the countryside and the natural conditions, Slovakia has limited opportunities for development of wind and solar power plants. I would suggest a topic dealing with reactive power in the grid due to renewables."	R&D in the area of nuclear energy does not fall is the scope of the ETIP SNET. It is addressed by the Sustainable Nuclear Energy Technology Platform http://www.snetp.eu/.

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EUROPEAN TECHNOLOGY AND INNOVATION PLATFORM

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This publication has been developed in the frame of the INTENSYS4EU project co-funded under the Horizon 2020 Programme

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