PANTERA Virtual Workshop at the EU Sustainable Energy Week (EUSEW) 2020

How can the Task Force "Research & Innovation (R&I) Priorities" be effectively linked to the activities of ETIP SNET

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ETIP SNET Vice-Chair

The EU Green Deal and its policies have several energy-related aspects and implication, which require R&I developments:

EUROPEAN GREEN DEAL

The European Green Deal, COM(2019) 640 final

EU TOWARDS SUSTAINABLE FUTURE

LEAVING NO ONE BEHIND

Policies

Climate neutrality	Clean, Reliable & Affordable Energy	Sustainable transport	Buildings and Construction	Circular Economy	Zero pollution EU	... Farm-2-fork Ecosystem

ENERGY-RELATED KEY ASPECTS / IMPLICATIONS

"50-55% emmissions target by 2030"
...

"Energy Efficiency"
"Renewable sources"
"Offshore wind"
"Smart sector integration (E, G, H&G, H2)"
"Cross-border and regional cooperation"
"Regulatory framework"
"Smartgrids"
"Storage"
"Reduce energy poverty /affordable"
"Integ, Interc, Digital Energy Market"
...

"Sustainable smart mobility (road, rail, water)"
"Public charging points"
"Alternative fuels"
"Low poluants emission technologies / standards"
"Digitalization"
...

"Energy Efficiency in Buildings"
"Digitalization / automation"
...

"Raw materials for clean technologies"
"Fuel cells and H2"
"Storage / Batteries"
"Digital technologies (IA, 5G, IoT, ...)"
"Energy Efficiency"
...

...

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EU Green Deal Policies → Energy System Building Blocks → Required Functionalities

Climate neutrality
- *50-55% emmissions reduction target by 2030*

Clean, Reliable & Affordable Energy
- *Energy Efficiency*
- *Renewable sources*
- *Offshore wind*
- *Smart sector integration (E, G, H&G, H2)*
- *Cross-border and regional cooperation*
- *Regulatory framework*
- *Smartgrids*
- *Storage*
- *Reduce energy poverty /affordable*
- *Integrated, Interconnect, Digital Energy Market*

Sustainable transport
- *Sustainable smart mobility (road, rail, water)*
- *Public charging points*
- *Alternative fuels*
- *Low poluants emission technologies/standards*
- *Digitalization*

Buildings and Construction
- *Energy Efficiency in Buildings*
- *Digitalization / automation*

Circular Economy
- *Raw materials for clean technologies*
- *Fuel cells and H2*
- *Storage / Batteries*
- *Digital technologies (IA, 5G, IoT, …)*
- *Energy Efficiency*

...

Energy System Building Blocks

- Efficient use of energy
- Infrastructure for Integrated Energy Systems
- Markets for Energy Transition
- Digitalization as enabler of Integrated ES
- Efficient organization of Energy System

VISION 2050 ETIP-SNET

Required Functionalities

- **Cooperation** btw System Operators for incr. renew. integrat.
- Upgraded Electricity **Networks and Systems**
- **Cross-sector** integration
- Energy System **Business** (models, regulation)
- Integrating **Flexibility** (gen, storage, conversion)
- **Simulation** tools for Energy Systems (increased capabilities)
- Integrating **Digitalization** services
- **Customer** at the Center
- Pan-European **Wholesale** markets
- Integrated local / **retail** markets

- Upgraded Electricity **Networks and Systems**
- Liquid fuels and electric **mobility**
- Energy System **Business** (models, regulation)
- Integrating **Flexibility** (gen, demand, storage, conversion)

- Efficient **Heating & Cooling** for buildings and industry
- Integrating **Digitalization** services
- Integrating **Flexibility** (gen, demand, storage, conversion)

- Upgraded Electricity **Networks and Systems**
- Integrating **Digitalization** services

FUNCTIONALITIES FROM ETIP-SNET

ETIP-SNET Roadmap 2020-2030

Functionality

- **Cooperation** between System Operators
- **Cross-sector** integration
- **Customer** at the Center
- Pan-European **Wholesale** markets
- Integrated local / **retail** markets
- Integrating **Digitalization** services
- Upgraded Electricity **Networks and Systems**
- Energy System **Business** (models, regulation)
- **Simulation** tools for Energy Systems
- Integrating **Flexibility** (gen, demand, storage, conversion)
- Efficient **Heating & Cooling** for buildings and industry
- Liquid fuels and electric **mobility**

Research Area	Research Sub-Area / Topic				
1. **CONSUMER, PROSUMER and CITIZEN ENERGY COMMUNITY**	1.1 Social campaigns and **social studies**	1.2 Adaptive consumer/user **behaviour** incl. energy communities	1.3 Consumer and prosumer **device control**		
2. **SYSTEM ECONOMICS**	2.1 Business models		2.2 Market and governance		
3. **DIGITALIZATION**	3.1 Protocols, standardisation and interoperability	3.2 Data Communication (ICT)	3.3 Data and Information Management (Platforms, IoT, etc.)	3.4 Cybersecurity and Privacy	3.5 End-to-end architecture
4. **PLANNING - HOLISTIC ARCHITECTURES and ASSETS**	4.1 Integrated Energy system Architectures	4.2 Long-term planning	4.3 Asset management and maintenance	4.4 System Stability analysis	
5. **FLEXIBILITY ENABLERS and SYSTEM FLEXIBILITY**	5.1 Demand Flexibility	5.2 Generation Flexibility	5.3 Storage flexibility & Energy Conversion flexibility	5.4 Network Flexibility	5.5 Transport Flexibility
6. **SYSTEM OPERATION**	6.1 Supervision control and State estimation	6.2 Short-term control	6.3 Medium and long-term control	6.4 Preventive control/ restoration	6.5 Control Center technologies

EU Green Deal Policies → **R&I needs and priorities**

EU Green Deal Policies

Climate neutrality
- 50-55% emmissions reduction target by 2030

Clean, Reliable & Affordable Energy
- Energy Efficiency
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Buildings and Construction
- Energy Efficiency in Buildings
- Digitalization / automation

Circular Economy
- Raw materials for clean technologies
- Fuel cells and H2
- Storage / Batteries
- Digital technologies (IA, 5G, IoT, …)
- Energy Efficiency

…

R&I needs and priorities

	Research Area	Research Sub-Area / Topic				
Prioritise energy efficiency and develop a power sector based largely on renewable sources	1. CONSUMER, PROSUMER and CITIZEN ENERGY COMMUNITY	1.1 Social campaigns and social studies	1.2 Adaptive consumer/user behaviour incl. energy communities	1.3 Consumer and prosumer device control		
	2. SYSTEM ECONOMICS	2.1 Business models		2.2 Market design and governance		
Secure and affordable EU energy supply	3. DIGITALIZATION	3.1 Protocols, standardisation and interoperability	3.2 Data Communication (ICT)	3.3 Data and Information Management (Platforms, IoT, etc.)	3.4 Cybersecurity and Privacy	3.5 End-to-end architecture
	4. PLANNING - HOLISTIC ARCHITECTURES and ASSETS	4.1 Integrated Energy system Architectures	4.2 Long-term planning	4.3 Asset management and maintenance	4.4 System Stability analysis	
Fully integrated, interconnected and digitalised EU energy market	5. FLEXIBILITY ENABLERS and SYSTEM FLEXIBILITY	5.1 Demand Flexibility	5.2 Generation Flexibility	5.3 Storage flexibility & Energy Conversion flexibility	5.4 Network Flexibility	5.5 Transport Flexibility
	6. SYSTEM OPERATION	6.1 Supervision Control and State estimation	6.2 Short-term control	6.3 Medium and long-term control	6.4 Preventive control/restoration	6.5 Control Center technologies

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WORKING GROUPS

WG1 Reliable, economic and efficient smart grid system	WG2 Storage technologies and sector interfaces	WG3 Flexible Generation	WG4 Digitisation of the electricity system and Customer participation	WG5 Innovation implementation in the business environment
new transmission and distribution technologies	Storage flexibilities	Generation flexibility	Digitalization of T&D	Homogeneous project analysis
interfaces with storage	Integration with other energy systems		ICT infrastructures for consumers and retail	Methodology to indetify system needs
demand response	Cost / benefits		Active demand response	Identify barriers towards deplyment
flexible generation			Energy efficiency in buildings and industry	
synergies with other energy networks			Decision-making support tools and control	
grid observability and controlability				
use of ICT				