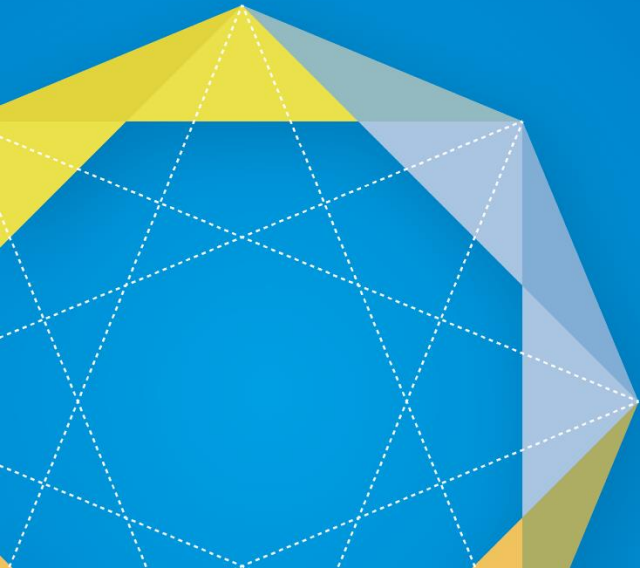# ETIP SNET

**European Technology and Innovation Platform
Smart Networks for Energy Transition**

#ETIPSNET

1. Introduction to ETIP SNET

ETIP SNET

Stakeholders

The ETIP's main goal is to guide and identify R&I priorities in support of Europe's energy transition beyond smart electricity grids.

Over 150 EXPERTS

12
TSOs

7
DSOs

77
Research & Academia

3
Storage
(technology and services providers)

2
Consumers
(aggregated and not aggregated)

4
Thermal Generation

14
ICT providers
(including consultancy)

11
Equipment Manufacturers & suppliers

12
Renewable Energy Sources

5
Interface to other energy carriers

2
Market players
(trading, utility)

5
Non-ICT suppliers
(including consultancy)

European Commission

ETIP SNET

Governance

European Commission

ETIP SNET ambassadors

★★★
Governing Board
30+ members representing key European stakeholders

ETIP SNET Secretariat

Executive Committee
ETIP SNET Chair & Vice-chairs, WG Chairs and the EC

Experts Coordination
via Working Groups
(5 permanent Working Groups)

In order to have a wide representation of stakeholders and offer agile and efficient operation, the Management and Governance structure of ETIP SNET is organised as shown.

ETIP SNET
Working Groups

WG1
Reliable, economic and efficient energy system

WG2
Storage technologies and system flexibilities

WG3
Flexible generation

WG4
Digitalisation of the electricity system and customer participation

WG5
Innovation implementation in the business environment

European Commission

ETIP SNET it's where vision meets action

Concrete Actions:

1

Provide input to **the SET Plan action 4** which addresses the technical challenges raised by the transformation of the energy system

2

Identification of **innovation barriers**, related to **regulation and financing**

3

Bringing together a **multitude of stakeholders and experts** from the energy sector

4

Updating **Visions, Roadmaps and Implementation Plans** to bring consolidated stakeholder views on R&I

5

Developing **knowledge-sharing mechanisms** that help bringing R&I results to deployment

6

Coordinating with other initiatives at National, European and International level to **reinforce the alignment of R&I priorities and needs**

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2. Key Topics per Working Groups
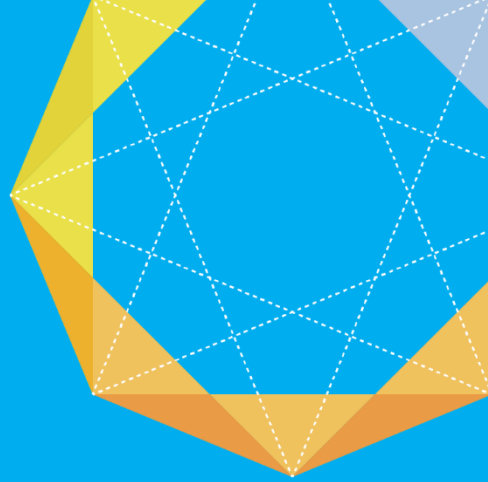
KEY TOPICS per working groups

WORKING GROUP 1
Reliable, economic and efficient energy system

Task Force

Energy Infrastructure Planning

White paper focused on the technological and market solutions for Integrated Energy Infrastructure Planning. It explores **current challenges** and **research areas**, and providing **recommendations** for addressing innovation barriers

Task Force

Hydrogen and Grids

Working on the dissemination of the report "**Impact of hydrogen integration on power grids and energy systems"**

Task Force

Energy Communities' impact on grids

White paper, in collaboration with ISGAN, which explores the role of Energy Communities and its implications (both in the form of opportunity and challenge) for DSOs and, consequently, for TSOs.

Task Force

Grid integration of sustainable transport

Focus paper, in cooperation with WG2 and 2Zero Partnership, exploring **integration of sustainable mobility** into the network as a strategy to reduce GHG emissions while providing affordable, accessible and clean mobility options.

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KEY TOPICS per working groups

WORKING GROUP 2

Storage technologies and system flexibilities

Task Force

District Storage

Working on a **position paper**, expected to be published in December 2024. The paper will aim to **identify and benchmark low-cost alternatives to Li-ion** for use alongside charging stations, in order to stimulate legislative interest in funding initiatives and drive research and development beyond lithium-ion.

KEY TOPICS per working groups

WORKING GROUP 3
Flexible generation

Action 1

Ramp-up of renewable generation and the effects on system level

Currently drafting a paper to assess the state of the art and project scenarios for the **integration of renewable energy in the EU electricity grid by 2030 and 2050**. It examines the implications and changes for electricity system control and planning, as well as infrastructure and technology development. After this publication, this action will focus on the elaboration of the **paper "Ramp up of renewable generation", focused on demand site management**.

Action 2

Ramp-up hydrogen-based power generation

Focused on the **focus paper "**Ramp-up hydrogen-based power generation". It aims to establish **guidelines and recommendations** for the provision of hydrogen for electric power generation. The objective is to ensure a stable and consistent electric energy supply, particularly in systems heavily reliant on variable Renewable Energy Sources.

KEY TOPICS per working groups

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WORKING GROUP 4
Digitalisation of the electricity system and customer participation

Task Force

Digitalisation action Plan

Recently published the **policy paper Energy Data Spaces (EDS)**. It describes **the state of data spaces in the energy system** and outlines the steps needed to adopt such technical solutions. It also highlights the need for a common European EDS to harmonise and make interoperable national initiatives and models

Task Force

Upskilling of the Energy System

Working on a paper which aims at assess the **upskilling demands for the grids to support the energy transition**. Mainly focusing on digital skills, the objective is **to define the skills requirements and ensure that skill demand from the industry is matched** with the offer from education institutes and training providers.

Task Force

Enhance System Supervision and Control

Analysing the current challenges in **power system supervision and control**, and the effects of digitalization **focusing on latest advancements on the use of digital technologies**. The paper will explore and provide recommendations on: a) Increase the monitoring, supervision and control of the system; b) Ensure the security of the system.

Task Force

Consumers and citizens engagement

Working on updating the Citizen and Customer Engagement Playbook. In this document, the Task Force will be focusing on **analysing specific cases from a social and economic point of view** in order to identify all the necessary components for a successful integration and participation of citizens in the energy transition

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KEY TOPICS per working groups

WORKING GROUP 5
Innovation implementation in the business environment

Action 1, 3, 4 and 5

Research Infrastructure repository

Working with DERlab, JRC, ERIGrid and PANTERA for the definition of a common repository and related process to report data, formalising semantic and ontology terms for universal implementation. Developing a maturity Index Tool.

Action 2

Regulation & Standards

Currently developing an excel file tracking new standards and codes

Action 6-7

Creation of synergies with BRIDGE

Developing synergies with the BRIDGE initiative, aiming to transform EIRIE as the visibility platform for BRIDGE projects' work
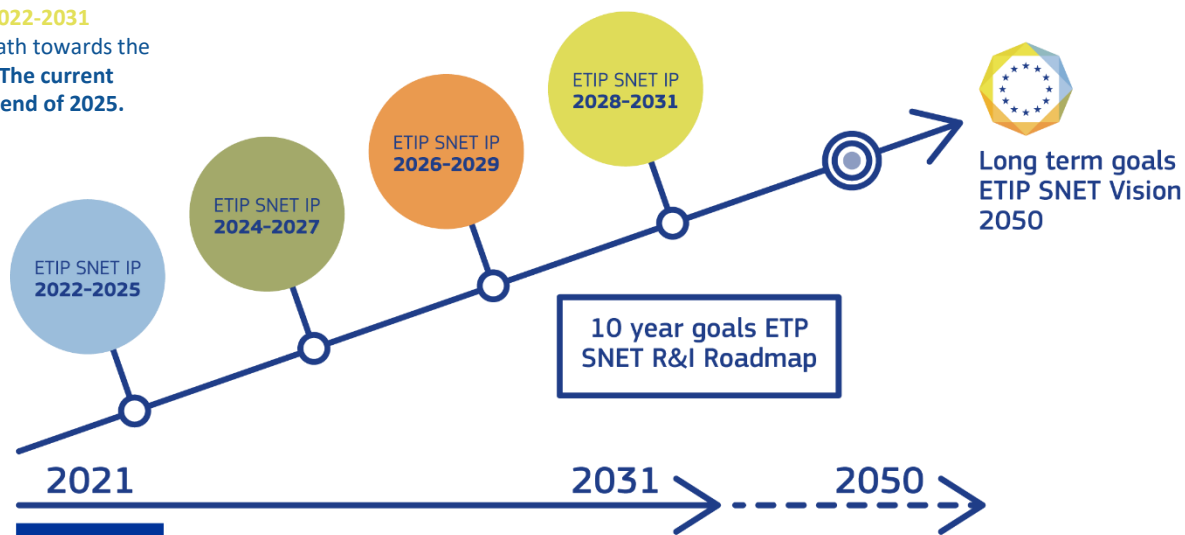
Action 8

Analyzing energy communities as catalysts of energy transition

Working on the draft and publication of a paper on energy communities as catalysts of energy transition

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Roadmap & Implementation Plan (IP)
Towards the 2050 Vision

The **ETIP SNET R&I Roadmap 2022-2031** describes the 10-year energy path towards the future and is regularly revised. **The current version will be updated at the end of 2025.**

ETIP SNET IP **2022–2025**

ETIP SNET IP **2024–2027**

ETIP SNET IP **2026–2029**

ETIP SNET IP **2028-2031**

Long term goals ETIP SNET Vision 2050

10 year goals ETP SNET R&I Roadmap

2021   2031   2050

The **ETIP SNET Implementation Plan 2025+** describes the details of the most urgent R&I needs to be tackled through European Commission and national work programmes and calls. **The current version will be updated in June 2026.**

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ETIP SNET Vision 2050

CONCENTRATED AND DISTRIBUTED vRES

FLEXIBILITY PORTFOLIO

STORAGE SOLUTIONS

INTEGRATED ENERGY NETWORKS

SECTOR COUPLING

DIGITALIZATION

European Commission

The 10-year High-Level Use Cases (HLUCs) 2022-2031 and 4-year Priority Project Concepts (PPCs)

The **2025+ Implementation Plan** introduces **9 High-Level Use Cases** (HLUCs) to communicate to the key audiences of ETIP SNET the urgency of transforming today's energy system with concrete real-world demonstrations, aiming at a (partially) renewable system by 2031 and full CO_2 neutrality by 2050.

For each HLUC, specific **Priority Project Concepts (PPCs)** are defined, serving as "families for R&I projects", covering all integration features of the Future Energy Systems with concrete targets and timelines. Each PPC has a defined start and end year in an R&I Implementation Plan period, and achieving its desired outcomes may span multiple four-year periods. The current PPCs cover the period 2025-2028.

These two concepts aim to define precisely the practical and demonstration outcomes of R&I projects and are described in more detail in the next slides.

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High Level use cases

with specific PPCs during 2025-2028

HLUC 1
Optimal Cross sector Integration and Grid Scale Storage
Total 10-year Budget: 620M€

HLUC 5
One stop shop and Digital Technologies for market participation of costumers (citizens) at the center
Total 10-year Budget: 420M€

HLUC 7
System Supervision and Control including Cyber Security
Total 10-year Budget: 660M€

HLUC 2
Market-driven TSO-DSO-System User Interactions
Total 10-year Budget: 530M€

HLUC 4
Massive RES Penetration into transmission and distribution grid
Total 10-year Budget: 500M€

HLUC 8
Transportation, Integration & Storage
Total 10-year Budget: 400M€

HLUC 3
European Wholesale Markets, Regional and Local Markets
Total 10-year Budget: 410M€

HLUC 6
Secure operation of widespread use of power electronics at all systems levels
Total 10-year Budget: 530M€

HLUC 9
Flexibility provision by Building, Districts and Industrial Processes
Total 10-year Budget: 20M€

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Priority Project Concepts

The table below summarises the PPCs in each HLUC, including those identified in the previous (2022-2025) and latest IP (2025+), and their potential evolution. Detailed explanations of the 2025+ PPCs are provided in the updated Implementation Plan

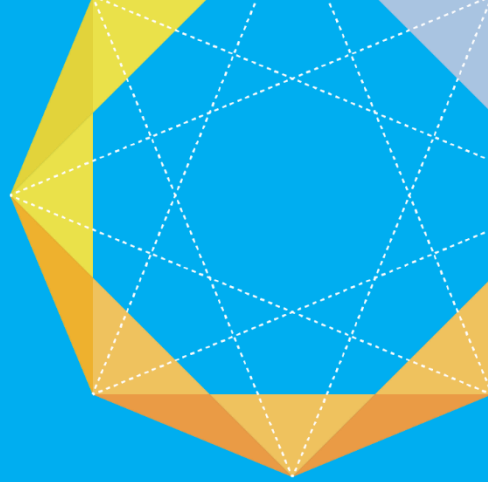|	ETIP SNET IP 2022-2025	ETIP SNET IP 2025+	ETIP SNET IP 2026+	
HLUC 1 Optimal Cross sector Integration and Grid Scale Storage	○ **PPC 1.1:** Value of cross sector integration and storage ○ **PPC 1.2:** Control and operation tools for multi energy systems ○ **PPC 1.3:** Smart asset management for a circular economy	○ **PPC 1.4:** Integrating hydrogen and CO2-neutral gases ○ **PPC 1.5:** Regulatory framework for cross sector integration	○ **PPC 1.4:** Integrating hydrogen and CO2-neutral gases ○ **PPC 1.5:** Regulatory framework for cross sector integration	
HLUC 2 Market-driven TSO–DSO–System User Interactions	○ **PPC 2.1:** Market models and architecture ○ **PPC 2.2:** Control and operation ○ **PPC 2.3:** Platform Development ○ **PPC 2.4:** Planning tools	○ **PPC 2.5:** Develop a Digital Twin of the European Electricity Grid ○ **PPC 2.6:** Viable business cases through market mechanisms and incentives ○ **PPC 2.7:** Governance for TSO, DSO and System Users		**LATER ETIP SNET IPs**
HLUC 3 Pan European Wholesale Markets, Regional and Local Markets	○ **PPC 3.1:** Fundamental market design ○ **PPC 3.2:** Regulatory framework and strategic investments ○ **PPC 3.3:** IT systems for cross-border trading	○ **PPC 3.4:** Validation of new market concepts		

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Priority Project Concepts

	ETIP SNET IP 2022-2025	ETIP SNET IP 2025+	ETIP SNET IP 2026+	
HLUC 4 Massive RES Penetration into the Transmission and Distribution Grid	o **PPC 4.1:** Technical barriers and technical measures o **PPC 4.2:** Control and operation tools o **PPC 4.3:** Infrastructure requirements and network technologies o **PPC 4.4:** Planning for a resilient system	o **PPC 4.5:** Well-functioning markets for a RES based energy system o **PPC 4.6:** Policies and governance for a RES based energy system		
HLUC 5 One-Stop Shop and Digital Technologies for Market Participation of Consumers (citizens) at the Centre	o **PPC 5.1** Value of Consumer/Customer acceptance and engagement o **PPC 5.2:** Plug and play devices and IoT o **PPC 5.3:** Utilisation of Communication Networks including cyber security o **PPC 5.4:** Cross-sectorial flexibility use cases	o **PPC 5.5:** Data Spaces o **PPC 5.6:** Building skills needed for developers and users of the energy system to accelerate its transition through its digitalization o **PPC 5.7:** Service management and operations o **PPC 5.8:** Sharing IT infrastructure investments	o **PPC 5.9:** Large Scale Demonstration activities o **PPC 5.10:** Creating consensus on consumer solutions	**LATER ETIP SNET IPs**
HLUC 6 Secure operation of widespread use of power electronics at all systems levels	o **PPC 6.1:** Control solutions for next generation inverters o **PPC 6.2:** Hybrid transmission/distribution and hybrid distribution AC/DC grids o **PPC 6.3:** Next Gen. distribution substation o **PPC 6.4:** Simulation methods and digital twins	o **PPC 4.5:** Well-functioning markets for a RES based energy system o **PPC 4.6:** Policies and governance for a RES based energy system	o **PPC 6.5:** HVDC interoperability, multi-terminal configuraxtions, meshed grids o **PPC 6.6:** Large Scale Demonstration activities o **PPC 6.7:** Standardisation activities	

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Priority Project Concepts

	ETIP SNET IP 2022-2025	ETIP SNET IP 2025+	ETIP SNET IP 2026+	
HLUC 7 Enhance System Supervision and Control including Cyber Security	o **PPC 7.1:** Next Gen. of TSO control room o **PPC 7.2:** Next Gen. of DMS o **PPC 7.3:** Next Gen. of measurements and GIS for distribution grids o **PPC 7.4:** Wide area monitoring, control and protections	o **PPC 7.5:** Grid operator of the future o **PPC 7.6:** Grid field workforce of the future o **PPC 7.7:** Human machine interface (HMI) o **PPC 7.8:** Cybersecurity of Energy Networks	o **PPC 7.9:** Large scale demonstration activities o **PPC 7.10:** Standardisation activities	
HLUC 8 Enhance System Supervision and Control including Cyber Security	o **PPC 8.1:** Technical and economic implication of decarbonisation of transport sector o **PPC 8.2:** Enhancing effectiveness of energy system operation and resilience with electromobility o **PPC 8.3**: Integrated planning of energy and transport sectors	o **PPC 8.4:** Adapting policy and market for seamless cost-effective merging of transport and energy sectors	o **PPC 8.5:** Demonstration activities	**LATER ETIP SNET IPs**
HLUC 9 Enhance System Supervision and Control including Cyber Security	o **PPC 9.1:** Value assessment of the integration of buildings o **PPC 9.2:** Control and operation tools for the integration of buildings o **PPC 9.3:** Planning for reliable integration of buildings	o **PPC 9.4:** Governance for an effective integration of buildings and smart energy communities	o **PPC 9.5:** Evolved markets for enabling buildings and energy community facilities	

Thank for your attention!

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