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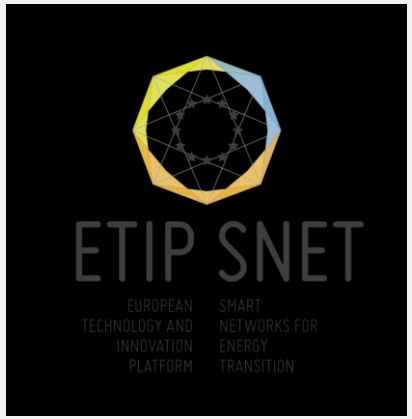

WG2:
Storage Technologies and Sector Interfaces

HELSINKI 3.10.2018

Seppo Hänninen (VTT Ltd)

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WG2 scope

Name: **Storage Technologies and Sector Interfaces**

Specific objective: addressing the technological and market developments related to energy storage solutions and the interfaces between energy sectors as tools to ensure the required level of flexibility for the transmission and distribution of electricity.

All energy storage technologies and **all possible interfaces are covered**, among others:

- Power-to-power
- Power-to-gas
- Hydro and marine storage
- Compressed air energy storage
- Thermal mass of buildings
- Hot water storage…

The **entire value chain of all energy storage options** is also covered, starting from the development and demonstration of new materials, technologies and solutions, addressing their integration into the overall energy system, the evaluation of their impact on flexibility and the related costs/benefits.

Interfaces between the power sector and the sectors **heat, gas and transport** are also included.

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WG2 organisation

Chair: Cristiana La Marca (Enel)

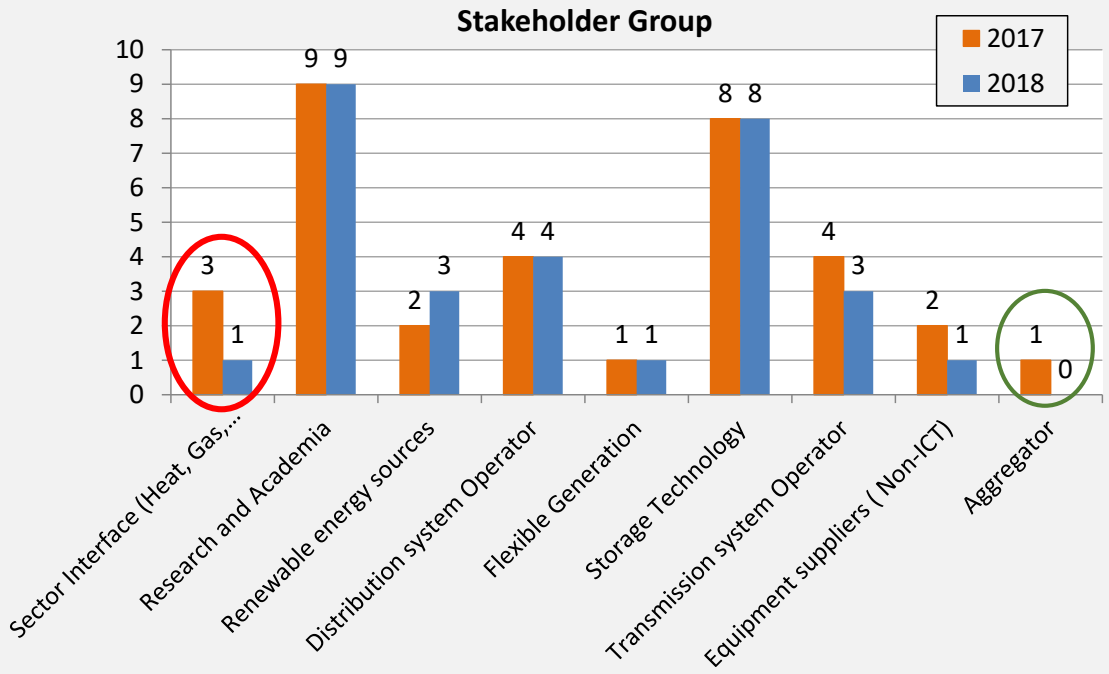
Co-chairs: Cristina Gómez Simón (ENTSO-E) and Carlos Arsuaga (Circe)

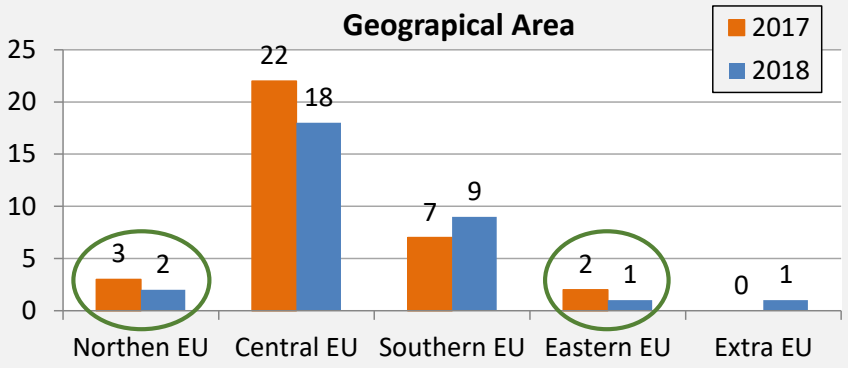
Special adviser: Omar Perego (RSE)

Organizational support: Thomas Otuszewski (EASE), Emin Aliyev(EASE)

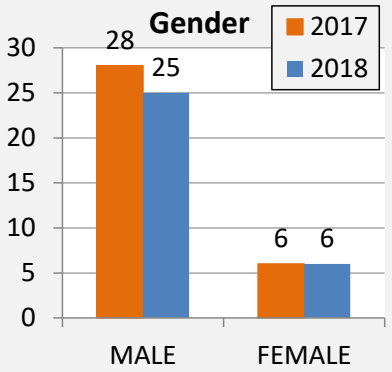
Annual expert renovation in 2018: 9 new experts joined → Current total number of WG2 experts: **31**

→ **Profiles missing!! – Sector interface; Aggregator…**





A call for experts' missing profiles will be soon launched – Procedure to joint still to be defined



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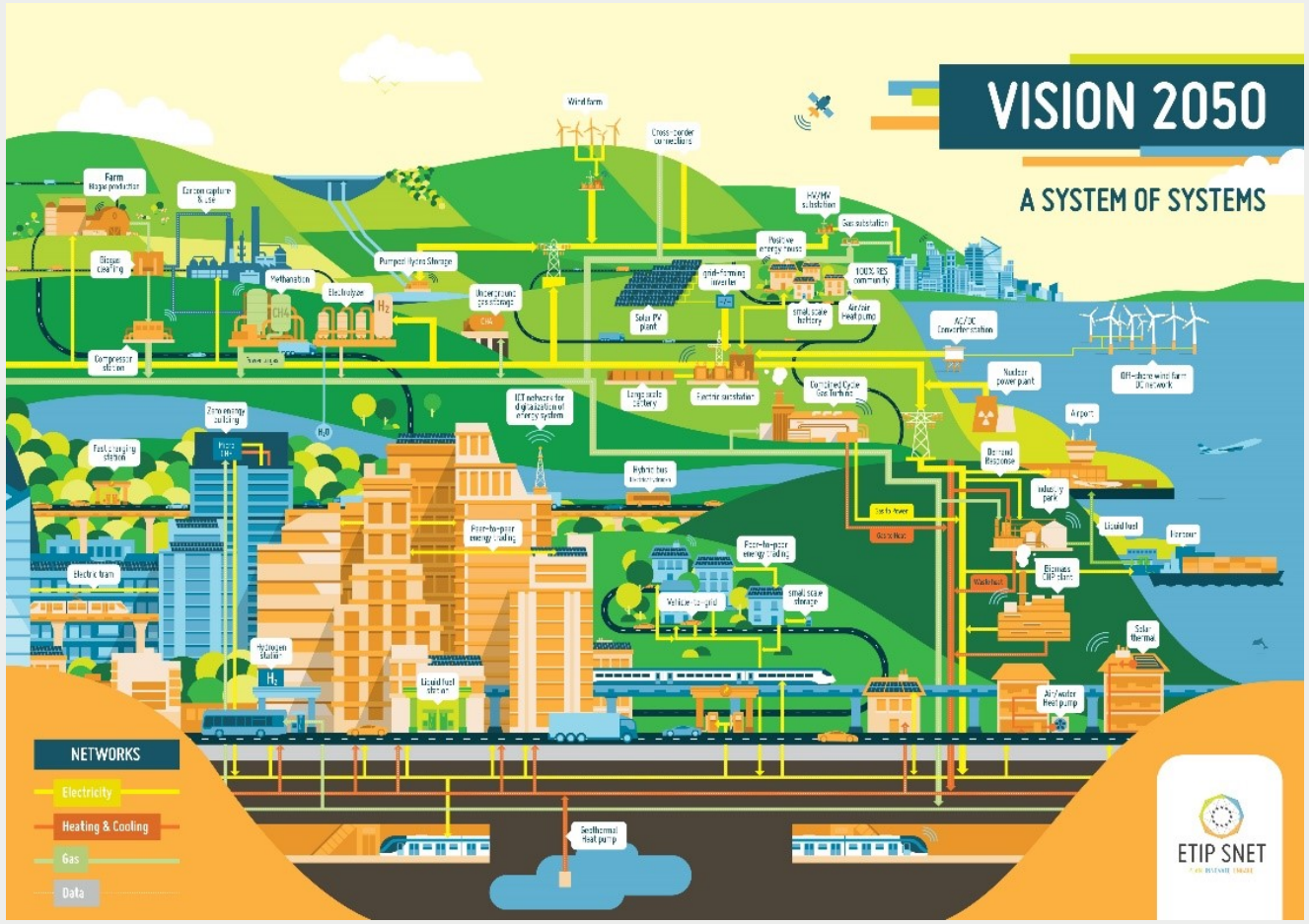
Support to ETIP SNET Vision document

❖ ETIP SNET Vision

The WG2 members also participate in the elaboration of the ETIP SNET Vision, which is a document that should **highlight issues including and beyond those already documented, researched, implemented, developed**, and which are key for satisfying the needs of the future energy system towards 2050.

The Vision has been released the 27th of June 2018.



Support to ETIP SNET Vision document

Activities

- All WG2 experts were asked to send specific comments to ETIP SNET Vision 2050 v.04 (05.03.2018)
- WG2 Vision Task Force discussed all comments received (09.03.2018)
- WG2 Chair sends consolidated input to Vision Core Team (14.03.2018)

Input of WG2:

- 13 WG2 experts provided comments and suggestions to the document
- Around 10 general comments and over 150 specific comments to different parts of the Vision document
- Main messages consolidated around 7 areas:
  - Missing elements in renewables, CO2, EV, etc.
  - Energy independence and European leadership
  - Energy storage technologies
  - Energy conversion and storage
  - The role of network operators and consumers
  - Figures 4 & 5 of the document
  - Funding and finance

Support to Mission Oriented objectives

❖ Mission oriented objectives for the new framework programme (Horizon Europe)

The WG2 worked and proposed 3 mission oriented objectives for the new framework programme:

1. Flexible, efficient and secure energy systems - Develop smart strategies and (digital) tools to promote the interoperability of energy storage with distributed and centralised RES and all energy vectors (gas including H2, heat, electricity) in order to reach a 35% share of RES in secure energy systems by 2030

2. Agile energy markets - Develop one self-organised holistic market in order to reach zero curtailment of RES and carbon free energy, optimize the exploitation of local resources, and create value from the energy vector interface (conversion and storage) by 2030

3. Environmental-Friendly Energy System - Develop efficient low-carbon energy storage and conversion systems with no use of CRMs (Critical Row Materials) to increase RES penetration preserving Environment and Biodiversity

Next steps –> ExCo to consolidate all missions received by WGs and propose a single ETIP SNET vision to be approved by the Governing Board on 2nd October

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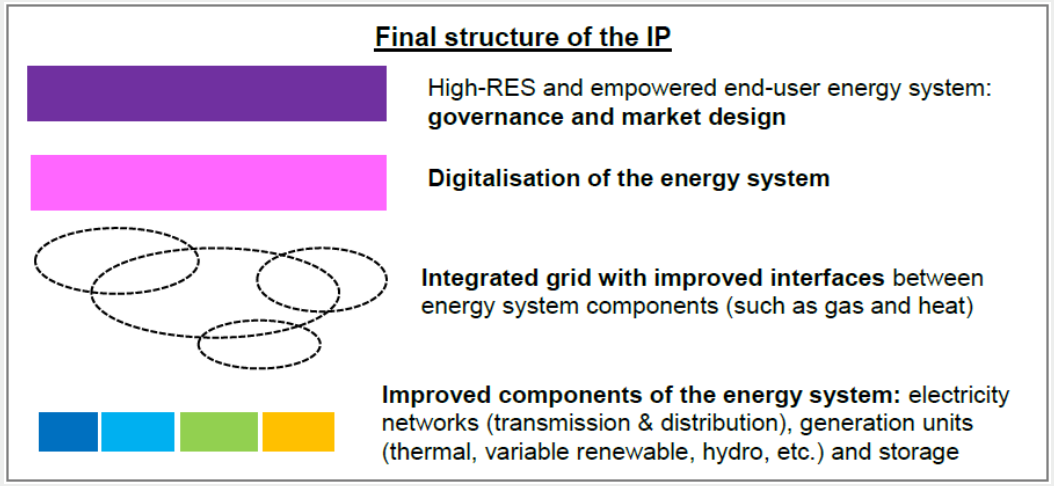
WG2 activities

❖ SET Plan Implementation Plan (IP)

The WG2 experts were asked to:

- Review the strategic targets of Action 4.1 “An optimised European power grid” of the SET PLAN - Declaration of Intent
- Identify the objectives and KPIs which are relevant to energy storage and interaction between energy networks
- Discuss input for the reformulation of targets
- Consolidating the “innovation fiches” of the draft SET Plan IP document
- Encouraging Member States to implement them, after the SET Plan IP has been published

❖ ETIP SNET Implementation Plan 2017-2020



3 topics
- **Topic 2: Market design for trading heterogeneous flexibility products**

6 topics

11 topics
- *Synergies between electricity and heat systems*
  - **Topic 10: Coupling of electricity and thermal sectors**
  - **Topic 11: Increase energy efficiency by utilising excess heat from other processes via heat networks and thermal storage**
- *Synergies between electricity and gas systems*
  - **Topic 12: Coupling of electricity and gas sectors**
- *Synergies between electricity transmission networks, generation and storage*
  - **Topic 15: Multiservice storage applications to enable innovative synergies between system operators and market players**
- *Coupling between flexible generation and storage*
  - **Topic 19: Towards fully dispatchable RES: Variable RES with Storage**

18 topics
- *Electricity networks*
- *Storage units*
  - **Topic 31: Advanced energy storage technologies for energy and power applications**
  - **Topic 32: Coupling of electricity and transport networks**
- *Generation units*

❖ Horizon 2020 Work Package 2018-2020 contribution

Finally, the WG2 provided input to the draft of the Horizon 2020 Energy Work Programme 2018-2020. WG2 recommendations included:

General comments

- Low share of 'Energy Systems' topics compared to 'Energy Efficiency' and 'Renewable Energy'
- Development of technologies should be considered on top of integration strategies

Topic ES1 – Consumer and demand response

- Explicitly mention energy storage solutions to allow automation in demand management.

Topic ES2 - Distribution Grid

- Include demonstration of small scale storage integration in low-voltage network, focusing on the role of the aggregators, and propose solutions of full scale virtual power plants

Topic ES3 – Transmission Grid

- Include stand-alone storage installation at utility scale in specific transmission network nodes

Topic ES4 – Integrated Energy Systems

- Better express the need of introducing thermal storage capacity to increase flexibility and reliability of fully integrated energy systems.

Topic ES5 – Islands

- Include storage coordinated with conventional generators and renewables to provide a reliable and efficient hybrid system operation in an isolated system

Topic ES7 – Advanced tools

- Add advanced technologies (storage and hybrid)

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WG2 next activities

WG2 next activities

❖ Common to all WGs

- Reply to European Commission consultation “on the strategy for long-term EU Greenhouse gas emissions reduction” (by 9th October)
- Start working on ETIP SNET Roadmap 2020-2029 (in 2019)

❖ Specific to WG2

- Participation/organisation of brokerage events for consortia building for joint projects (e.g. EERA JP Smart Grids Workshop on 12th September 2018 in Sophia Antipolis)
- Preparation of white papers on storage/sector interfaces issues

Questions for round table discussion

- System flexibility can be enhanced by generation and network integration, by demand response and by different types of storages. How you see, which of these have the greatest potential in the future and why?
- Regarding the Energy Storage Policy recommendations, the discussion is focused to removing regulatory, technical, markets etc barriers. Which of these are most urgent and has most impact in increasing the implementation of storages in order to enhance the system flexibility and also for renewables integration?
- From R&D point of view, should more effort to be put to small scale storage integration in low-voltage network, focusing on the role of the aggregators, and propose solutions of full scale virtual power plants than centralized storage integration in transmission level?
- Based on the ETIP-SNET project survey the majority of the storage applications addressed to batteries in the power-power interface. Should more research be focused to storages of the other energy vectors?

Thank you for your attention !