ETIP SNET and BRIDGE Presentation

European Technology and Innovation Platform
Smart Networks for Energy Transition

11th ETIP SNET Regional Workshop

Jan Okko Ziegler
ETIP SNET Chair
21 April 2021

ETIP SNET: Goals and Mission

2016

The European Technology and Innovation Platform *Smart Network for Energy Transition* has been created under the SET PLAN with other 9 sectorial ETIPs

- ***Integrating and optimising all sources and vectors of the entire energy system***
- ***Guiding Research & Innovation (R&I) in support to Europe's energy transition***
- **Addressing the innovation challenges for the energy system and market evolution, toward climate resilience and renewables integration, while ensuring affordability and security of supply**

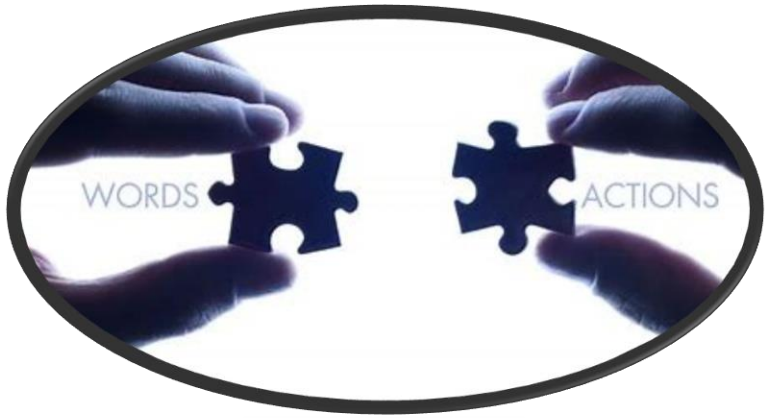
… beyond smart electricity grids

European Commission

From ideas to facts

CONCRETE ACTIONS

- *Bringing together a **multitude of stakeholders and experts** from the energy sector*
- *Preparing and updating **Visions, Roadmaps and Implementation Plans** bringing a consolidated stakeholder view on R&I to European Energy Policy initiatives*
- *coordinating with other Initiatives at National (Members States), European and International level **to reinforce the alignment of Strategic Agendas and R&I priorities and needs***
- *identification of **innovation barriers**, related to **regulation and financing** and developing further enhanced knowledge-sharing mechanisms that help bringing R&I results to deployment*



European Commission

ETIP SNET: our Stakeholders

Transmission System Operators (TSOs)	Distribution System Operators (DSOs)	National Representatives	Research & Academia
Storage (technology and services providers)	Consumers (aggregated and not aggregated)	Thermal Generation (flexible)	Renewable Energy Sources Generation
ICT, Network and Software providers	Equipment manufacturers and suppliers (non-ICT)	Interface to Other Energy Carriers (Heat, Transport, Gas, ...)	Regulators

40 members

WG1
Reliable, economic and efficient smart grid system

52 members

WG2
Storage technologies and sector interfaces

36 members

WG3
Flexible Generation

WG4
Digitisation of the electricity system and customer participation

71 members

WG5
Innovation implementation in the business environment

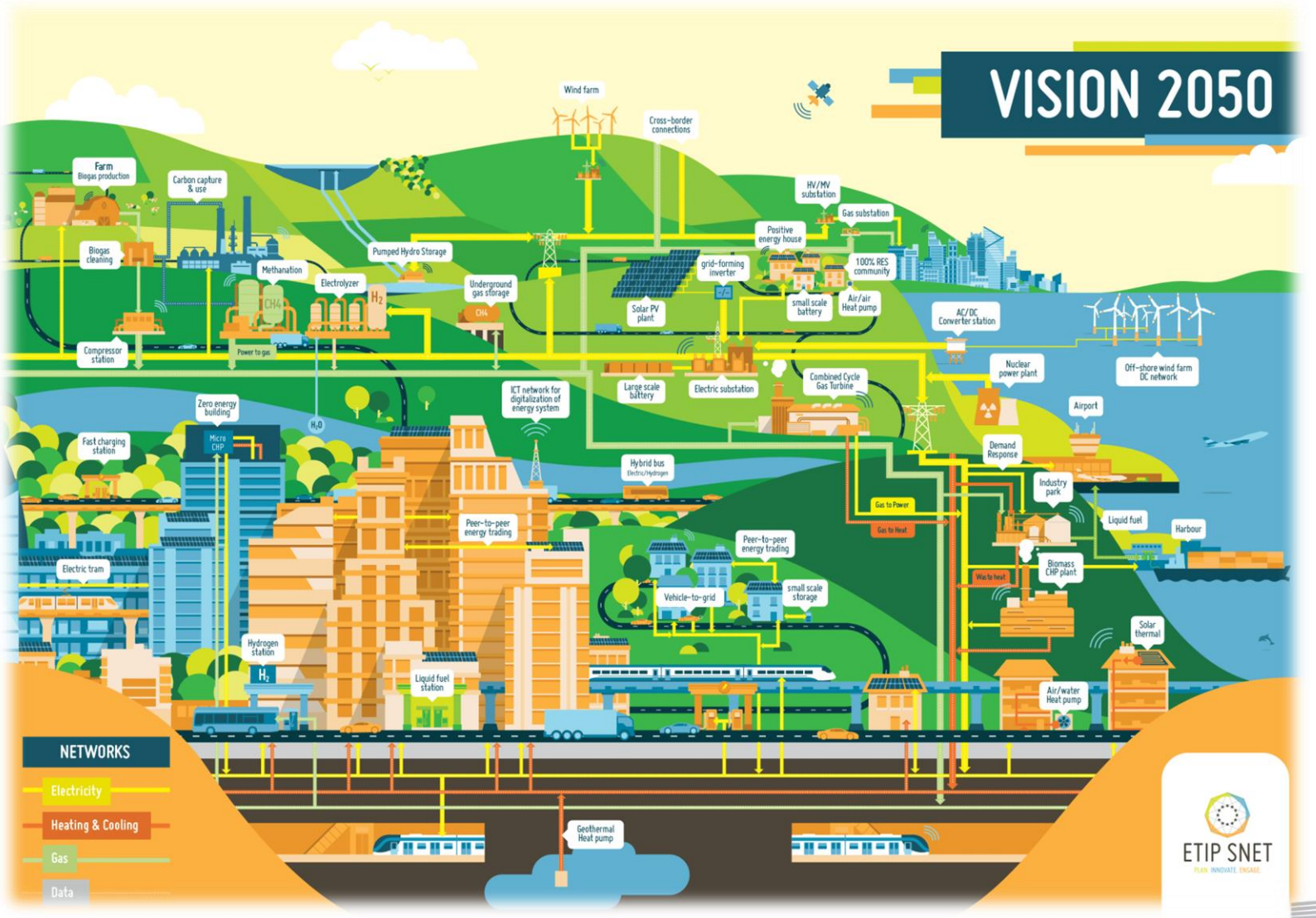
40 members

NSCG
National Stakeholders Coordination Group

... a community of more than 350 experts from the Energy sector!!

European Commission

ETIP SNET Vision 2050



CONCENTRATED AND DISTRIBUTED vRES

FLEXIBILITY PORTFOLIO

STORAGE SOLUTIONS

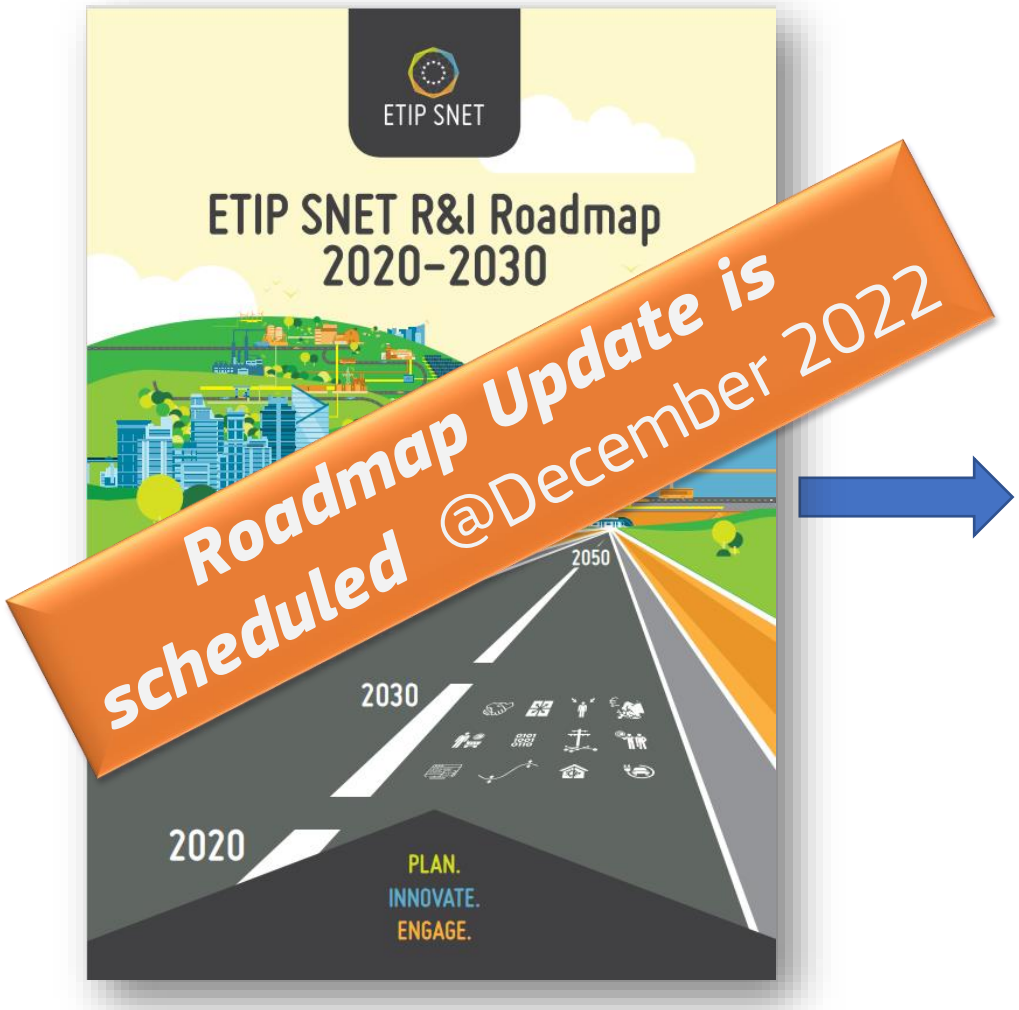
INTEGRATED ENERGY NETWORKS

SECTOR COUPLING

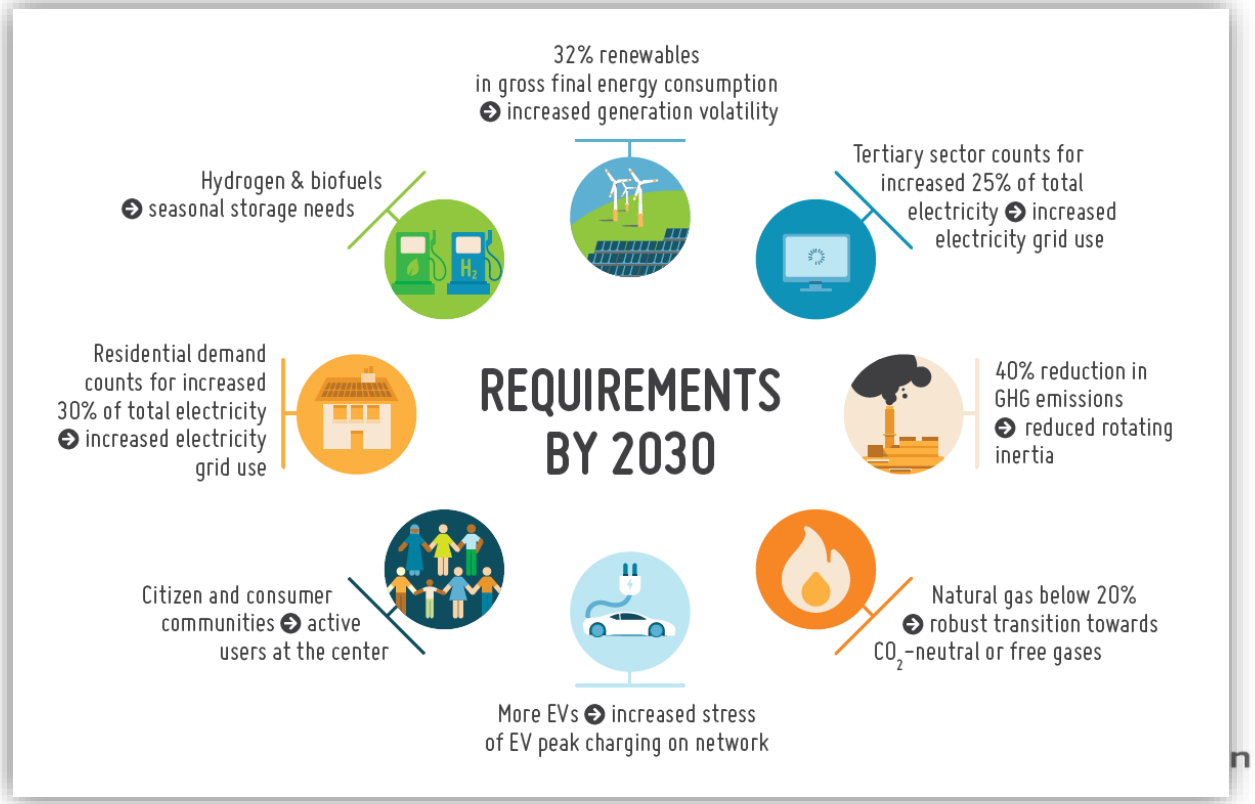
DIGITALISATION

European Commission

ETIP SNET Roadmap 2020 - 2030



- It synthesizes ***consolidated and balanced stakeholders' views for the future R&I needs of the Integrated Energy System*** with electricity as its backbone.
- It relies on a ***detailed analysis of monitored and reviewed national, European and international R&I projects***



ETIP SNET main assets of Roadmap 2020 - 2030

The present roadmap addresses the R&I activities to be carried out in view of the practical achievement of the

12 FUNCTIONALITIES

that will enable the transformation toward 2050 goals and implementation by 2030

These **FUNCTIONALITIES** will range across:

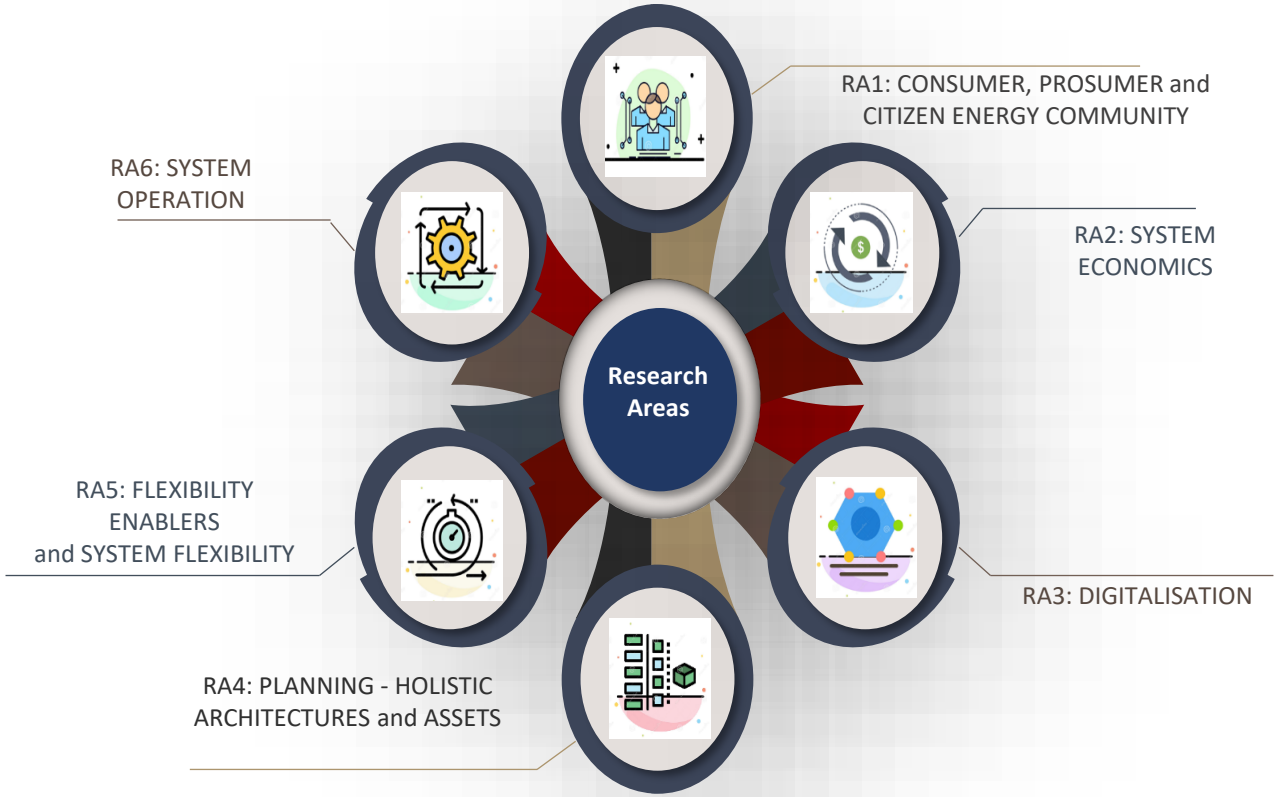
- the ***energy system value chain*** (from generation to energy storage, transmission, distribution and end-use):
  - ✓ its ***stakeholders*** (from the customer, to the market, network and service operators),
  - ✓ its ***different vectors*** (from electricity to gas, heating and cooling, transport, water etc.)
  - ✓ ***and the related non-technical issues*** (legislation, regulation, markets etc.).

Building blocks (ETIP SNET Vision 2050)	FUNCTIONALITY (Full name)	Short FUNCTIONALITY[1]
The efficient organisation of energy systems	F1 Cooperation between system operators	F1 Cooperation
	F2 Cross-sector integration	F2 Cross-Sector
	F3 Integrating the subsidiarity principle – The customer at the center, at the heart of the Integrated Energy System	F3 Subsidiarity
Markets as key enablers of the energy transition	F4 Pan-European wholesale markets	F4 Wholesale
	F5 Integrating local markets (enabling citizen involvement)	F5 Retail
Digitalisation enables new services for Integrated Energy Systems	F6 Integrating digitalisation services (including data privacy, cybersecurity)	F6 Digitalisation
Infrastructure for Integrated Energy Systems as key enablers of the energy transition	F7 Upgraded electricity networks, integrated components and systems	F7 Electricity Systems and Networks
	F8 Energy System Business (incl. models, regulatory)	F8 Business
	F9 Simulation tools for electricity and energy systems (software)	F9 Simulation
Efficient energy use	F10 Integrating flexibility in generation, demand, conversion and storage technologies	F10 Flexibility
	F11 Efficient heating and cooling for buildings and industries in view of system integration of flexibilities	F11 Heating & Cooling
	F12 Efficient carbon-neutral liquid fuels & electricity for transport in view of system integration of flexibilities	F12 Transport

ETIP SNET Research Areas by 2030

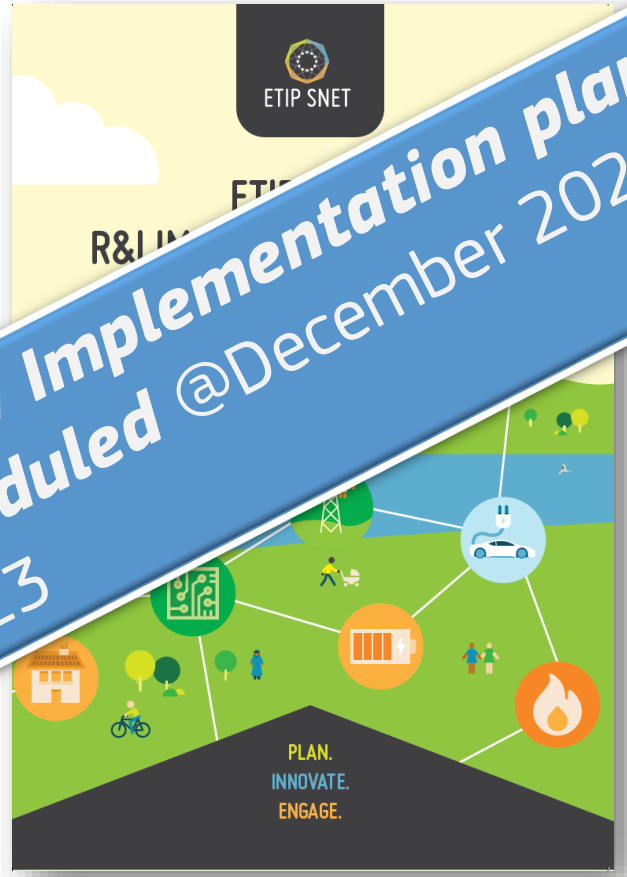
The research activities to be conducted between 2020 – 2030 are organized in the Roadmap according to the following ***Research Areas:***

RA No.	Research Area (RA)	RA-Explanation
1	CONSUMER, PROSUMER and CITIZEN ENERGY COMMUNITY	Citizen and prosumer empowerment and engagement
2	SYSTEM ECONOMICS	Business models, market design and market-governance
3	DIGITALISATION	Digitalisation, communication and data handling (including Data, Cyber and System security)
4	PLANNING – HOLISTIC ARCHITECTURES and ASSETS	Energy system architectures, design and planning; new materials, technology solutions, asset management, maintenance; System Stability and resilience, multifunctional-system interfaces and system compatibility
5	FLEXIBILITY ENABLERS and SYSTEM FLEXIBILITY	Adapting all energy components to provide flexibility to the system (Flexibility in Demand, Generation, Storage & Energy Conversion, Network, Transport)
6	SYSTEM OPERATION	Reliability, forecasting, monitoring, control and automation (State estimation and supervision, short-term, medium and long-term control)



European Commission

ETIP SNET Implementation Plan 2021- 2024



2 New Implementation plans are scheduled @December 2021 & August 2023

Research Areas (RA)	TOPIC No.	TOPIC	Budget 2021-2024 (Millions of Euros)
1. CONSUMER, PROSUMER and CITIZEN ENERGY COMMUNITY	1.1	Social campaigns and social studies (related to societal acceptance and environmental sustainability of energy infrastructures)	15
	1.2	Adaptive consumer/user behaviour including energy communities (interaction, incentives by dynamic tariffs)	29
	1.3	Consumer and prosumer device control	33
2. SYSTEM ECONOMICS	2.1	Business models (including Aggregators)	22
	2.2	Market design and governance (Retail, Wholesale; Cross-border; Ancillary services; Flexibility markets)	64
3. DIGITALISATION	3.1	Protocols, standardisation and interoperability (IEC, CIM, Information models)	
	3.2	Data Communication (ICT) (Data acquisition, Smart Meter, Sensors (monitoring), AMR, AMM, smart devices)	61
	3.3	Data and Information Management (Platforms, Big Data, SW, IoT)	35
	3.4	Cybersecurity (vulnerabilities, failures, risks) and privacy	66
	3.5	End-to-end architecture (integrating market, automation, control, data acquisition, digital twin, end-users)	24
4. PLANNING – HOLISTIC ARCHITECTURES and ASSETS	4.1	Integrated Energy system Architectures (design including new materials and hybrid AC/DC grids)	55
	4.2	Long-term planning (System development)	72
	4.3	Asset management and maintenance (maintenance operation, failure detection, asset lifecycles, lifespan and costs, ageing)	48
	4.4	System Stability analysis	29
5. FLEXIBILITY ENABLERS and SYSTEM FLEXIBILITY	5.1	Demand flexibility (household and industry related)	38
	5.2	Generation flexibility (flexible thermal, RES such as Hydro, PV and wind generators)	28
	5.3	Storage flexibility & Energy Conversion flexibility (PtG&H, PtG, GtP, PtL, LtP; PtW; WtP)	53
	5.4	Network flexibility (FACTS, FACDS, smart transformers and HVDC)	40
	5.5	Transport flexibility (V2G/EV; railway, trams, trolleybus)	24

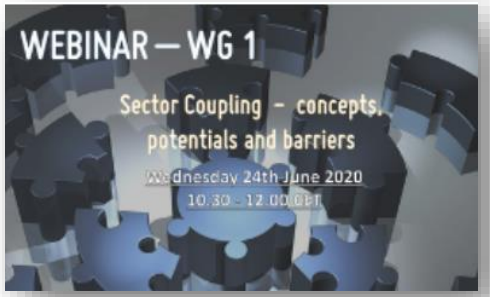
ETIP SNET Working Groups: Outcomes and publications

WORKING GROUP 1
RELIABLE, ECONOMIC AND EFFICIENT ENERGY SYSTEM

WG1 addresses the mid and long-term business and technology trends contributing to the overall energy system optimization at affordable investment and operation costs, with particular reference to ***system development scenarios, network planning, operation, observability and control, asset management, flexibility as seen from the system aspects and resilience.***

WHITE PAPER
Holistic architectures for future power systems
March 2019

WHITE PAPER
Sector Coupling: Concepts, State-of-the-art and Perspectives, January 2020



POSITION PAPER
Smart Sector Integration, towards an EU System of Systems, April 2021

Planned White Papers on:

1. Hydrogen and Grids
2. Flexibility for Resilience
3. E-mobility

European Commission

ETIP SNET Working Groups: Outcomes and publications

WORKING GROUP 2

STORAGE TECHNOLOGIES AND SYSTEM FLEXIBILITIES

WG2 addresses the technology and market developments related to ***energy storage solutions*** intended as one of the outstanding tools to ensure the required level of ***flexibility for the transmission and distribution of electricity***.

Strong Collaboration with ETIP Batteries for several papers and definition of KPIs

BATTERIES EUROPE
Working Groups

Planned activity and White Papers between 2021 and 2022:

- Defining approach for circular economy in the energy storage field

European Commission

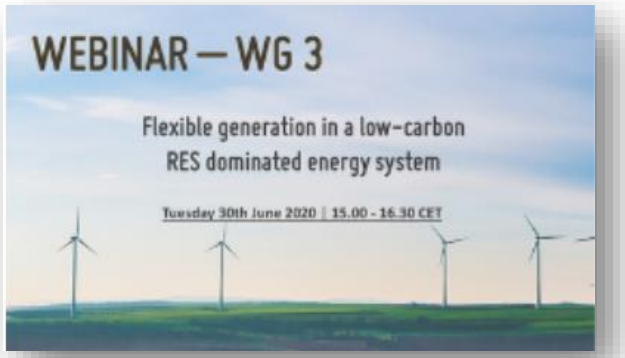
ETIP SNET Working Groups: Outcomes and publications

WORKING GROUP 3

FLEXIBLE GENERATION

WG3 addresses the business and technology trends of generation considering the contribution of ***flexibility from thermal power plants*** (bulk and distributed), and of innovative technologies and ***solutions in thermal-based generation systems*** (e.g. micro-CHP, industrial co-generation), **heat distribution** (e.g. district heating), ***storage and optimization of the RES generation technologies*** to contribute to reach a secure, clean and reliable energy system to address the needs for flexibility in the framework of an integrated energy system.

FLEXIBLE POWER GENERATION IN A DECARBONISED EUROPE
March 2020



Strong Collaboration with the ETIP RHC

European Commission

ETIP SNET Working Groups: Outcomes and publications

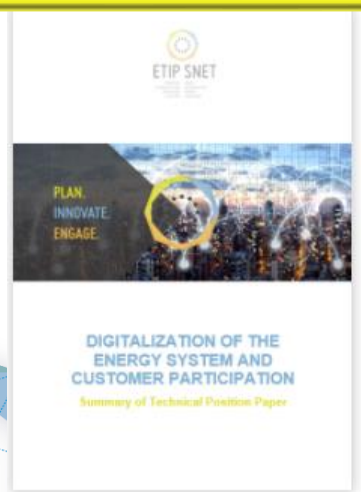
010110
100010
110101

WORKING GROUP 4

DIGITALISATION OF THE ELECTRICITY SYSTEM AND CUSTOMER PARTICIPATION

WG4 addresses the use and impact of the ***Information and Communication technologies*** as a pervasive tool ***along the entire value chain of the power generation, transportation and use***.

DIGITALIZATION OF THE ENERGY SYSTEM AND CUSTOMER PARTICIPATION: Description and recommendations of Technologies, Use Cases and Cybersecurity November 2018



Webinar at ENGERATI with the Co-Chair Maher Chebbo

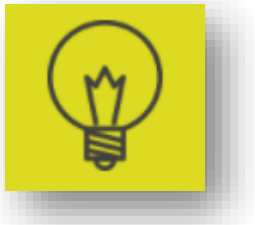
Developing and finalizing a BIG IDEA as "One stop shop" for users energy access

WHAT NEXT:

- **Developing Digital Use Cases**

European Commission

ETIP SNET Working Groups: Outcomes and publications



WORKING GROUP 5

INNOVATION IMPLEMENTATION IN THE BUSINESS ENVIRONMENT

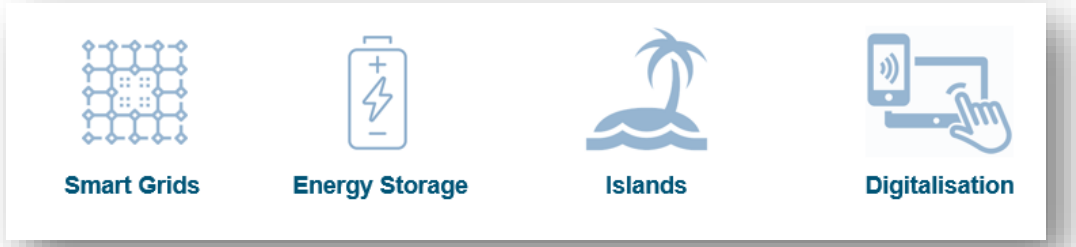
WG5 mobilizes experts in ***support of R&I work in the EU to reach the market*** and to this effect work closely with all WGs of ETIP SNET to utilize project results in support of R&I needs for the years to come. To this effect, ***work for the establishment of a multifunctional platform*** through which work with experts will be enhanced and reporting of project results much more targeted and fruitful.

5 Working Teams				
Research and Infrastructure	**Regulation and standardisation**	**GAP analysis**	**Innovation support to the market uptake**	**Global & European Research and Innovation community**
Extend the research infrastructure inventory and accessibility offered by the DERlab to ***enhance accessibility and usability.***	***Active standards, codes and regulations*** to be effectively referenced to support the work of R&I community in the field of Smart Grids and Systems	To ***build a methodology for effective exploitation*** of the results of smart grids and other related EU supported R&I research projects	To ***support RD&I projects for market uptake*** by building a methodology to identify market needs, to link the results of EU & regional funded projects.	To ***build a repository*** with information and actions of EU with international actors to contribute to the energy transition building a ***best practice library of useful use cases***

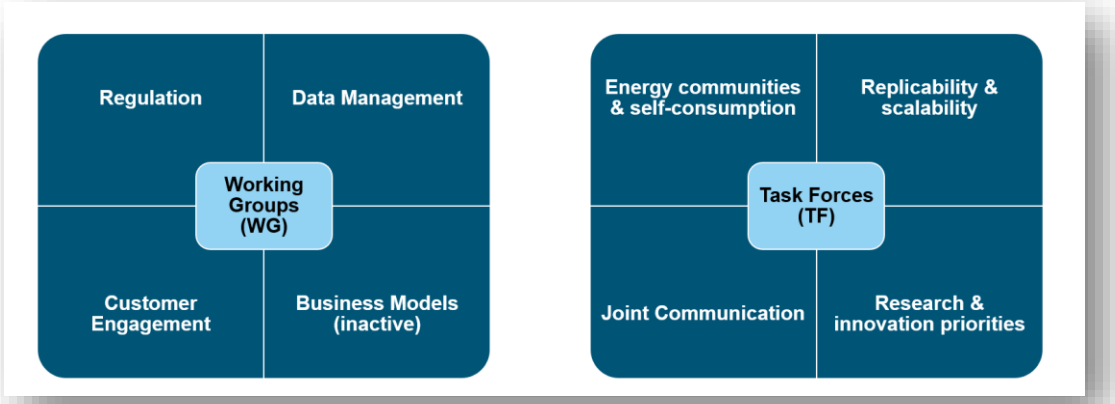
BRIDGE INITIATIVE

- In strong collaboration with ETIP SNET, BRIDGE is a European Commission initiative aimed at putting together EU Projects to create a ***structured view of cross-cutting issues*** which are encountered in the demonstration projects and may constitute an obstacle to innovation, fostering continuous knowledge sharing amongst projects.

Projects Topics



Current Structure



ETIP SNET next events

"Digitalization of Batteries for Smart Energy and Transport Systems"

online workshop - on **5 May 2021**

from 14.00 to 16.00 (Brussels time).

Co-organized by BATTERIES EUROPE – ETIP SNET - EGVIA

SAVE THE DATE

12th ETIP SNET Regional Workshop

(8 Workshops will take place till 2023)

European Commission

Thank for your participation and...

ENJOY THE WORKSHOP!