



ETIP SNET Regional Workshop, Dec 1, 2022

Moderator: Ludwig Karg, B.A.U.M.

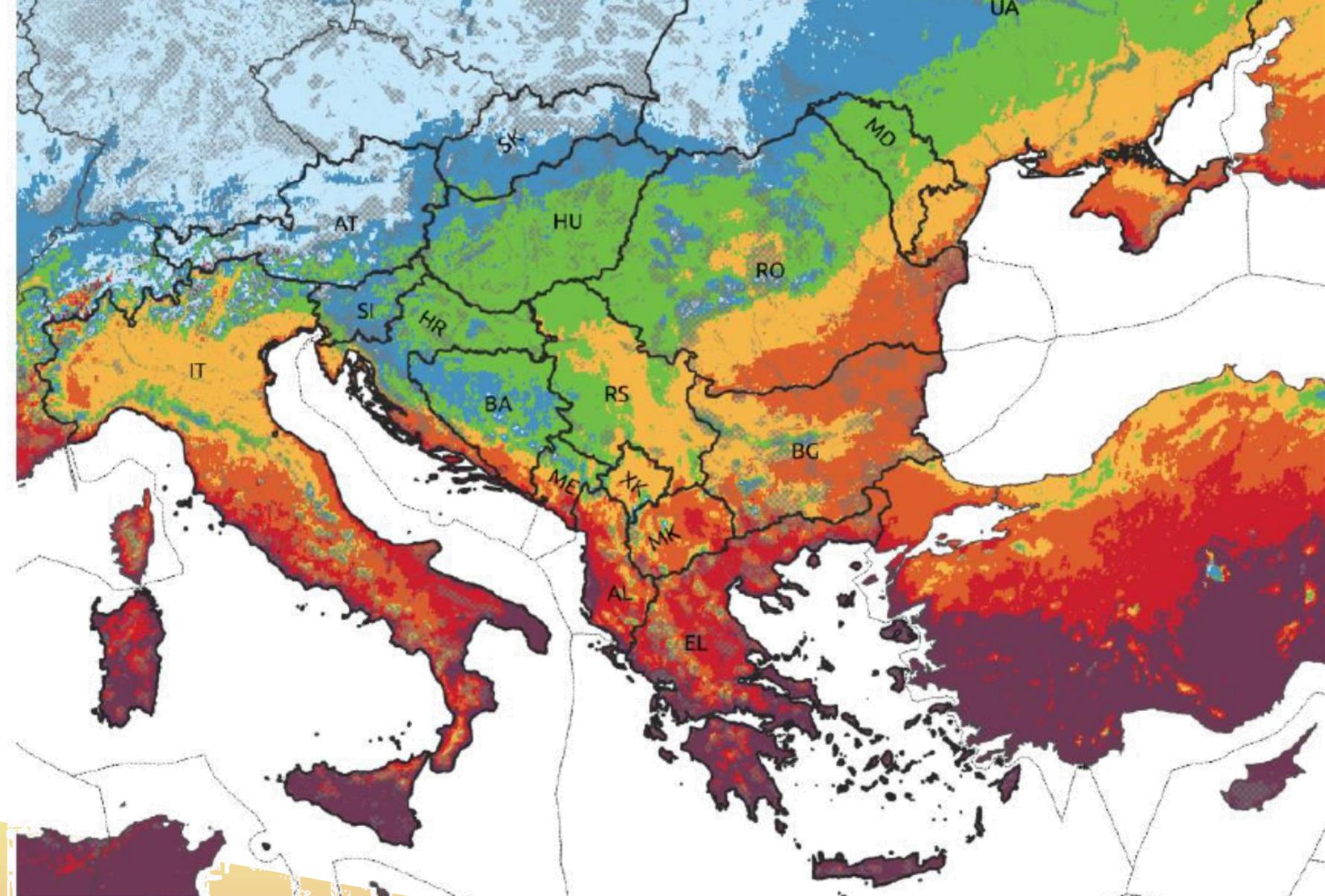


Agenda

9.30	Intro	Opening and welcoming	Maria Laura Trifiletti, ETIP SNET representatives
9.35	Info	Introduction to ETIP SNET & BRIDGE	ETIP SNET Core Team representatives
9.40	Info	Introduction to the High Level Use Cases (HLUC) approach for the ETIP SNET Implementation Plan and Roadmap (IP & RM)	Nikos Hatziargyriou - ETIP SNET Core Team
9:50	Panel 1	Funding priorities at national/regional level in South-East Europe	Ludwig Karg (moderator)
		<ul style="list-style-type: none"> • Focus of Research Development and Innovation (RDI) programmes in South and South-East Europe (SE-EU) <ul style="list-style-type: none"> ○ S / SE-EU projects of Joint Programming Platform ERA-Net Smart Energy System ○ project BERLIN and funding programme ENI CBCMED • Relation of SE-EU RDI programmes and ETIP SNET IP&RM • Collecting input for improvement of High Level Use Cases (HLUC) of ETIP SNET IP 	Julia Chenut, Support Team to JPP SES Venizelos Efthymiou, FOSS, Cyprus Rainer Bacher - ETIP SNET Core Team all panel: interactive discussion using voting tool
10.35	Panel 2	Projects with respect to HLUC (pitch per project (3 min); feedback and discussion (4 min))	Ludwig Karg (moderator), Nikos Hatziargyriou & Rainer Bacher - ETIP SNET Core Team
		○ TRINITY (funded in EC Horizon 2020 program)	Álvaro Nofuentes Prieto, ETRA tbc
		○ E-LAND (funded in EC Horizon 2020 program)	Isidoros Kokos. Intracom (Greece)
		○ Energy and Climate Security Risk Index (financed by the European Climate Foundation)	Martin Vladimirov, Center for the Study of Democracy (CSD), Sofia
		○ DISTRHEAT (funded in ERA-Net Smart Energy Systems program)	Mirko Morini, Universita di Parma
		○ Joint RDI projects with Central and South-East Europe and the CRESYM Initiative	Prof. Antonello Monti, RWTH Aachen / FH Gesellschaft
11.25	Outro	Conclusions	Maria Laura Trifiletti – ETIP SNET representative

Region

Bulgaria
Croatia
Cyprus
Greece
Hungary
Italy
Malta
Romania
Slovenia





Introduction To ETIP SNET

Coordinator: Maria Laura Trifiletti



ETIP SNET Vision 2050



CONCENTRATED AND
DISTRIBUTED vRES

FLEXIBILITY PORTFOLIO

STORAGE SOLUTIONS

INTEGRATED ENERGY
NETWORKS

SECTOR COUPLING

DIGITALISATION



ETIP SNET R&I Implementation Plan 2022-2025

Nikos Hatziargyriou



ETIP SNET

R&I Implementation Plan 2022-2025 available [here](#)

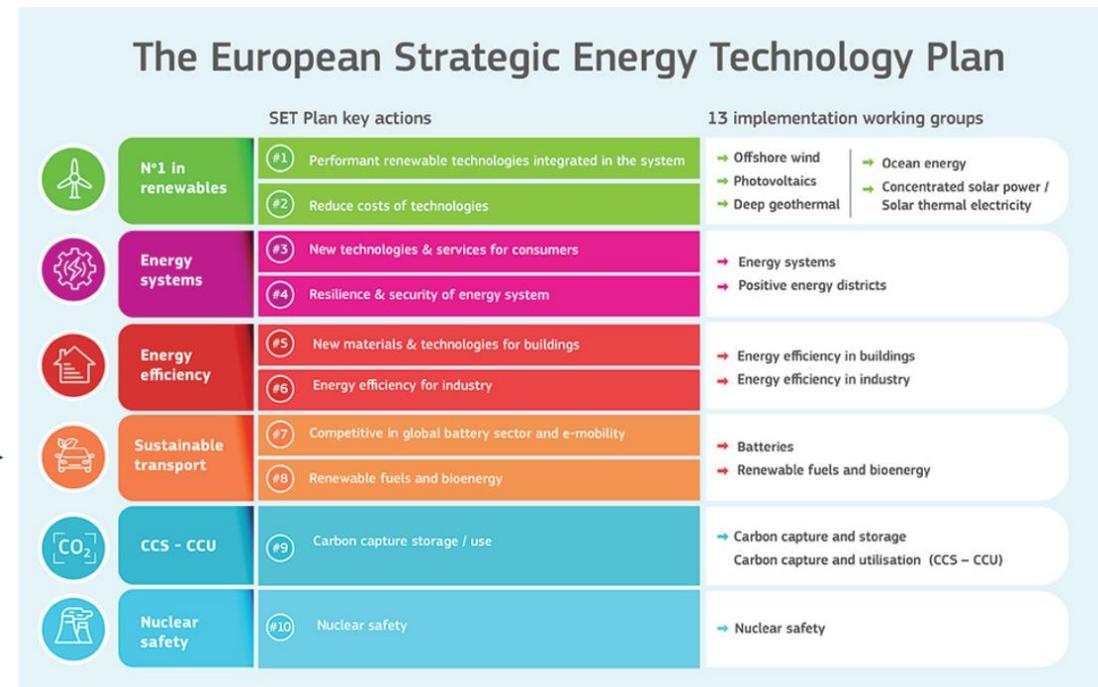


ETIPs under the SET PLAN Umbrella

The European Strategic Energy Technology Plan (SET Plan) is a key stepping-stone to *boost the transition towards a climate neutral energy system* through the development of low-carbon technologies in a fast and cost-competitive way.



The SET Plan consists of 10 Key Action and related Implementation Working Group (IWGs).



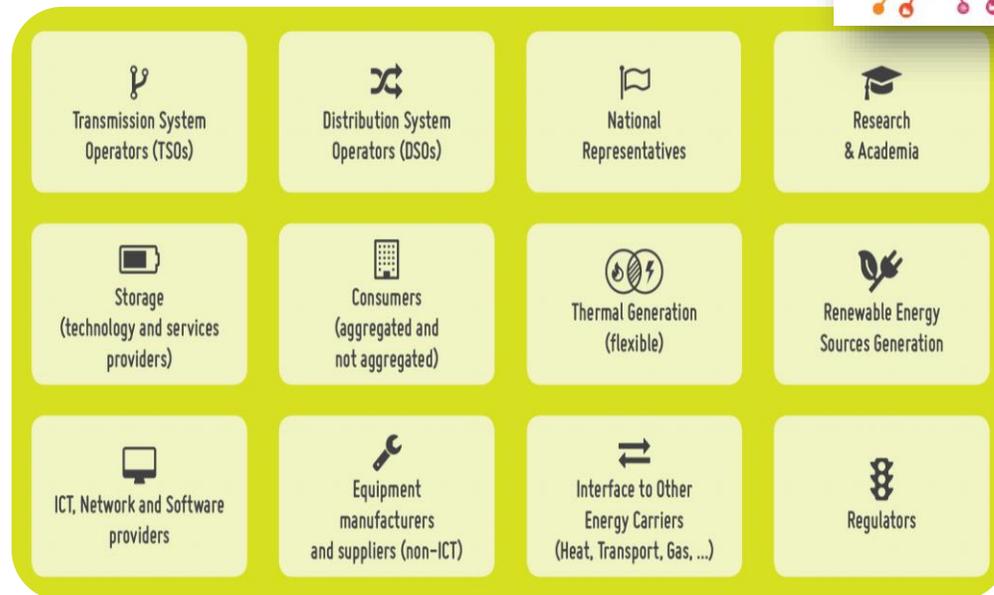
Under the SET PLAN

The European Technology and Innovation Platforms (ETIPs) were created:

- to support the implementation of the SET Plan by bringing together EU countries, industry, and researchers in key areas.
- to promote the market uptake of key energy technologies by pooling funding, skills, and research facilities.

ETIP Smart Networks for Energy Transition - Goals and Structure

*Guide and identify R&I priorities to support 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.***



- Brings together main **stakeholders** and more than **350 experts** from the energy sector from all around Europe and beyond
- Prepares and updates **Visions, Roadmaps and Implementation Plans**
- It crafts a consolidated stakeholder view **on R&I to European Energy Policy initiatives toward Energy Transition in order to achieve medium and long term objectives**

ETIP SNET Vision 2050



CONCENTRATED AND
DISTRIBUTED vRES

FLEXIBILITY PORTFOLIO

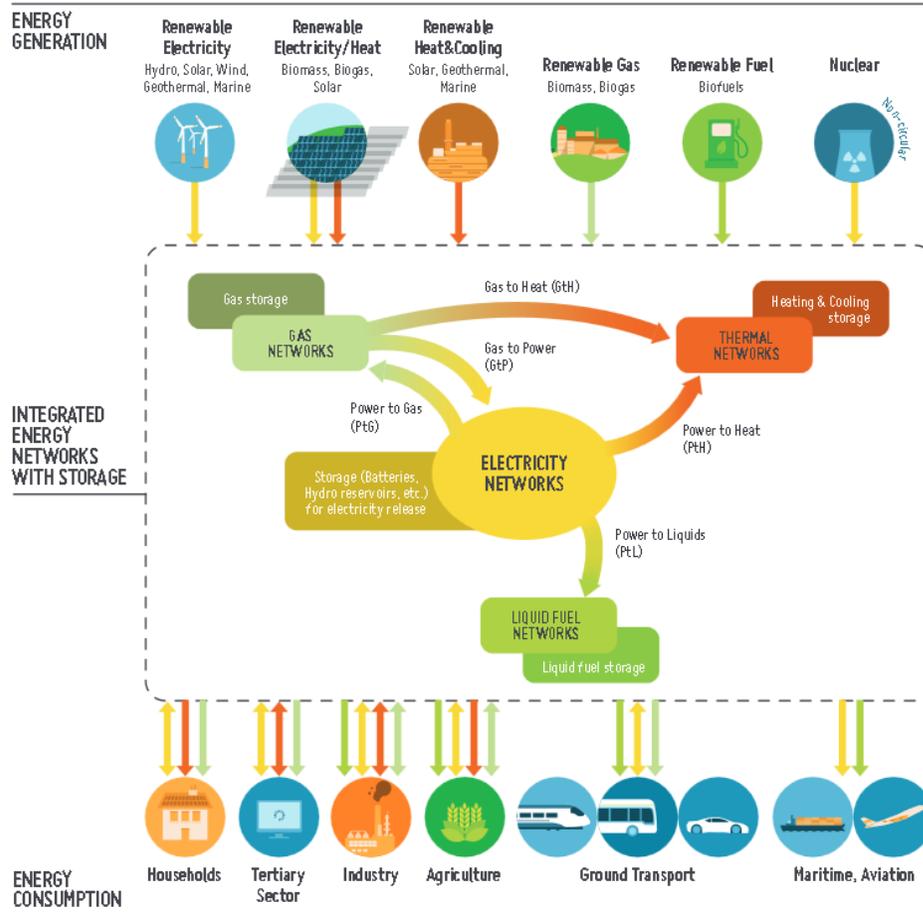
STORAGE SOLUTIONS

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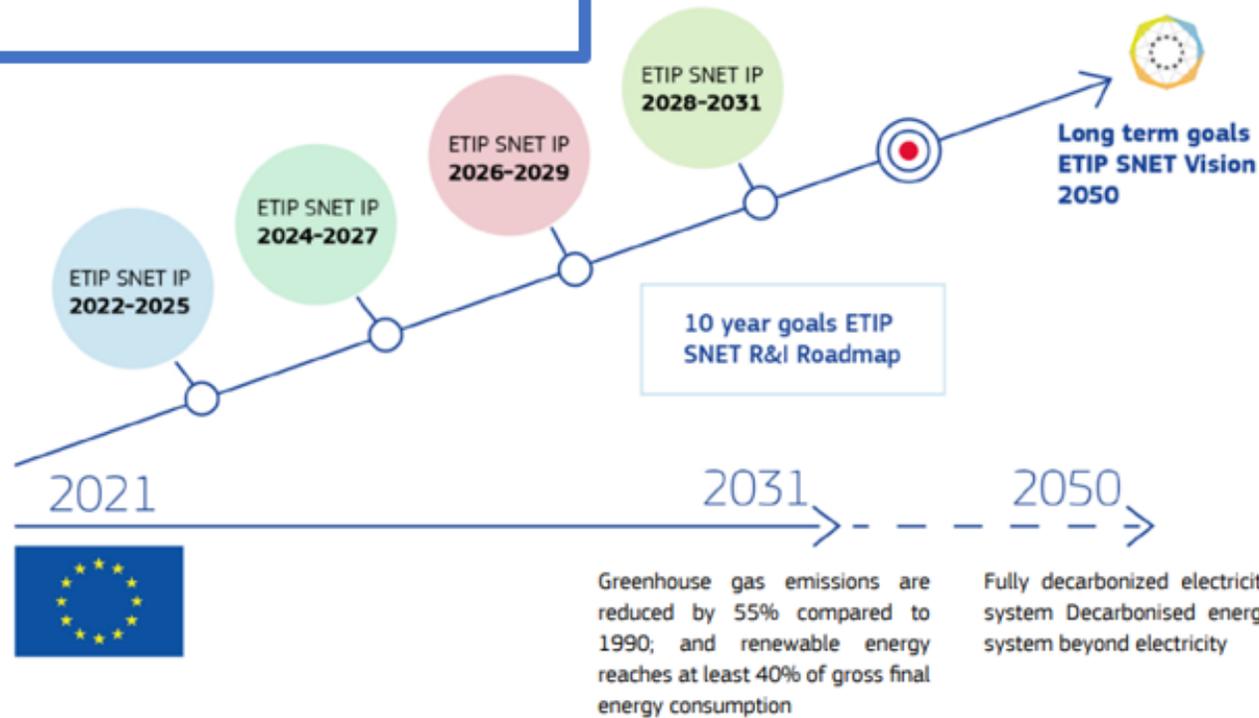
The components of the vision



- **Extensive electrification** in (nearly) all sectors of the energy system
- **Efficient coupling** between the electricity system and other energy vectors to **enhance flexibility and efficiency**
- Use of **energy conversion and storage solutions**
- Widespread **digitalisation**

Roadmap & Implementation Plan (IP)

The **ETIP SNET R&I Roadmap 2020-2030** describes the 10-year path towards this future. The Roadmap will be updated by the end of 2022.



The ETIP SNET **Implementation Plan 2022-2025** outlines in detail the priority R&I needs for the next four years 2022-2025.

Main Drivers of the Roadmap and the IP

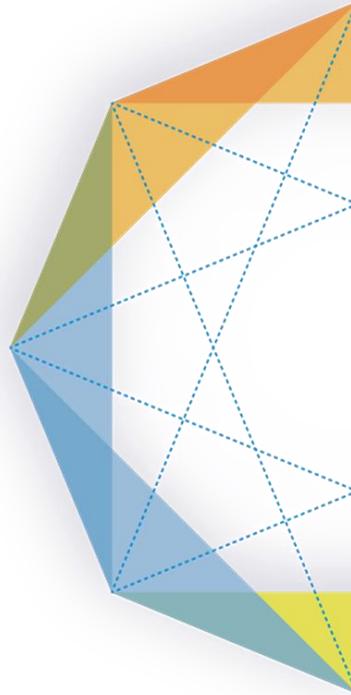
- **Decarbonisation of energy systems, transport, industry, and building stock**
- **Involvement of consumers and citizen communities in energy systems**



- **Digitalisation as key enabler of the environmental transition and participative energy markets**
- **Reliability, adaptability and resilience of the integrated energy systems**



Implementation Plan Main Concepts

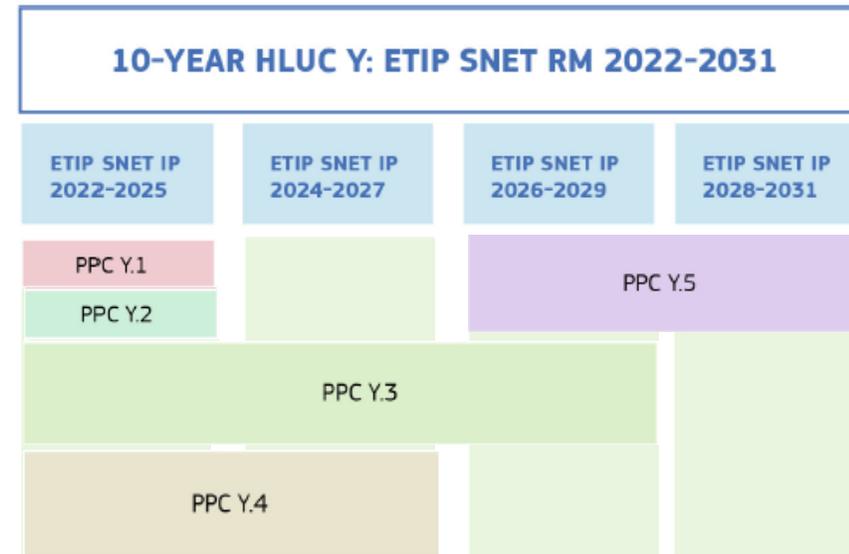


The ETIP SNET R&I Implementation Plan 2022-2025 describes the R&I efforts to be achieved by 2024 based on two principles:

1. It reuses the basic ideas defined in the previous R&I Roadmaps and Implementation plans, such as Research Areas, Research TOPICS and Research TASKS to organise the research for the proposed research priorities.
2. It adopts the key concept of High-Level Use Cases (HLUCs) with associated sets of Priority Project Concepts (PPCs) to specify the targeted outcome of R&I projects in general, including demonstration.

Main Concepts

- HLUC: High-level Use Case
- PPC: Priority Project Concept



- PPCs might extend to more than one IP
- Research Tasks are associated with PPCs
- More than one Task might be needed for one PPC

High Level Use Cases



High Level Use Cases

HLUC 1: Optimal
Cross sector
Integration and
Grid Scale Storage

Total Budget:
130M€

HLUC 2: Market-
driven TSO–DSO–
System User
Interactions

Total Budget:
90M€

HLUC 3: Pan
European Wholesale
Markets, Regional
and Local Markets

Total Budget:
80M€

HLUC 4: Massive
Penetration of RES into
the transmission and
distribution grid

Total Budget:
145M€

HLUC 5: One stop shop and
Digital Technologies for market
participation of consumers
(citizens) at the center

Total Budget :
120M€



HLUC 6: Secure operation
of widespread use of
power electronics at all
systems levels

Total Budget:
100M

HLUC 7: Enhance
System Supervision
and Control including
Cyber Security

Total Budget
135M€

HLUC 8:
Transportation
Integration &
Storage

Total Budget:
100M€

HLUC 9: Flexibility
provision by Building,
Districts and Industrial
Processes

Total Budget:
100M€



ENLIT: ETIP SNET Regional Workshop, Dec 1, 2022



**Joint Programming Platform
Smart Energy Systems
Julia Chenut**



Joint Programming Platform ERA-Net Smart Energy System



“A Transnational Joint Programming Platform to Initiate Co-Creation and Promote Energy System Innovation”

Focus Initiatives

**Smart Grids Plus
(SG+)**

Development and integration of smart grid systems

**Integrated Regional
Energy Systems
(RegSys)**

Efficiently provide, host and utilize up to and beyond 100% share of renewables in local or regional energy supply

EnerDigit

Digitalization for the energy transition

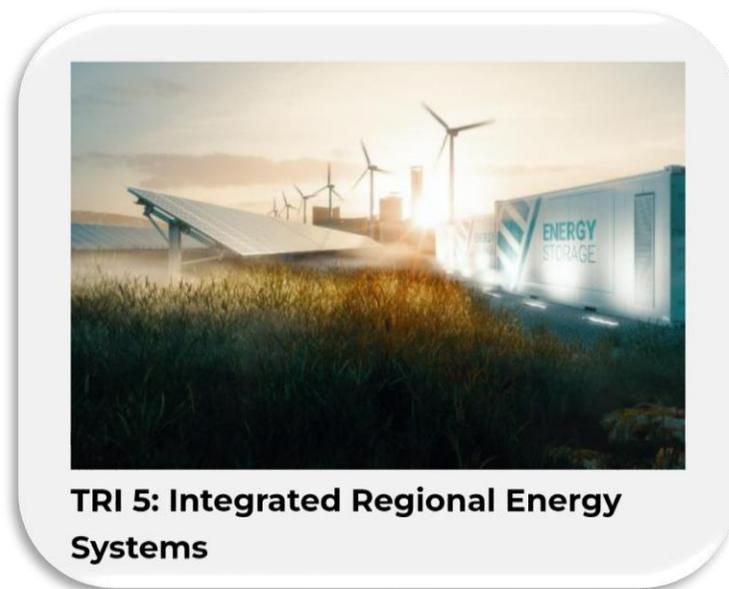
Layers

Technology

Marketplace

Adoption

Clean Energy Transition Partnership



JPP SES: Funding Partners



This initiative has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements no. 646039, 775970 and 883973.



European
Commission

JPP SES: Funding Partners (South-East Europe Only)

			SG+	RegSys	EnerDigit
	Environmental Protection and Energy Efficiency Fund, Croatia	 FOND ZA ZAŠTITU OKOLIŠA I ENERGETSKU UČINKOVITOST	✓	✓	
	National Research, Development and Innovation Office (NRDI Office), Hungary	 NEMZETI KUTATÁSI, FEJLESZTÉSI ÉS INNOVÁCIÓS HIVATAL		✓	
	Ministero dell'Istruzione, dell'Università e della Ricerca, Italy	 Ministero dell'Istruzione		✓	
	Executive Agency for Higher Education, Research, Development and Innovation Funding, Romania	 UEFISCDI	✓	✓	✓
	Ministry of the Infrastructure and Spatial Planning, Directorate for Energy, Slovenia	 REPUBLIC OF SLOVENIA GOV.SI	✓		
	Direzione Generale Ambiente e Clima - Regione Lombardia (Not an Active Member)	 Regione Lombardia	✓		



HLUC Impact of South-East Europe Projects (ERA-Net SES)



Project Acronym	JC Cohort	HLUC 1	HLUC 2	HLUC 3	HLUC 4	HLUC 5	HLUC 6	HLUC 7	HLUC 8	HLUC 9
FinSESCo	2020									
AISTOR	2019									
BIO-NRG STORE	2019									
DEVISE	2019	x					x			
IFAISTOS	2019	x			x					
I-Greta	2019									
MESH4U	2019									
ANM4L	2018		x		x			x		x
DiGriFlex	2018									
DISTRHEAT	2018	x								x
EVA	2018									
EVCHIP	2018									
Multiportgrid	2018	x								x
PIGergy	2018									
SuperP2G	2018	x								
ZEHTC	2018	x								

HLUC 1: Optimal Cross sector Integration and Grid Scale Storage

HLUC 2: Market-driven TSO–DSO–System User interactions

HLUC 3: Pan European Wholesale Markets, Regional and Local Markets

HLUC 4: Massive Penetration of RES into the transmission and distribution grid

HLUC 5: One stop shop and Digital Technologies for market participation of consumers (citizens) at the center

HLUC 6: Secure operation of widespread use of power electronics at all systems levels

HLUC 7: Enhance System Supervision and Control including Cyber Security

HLUC 8: Transportation Integration & Storage

HLUC 9: Flexibility provision by Building, Districts and Industrial Processes

Key Projects in Region South-East Europe (JPP SES)



ANM4L aims at demonstrating how innovative **active network management (ANM)** solutions can increase the integration of **renewable energy sources (RES)** in electricity distribution networks.

Project Partner from SE-EU
E.ON Észak-dunántúli Áramhálózati (Hungary)



Zero Emission Hydrogen Turbine Center

With renewable energy sources, green hydrogen and gas turbines combined, we can store energy and achieve a reliable and sustainable energy system

Project Partner from SE-EU
University of Bologna (Italy)



EVA Project
Optimization of Regional Infrastructures for the Transition to **Electric and Connected Autonomous Vehicles**

Project Partner from SE-EU
EURAC Research (Italy)



Financing Smart Energy Systems via Crowd Investing & Digitalizing Energy Contracting in the Building Sector

Project Partner from SE-EU
BEIA Consult International (Romania)





HLUC relevance for region South-East Europe (ERA-Net SES)



Projects	HLUC 1	HLUC 2	HLUC 3	HLUC 4	HLUC 5	HLUC 6	HLUC 7	HLUC 8	HLUC 9	Other
ANM4L	●	●●●	●	●●●	●		●●●		●●●	
EVA	●	●	●	●			●	●	●	
ZEHTC	●●●		●	●●				●●	●●	
FinSESCo	●	●●	●●	●●	●			●	●	

- extremely relevant
- highly relevant
- relevant to some degree
- n/a – don't know

- HLUC 1: Optimal Cross sector Integration and Grid Scale Storage
- HLUC 2: Market-driven TSO–DSO–System User interactions
- HLUC 3: Pan European Wholesale Markets, Regional and Local Markets
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- HLUC 5: One stop shop and Digital Technologies for market participation of consumers (citizens) at the center
- HLUC 6: Secure operation of widespread use of power electronics at all systems levels
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- HLUC 8: Transportation Integration & Storage
- HLUC 9: Flexibility provision by Building, Districts and Industrial Processes



Key findings from South-East Europe Projects (ERA-Net SES)



Projects	Key Findings or Expected Results	Relevant HLUC(s)
ANM4L	<ul style="list-style-type: none"> Identified the benefits of Active Network Management (ANM) can bring, especially for faster energy transition. ANM offers a faster way to accept new RES connections 	<p>Direct: 2,4,7,9 Indirect: 1,3,5</p>
EVA	<ul style="list-style-type: none"> The project will develop a set of guidelines aimed at supporting regional authorities in the transition towards electric and connected autonomous vehicles and at optimizing the related infrastructures 	<p>Direct: None Indirect: 1,2,3,4,7,8,9</p>
ZEHTC	<ul style="list-style-type: none"> A demonstration plant is built to show how hydrogen, gas turbines, renewable energy production and energy storage work together in a future flexible and sustainable energy system. Hydrogen is well controllable from a safety perspective but regulations are still in development. 	<p>Direct: 1 Indirect: 3,4,8,9</p>
FinSESCo	<ul style="list-style-type: none"> Using data from building permits and energy audits, the platform offers: <ul style="list-style-type: none"> gamified investment process, diversification options in an investor dashboard, smart contracts, digital encrypted meter-based repayment process and machine learning-based fault detection during operation will be offered by platform modules. 	<p>Direct: None Indirect: 1,2,3,4,5,8,9</p>



Proposals from South-East Europe Projects (ERA-Net SES)



Projects	Proposal(s) / Recommendation(s)	Relevant HLUC(s)
ANM4L	<ul style="list-style-type: none"> Use ANM to keep up with the pace of the energy transition Changes in the method of economic incentive regulation and introduction of a total expenditure approach are necessary. Standardized communication, software modularity, and interoperability are solution supporting integration and maintenance of ANM tools in DSO 	Direct: 2,4,7,9 Indirect: 1,3,5
EVA	<ul style="list-style-type: none"> Postpone the investment in power grid for enabling EV charging infrastructure through smart bi-directional charging and peak shaving through intelligent scheduling. Promote Shared Electric Connected Autonomous Vehicles (S-ECAV) and encourage Vehicle-2Grid (V2G) 	Direct: None Indirect: 1,2,3,4,7,8,9
ZEHTC	<ul style="list-style-type: none"> Increased focus on other green fuels including liquid - Bio-fuel (biogas, biodiesel) and e-fuels (ammonia, methanol) are beneficial to complement Hydrogen. 	Direct: 1 Indirect: 3,4,8,9
FinSESCo	<ul style="list-style-type: none"> Ease the set-up of Energy Performance Contracting (EPCo) and Energy Savings Performance Contracting (ESPCo) by end-to-end digitalization of the energy contracting (and the interacting process for public bodies and larger companies). 	Direct: None Indirect: 1,2,3,4,5,8,9

Thank you!

Find more on:

www.eranet-smartenergysystems.eu

In particular our:

Policy Briefs

Spotlights

From the:

JPP SES Knowledge Community



Contact me:

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Head of CETPartnership Coordination

Secretariat

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Development of Hybrid Photovoltaic-based Nanogrids for the Energy Rehabilitation of Public Buildings: The BERLIN Project



Dr Venizelos Efthymiou
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ENI CBC: We make cooperation happen in the Mediterranean!

1. The Mediterranean faces a multitude of common challenges, including climate change, pollution, youth unemployment and social inequality. Acting together to address these challenges and improve the lives of men and women across the region is the impetus for the 2014-2020 ENI CBC “Mediterranean Sea Basin Programme”, the largest Cross-Border Cooperation (CBC) initiative implemented by the EU under the European Neighbourhood Instrument (ENI).
2. The Programme brings together the coastal territories of 14 countries in view of fostering fair, equitable development on both sides of the Mediterranean. Through calls for proposals, ENI CBC Med finances cooperation projects for a more competitive, innovative, inclusive and sustainable Mediterranean area.
3. The strategic framework of the Programme is based on 4 Thematic Objectives and 11 Priorities as a contribution to the main socio-economic and environmental challenges of the Mediterranean



Overview of the BERLIN project

- Promote the wider adoption of **distributed energy generation** in Mediterranean regions
- Implement cross-border pilot actions for the
 - **innovative and cost-effective energy rehabilitation of public buildings**
 - based on the **microgrid** concept



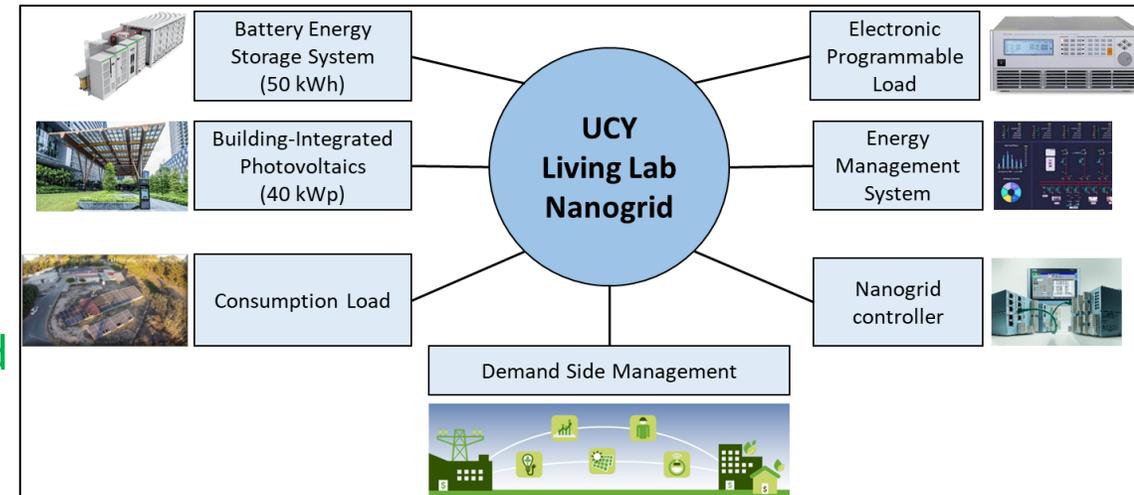
BERLIN: Key objectives of the project and technologies used

- **System integration of three key technologies:**

- Photovoltaics (PV)
- Battery energy storage systems (BESS)
- Demand Side Management (DSM)

- **Targets**

- *Increase*
 - ❖ Self-sufficiency
 - ❖ RES share
- Create a *new paradigm* under the concept of **hybrid nanogrid PV+BESS+DSM systems**
- Achieve a cost-effective implementation of these technologies to *transform* existing public buildings into **self-resilient buildings that are green, smart, innovative and sustainable**



Pilots: Implemented Technologies and Systems

- The state-of-art included in the innovation actions of the BERLIN pilots focuses on the:
 - Design, benchmarking & optimization of joint technical solutions for building energy rehabilitations
 - Collection & validation of data at regional & central dataset points
 - Analysis of the data to develop a consumption model for each pilot
 - Development of regional dynamic electricity tariffs with the application & testing of effective DSM solutions

Location	Pilot characteristics	
	Type of building	Minimum nominal PV power/BESS capacities
Nicosia, Cyprus	PV laboratory	40 kWp/50 kWh
Kozani, Greece	Student dormitory	34 kWp/31 kWh
Kozani, Greece	Town hall	20 kWp/32 kWh
Eilat, Israel	High school	100 kWp/200 kWh
Eilat, Israel	High school	350 kWp/300 kWh
Cagliari, Italy	University buildings	40 kWp/70 kWh



HLUC relevance for project BERLIN



<i>BERLIN</i>	HLUC 1	HLUC 2	HLUC 3	HLUC 4	HLUC 5	HLUC 6	HLUC 7	HLUC 8	HLUC 9	other
Self Resilient Buildings	N/A	N/A	N/A	●●	●●	N/A	N/A	N/A	●●●	No
Nanogrid: Interligent interconnected system	N/A	N/A	N/A	●●	●●	N/A	N/A	N/A	●●●	No
Deman Response / Flexibility	N/A	N/A	N/A	●●	●●	N/A	N/A	N/A	●●●	No

- extremely relevant
- highly relevant
- relevant to some degree
- n/a – don't know



Proposals from project BERLIN



<i>BERLIN</i>	proposal(s) / recommendation(s)	relevant for HLUC(s)
Market responsive buildings	After evaluating the HUCs thoroughly, we find that trading of flexibility coming from Smart Nodes that can be formed by intelligent buildings or a combination of buildings is not adequately addressed. This is fundamental in the emerging needs of the electricity market.	2, 3, 9

Panel Session 1: Funding priorities at national/regional level in South-East Europe

Ludwig Karg, moderator

🕒 Focus of Research Development and Innovation (RDI) programmes in South and South-East Europe (SE-EU)

○ The S-EU and SE-EU projects of Joint Programming Platform ERA-Net Smart Energy System

Julia Chenut, Support Team to JPP SES

○ The ENI CBCMED programme

Venizelos Efthymiou, FOSS, Cyprus

○ Activities and plans of National Stakeholder Coordination Group (NSCG)

Michele de Nigris, RSE, Italy, leading delegate of the NSCG

🕒 **Relation of SE-EU RDI programmes and ETIP SNET IP&RM**

Rainer Bacher - ETIP SNET Core Team

🕒 Collecting input for improvement of High Level Use Cases (HLUC) of ETIP SNET IP & RM

all panel: interactive discussion using voting tool



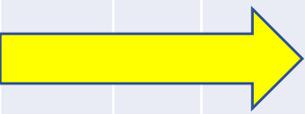
Study on the Central and South Eastern Europe energy connectivity (CESEC) cooperation on electricity grid development and renewables

Final report



Written by: Iulia Falcan, Laura Heidecke, Marie-Jose Zondag (Ecorys); Lukas Liebmann, Gustav Resch (TU Wien); László Szabó, Enikő Kácsor, Alfa Diallo, András Mezősi (REKK); Karsten Lüdorf (Consentec); Jenny Winkler, Ammar Maghnam, Hazem Abdel-Khalek, Julia Panny (Fraunhofer IEG); Monique Voogt (SQ Consult)

March - 2022



Study countries go beyond E- and SE-EU: Bulgaria (BG), Croatia (HR), Cyprus, Greece, Hungary (HU), Italy (IT), Malta, Romania (RO) or Slovenia (SI)

Figure 1.1 CESEC countries



Figure 3.8 Solar radiation map of CESEC region, indicating site conditions (global irradiance on an optimally inclined surface) for solar PV

Global irradiation

Data: PVGIS / CM SAF Solar Radiation Data

Average (2005 – 2015) global irradiance on an optimally inclined surface. Average over both day and night.

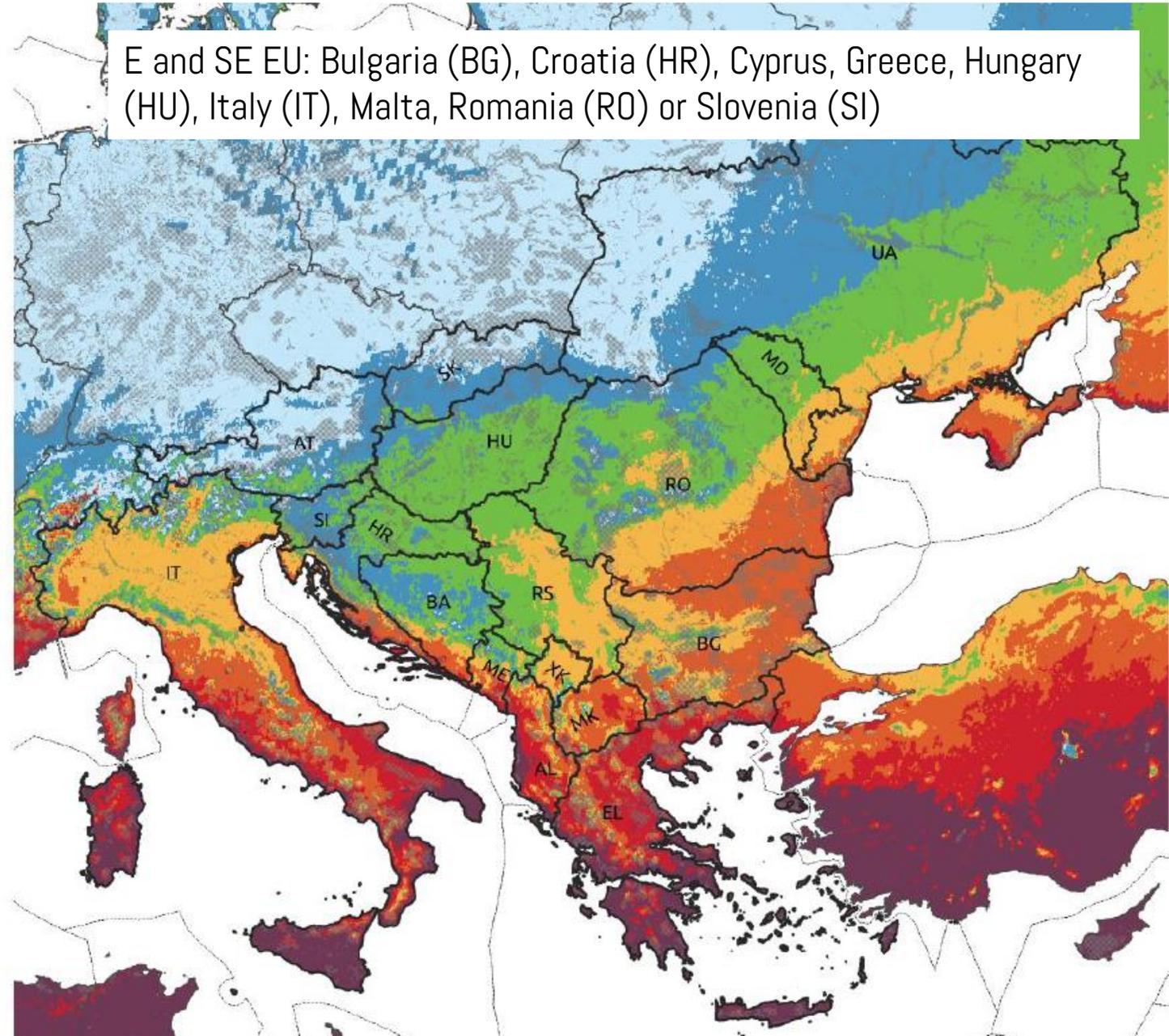
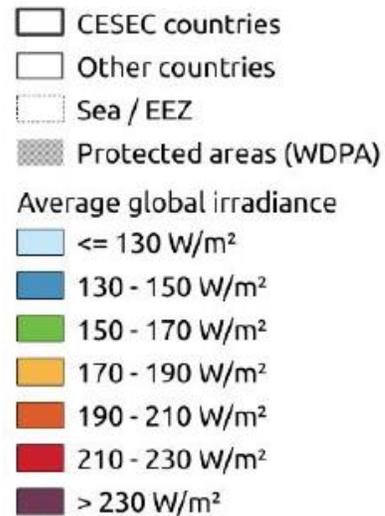


Figure 3.9 Wind map of CESEC region, indicating site conditions (full load hours) for wind onshore

Calculated wind power

cesec-countries_epsg3035

Full Load Hours: CESEC

<= 1882 FLH

1882 - 2151 FLH

2151 - 2449 FLH

2449 - 2878 FLH

2878 - 3085 FLH

3085 - 3221 FLH

3221 - 3350 FLH

> 3350 FLH

cosmo-relevant-countries

Color intervals don't have same width (quantiles)!

Turbine: Nordex N163-4.95

Hub height = 150m

Rotor diameter = 163m

Efficiency = 0.85

Only pixels > 1600 FLH!

Excluded areas:

* elevation >2000m or slope >20°

* specific land use

* nature reserve

(see documentation)

Wind speed data by COSMO-REA6 (150m pre-calculated),

1995/01 – 2019/08

EPSG:3035 (100m x 100m)

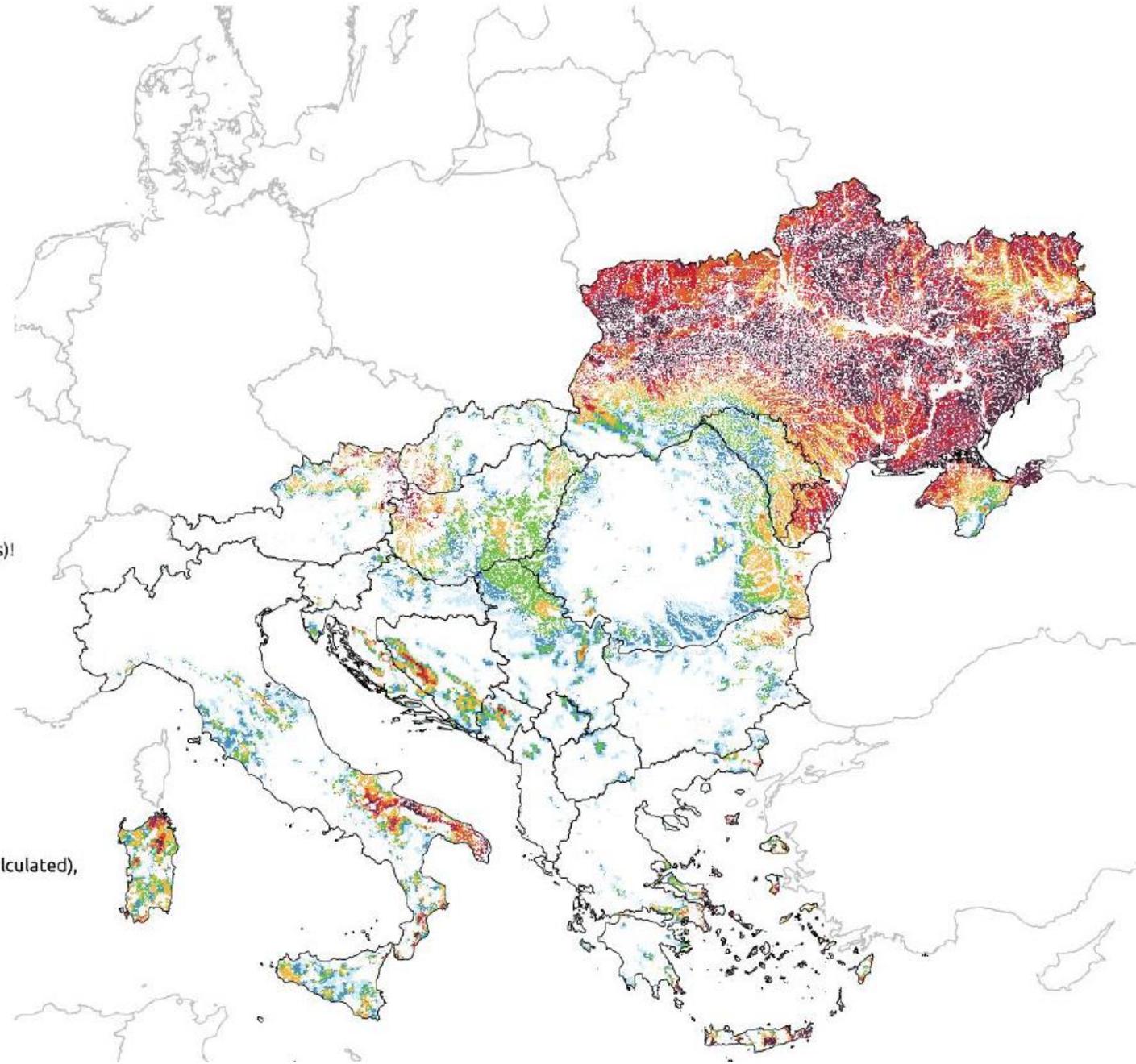


Figure 3.10 Wind map of CESEC region, indicating site conditions (full load hours) for offshore wind

Offshore wind

Used power curve: Vestas V164/8000 (150 m)
Assumed total efficiency: 85%

Wind taken from COSMO-REA6 1995 – 2019/08

FLH: full load hours

☐ CESEC countries

☐ Other countries

☐ Exclusive Economic Zones

⊗ Protected areas (WDPA)

Avg. FLH V164/8000 at 150m (85% eff.)

☐ ≤ 1600 FLH

☐ 1600 - 2100 FLH

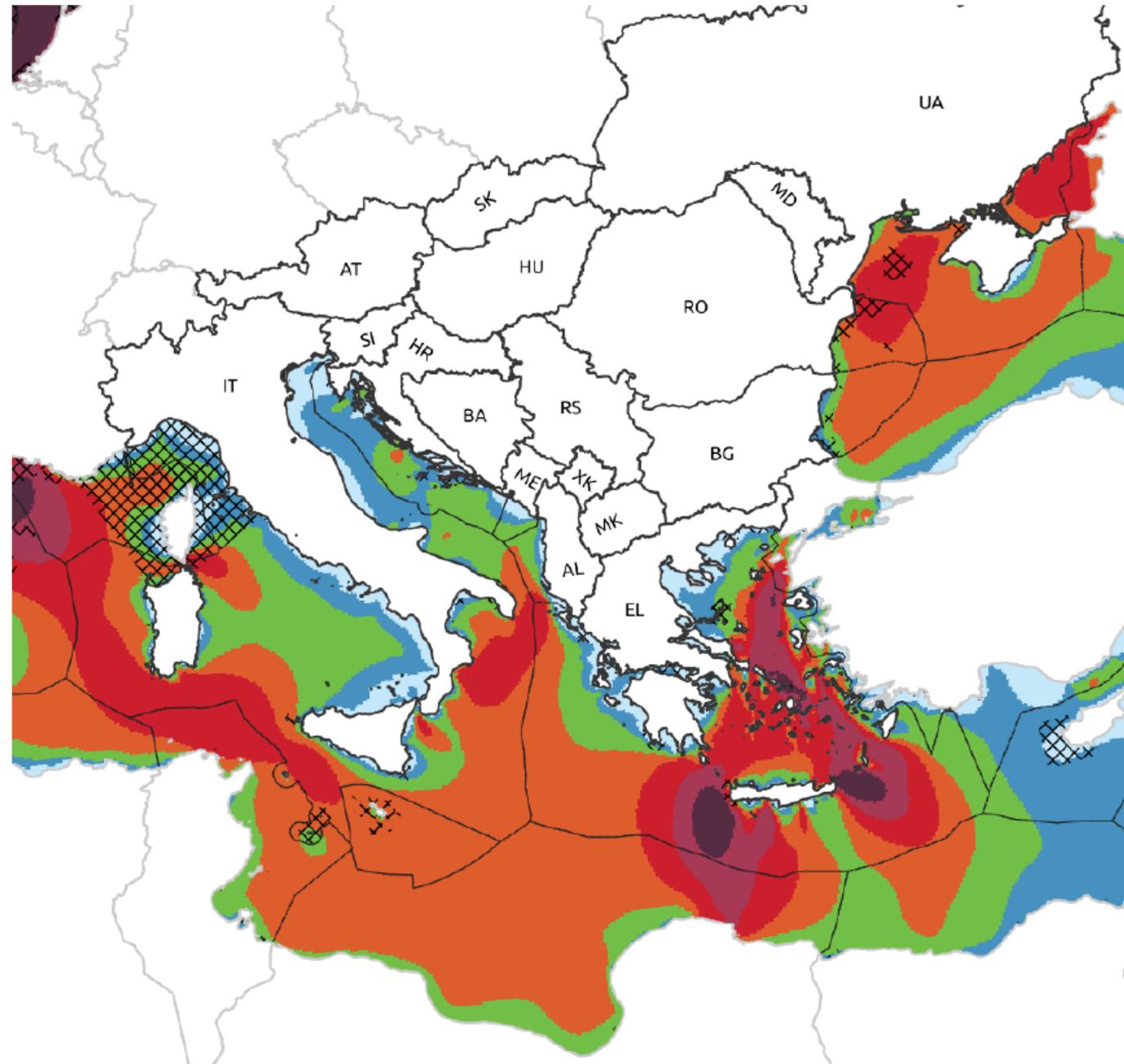
☐ 2100 - 2600 FLH

☐ 2600 - 3000 FLH

☐ 3000 - 3600 FLH

☐ 3600 - 4200 FLH

☐ > 4200 FLH



National Funding Agencies (Relevant R&I Programmes [in Energy [Systems]]) S- and SE-Europe

Bulgaria (BG), Croatia (HR), Cyprus, Greece, Hungary (HU), Italy (IT), Malta, Romania (RO), Slovenia (SI)

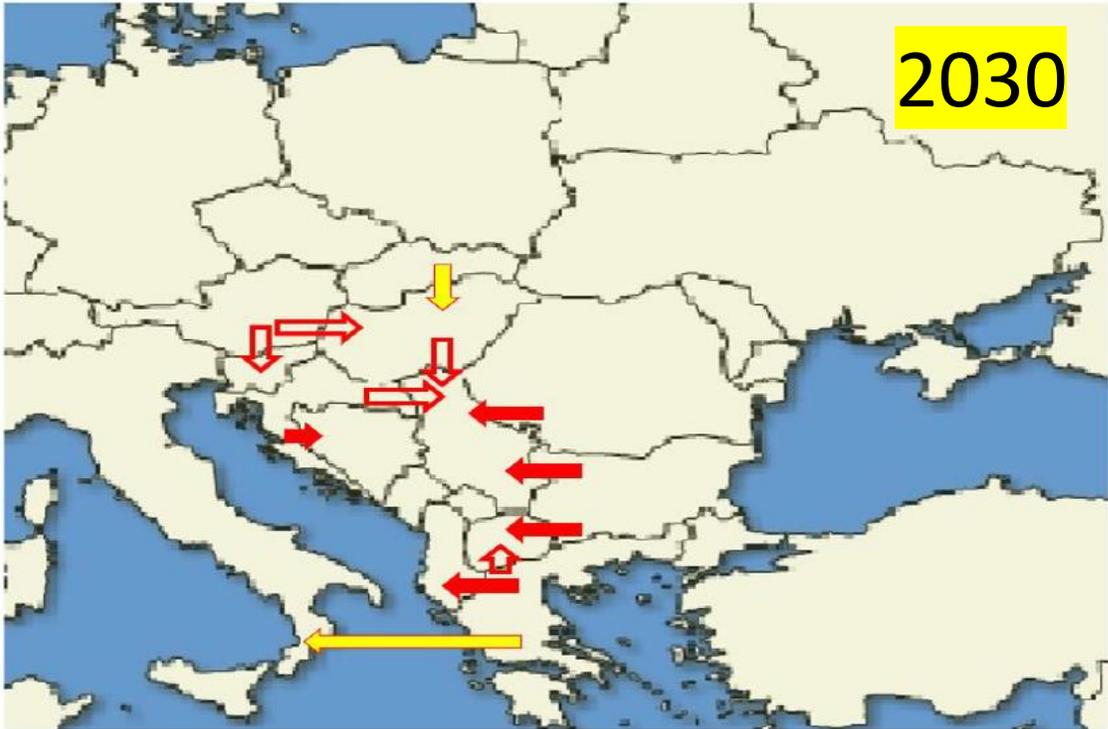
- CYPRUS – Research and Innovation Foundation (RIF)
- GREECE – GENERAL SECRETARIAT FOR RESEARCH AND INNOVATION (GSRI)
- HUNGARY – National Research, Development and Innovation Office (NKFIH)
- ITALY
 - Ministero Dell'universita' E Della Ricerca (MUR)
 - Ministero dello sviluppo economico (MISE)
- MALTA – Malta Council for Science and Technology (Programme Manager) (MCST)
- ROMANIA – Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI)

National Funding Agencies in Europe (R&I Programmes on Energy Systems)

Source: CETP Call 2022

1. AUSTRIA – Austrian Research Promotion Agency (FFG)
2. BELGIUM
 - FLANDERS – Fonds Innovatie en Ondernemen (FIO/VLAIO)
 - WALLONIA – Service Public de Wallonie (SPW)
3. CANADA/ALBERTA REGION - Emissions Reduction Alberta (ERA)
4. CYPRUS – Research and Innovation Foundation (RIF)
5. CZECH REPUBLIC – Technology Agency of the Czech Republic (TA CR)
6. DENMARK
 - Energy Technology Development and Demonstration Programme (EUDP)
 - Innovation Fund Denmark (IFD)
7. ESTONIA
 - Estonian Research Council (ETAG)
 - Ministry of Economic Affairs and Communications (MKM)
8. FINLAND – Innovaatorahoituskeskus Business Finland (BF)
9. FRANCE
 - Agence de la transition écologique – (ADEME)
 - Agence Nationale de la Recherche (ANR)
 - FRANCE/REGION PAYS DE LA LOIRE - Pays de la Loire Region Council (RPL)
10. GERMANY
 - Federal – Forschungszentrum Jülich GmbH, Project Management Jülich (FZJ/PtJ) on behalf of BMWK
 - NORTH RHINE-WESTPHALIA – Forschungszentrum Jülich GmbH, Projektträger Jülich (FZJ/PtJ) on behalf of MWIKE
 - SAXONY – Saxon State Ministry for Science, Culture and Tourism (SMWK)
11. GREECE – GENERAL SECRETARIAT FOR RESEARCH AND INNOVATION (GSRI)
12. HUNGARY – National Research, Development and Innovation Office (NKFIH)
13. ICELAND – The Icelandic Centre for Research (RANNIS)
14. IRELAND
 - Geological Survey Ireland (GSI)
 - Sustainable Energy Authority of Ireland (SEAI)
15. ISRAEL – Ministry of Energy (MoE)
16. ITALY
 - Ministero Dell’universita’ E Della Ricerca (MUR)
 - Ministero dello sviluppo economico (MISE)
17. LATVIA – LATVIJAS ZINĀTNES PADOME (LZP)
18. LITHUANIA – Ministry of Energy of the Republic of Lithuania (ENMIN)
19. MALTA – Malta Council for Science and Technology (Programme Manager) (MCST)
20. THE NETHERLANDS
 - Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)
 - Rijksdienst voor Ondernemend Nederland (RVO)
21. NORWAY – The Research Council of Norway – (RCN)
22. POLAND – The National Centre for Research and Development (Narodowe Centrum Badań i Rozwoju,
23. NCBR)
24. PORTUGAL – FUNDAÇÃO PARA A CIÊNCIA E A TECNOLOGIA I.P. (FCT)
25. ROMANIA – Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI)
26. SPAIN
 - Agencia Estatal de Investigación (AEI) SPAIN – The Centre for the Development of Industrial Technology (CDTI)
 - ASTURIAS – Fundación para el fomento en Asturias de la Investigación Científica Aplicada y la Tecnología (FICYT)
 - BASQUE REGION – Consejería De Desarrollo Económico, Sostenibilidad Y Medio Ambiente. Eusko Jaurilaritza-Gobierno Vasco. (EUSKADI)
 - BASQUE REGION – ENTE VASCO DE LA ENERGÍA (EVE)
 - CANTABRIA – Regional Development Agency of Cantabria (SODERCAN)3
27. SWEDEN – Swedish Energy Agency (SWEA)
28. SWITZERLAND
 - Federal Department of the Environment, Transport, Energy and Communications (DETEC- SFOE)
 - SWISS NATIONAL SCIENCE FOUNDATION, (SNSF)
29. TÜRKIYE – The Scientific and Technological Research Council of Türkiye (TUBITAK)
30. UNITED KINGDOM/SCOTLAND – Scottish Enterprise (SE)

Figure 4.4 List of commercially congested borders with existing infrastructure, 2030



- ← Utilisation is **more than 75%** in at least three, and **more than 90%** in one RES scenario
- ← Utilisation is **more than 75%** in at least three RES scenarios
- ← Utilisation is **more than 75%** in at least one RES scenario

Figure 4.6 List of commercially congested borders with existing infrastructure, 2050



- ← Utilisation is **more than 75%** in at least three, and **more than 90%** in one RES scenario
- ← Utilisation is **more than 75%** in at least three RES scenarios
- ← Utilisation is **more than 75%** in at least one RES scenario

Horizon Europe Work Programs (draft) 23/24 and links to **ETIP SNET HLUCs**

(Cluster 5)

- Cross-sectoral solutions for the climate transition (**HLUC 1**)
- Clean and competitive solutions for all transport modes (**HLUC 8**)
- Transformation towards the climate-neutrality (**HLUC 3, 4, 5, 6**)
- Sustainable, secure and competitive energy supply (**HLUC 2, 3, 4, 6, 7**)
- Efficient, sustainable and inclusive use of energy (**HLUC 5, 9**)
- Safe, resilient transport and smart mobility services for passengers and goods (**HLUC 8, 5, 3, 9**)

(Cluster 3)

- Increased cybersecurity (**HLUC 7**)
- Disaster-resilient society for Europe (**HLUC 2, 5, 7**)

(Cluster 4)

- A human-centred and ethical development of digital and industrial technologies (**HLUC 5, 2**)

(Cluster 6)

- Innovative governance, environmental observations and digital solutions in support of the green deal (**HLUC 3, 5**)

- **HLUC 1**: Optimal Cross sector Integration and Grid Scale Storage
- **HLUC 2**: Market-driven TSO–DSO–System User interactions
- **HLUC 3**: Pan European Wholesale Markets, Regional and Local Markets
- **HLUC 4**: Massive Penetration of RES into the transmission and distribution grid
- **HLUC 5**: One stop shop and Digital Technologies for market participation of consumers (citizens) at the centre
- **HLUC 6**: Secure operation of widespread use of power electronics at all systems levels
- **HLUC 7**: Enhance System Supervision and Control including Cyber Security
- **HLUC 8**: Transportation Integration & Storage
- **HLUC 9**: Flexibility provision by Building, Districts and Industrial Processes

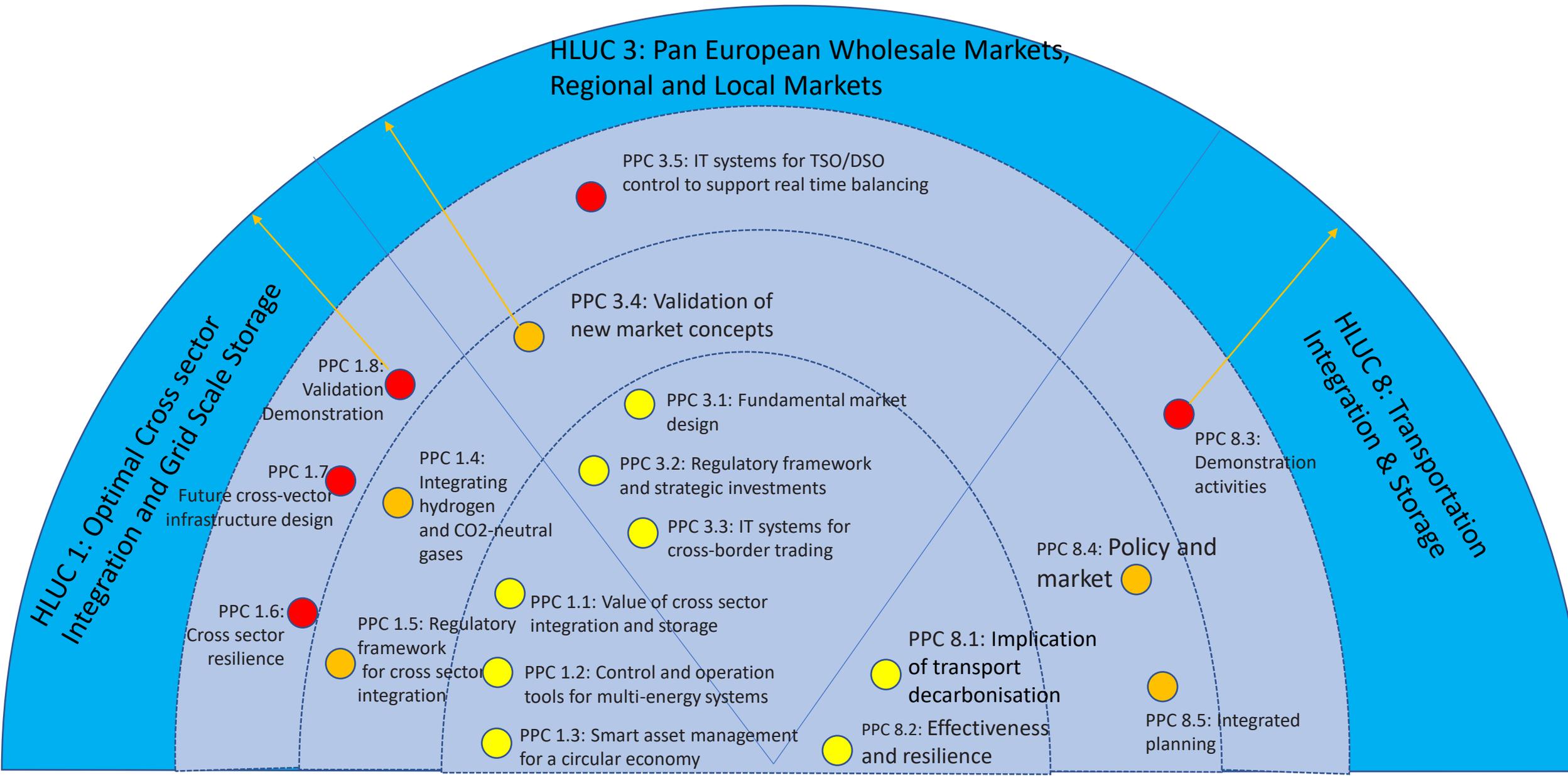
ETIP SNET R&I ROADMAP 2022-2031 (9 HLUC and 57 PPCs)

- HLUC 1: Optimal Cross sector Integration and Grid Scale Storage
- HLUC 2: Market-driven TSO–DSO– System User interactions
- HLUC 3: Pan European Wholesale Markets, Regional and Local Markets
- HLUC 4: Massive Penetration of RES into the transmission and distribution grid
- HLUC 5: One stop shop and Digital Technologies for market participation of consumers (citizens) at the centre
- HLUC 6: Secure operation of widespread use of power electronics at all systems levels
- HLUC 7: Enhance System Supervision and Control including Cyber Security
- HLUC 8: Transportation Integration & Storage
- HLUC 9: Flexibility provision by Building, Districts and Industrial Processes

HLUC 3: Pan European Wholesale Markets, Regional and Local Markets

HLUC 1: Optimal Cross sector Integration and Grid Scale Storage

HLUC 8: Transportation Integration & Storage



Later IPs

ETIP SNET IP 2026+

ETIP SNET IP 2024+

ETIP SNET IP 2022-2025

ETIP SNET IP 2022-2025

ETIP SNET IP 2024+

ETIP SNET IP 2026+

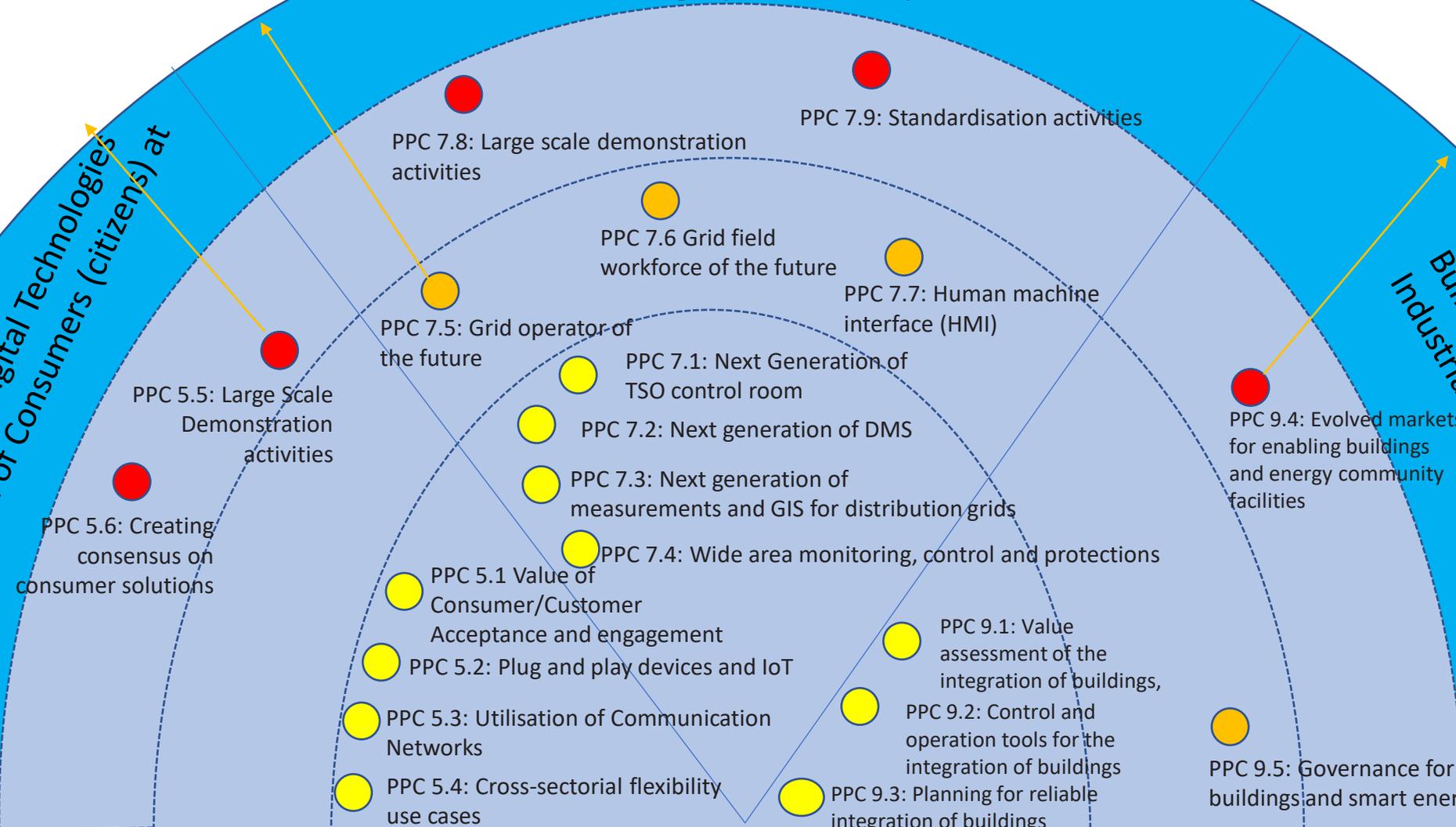
Later IPs



HLUC 7: Enhance System Supervision and Control including Cyber Security

HLUC 5: One-Stop Shop and Digital Technologies for Market Participation of Consumers (citizens) at the Centre

HLUC 9: Flexibility provision by Building, Districts and Industrial Processes



PPC 7.8: Large scale demonstration activities

PPC 7.9: Standardisation activities

PPC 7.6 Grid field workforce of the future

PPC 7.7: Human machine interface (HMI)

PPC 7.5: Grid operator of the future

PPC 7.1: Next Generation of TSO control room

PPC 5.5: Large Scale Demonstration activities

PPC 7.2: Next generation of DMS

PPC 9.4: Evolved markets for enabling buildings and energy community facilities

PPC 5.6: Creating consensus on consumer solutions

PPC 7.3: Next generation of measurements and GIS for distribution grids

PPC 7.4: Wide area monitoring, control and protections

PPC 5.1 Value of Consumer/Customer Acceptance and engagement

PPC 9.1: Value assessment of the integration of buildings,

PPC 5.2: Plug and play devices and IoT

PPC 9.2: Control and operation tools for the integration of buildings

PPC 5.3: Utilisation of Communication Networks

PPC 9.3: Planning for reliable integration of buildings

PPC 5.4: Cross-sectorial flexibility use cases

PPC 9.5: Governance for an effective integration of buildings and smart energy communities

Later IPs

ETIP SNET IP 2026+

ETIP SNET IP 2024+

ETIP SNET IP 2022-2025

ETIP SNET IP 2022-2025

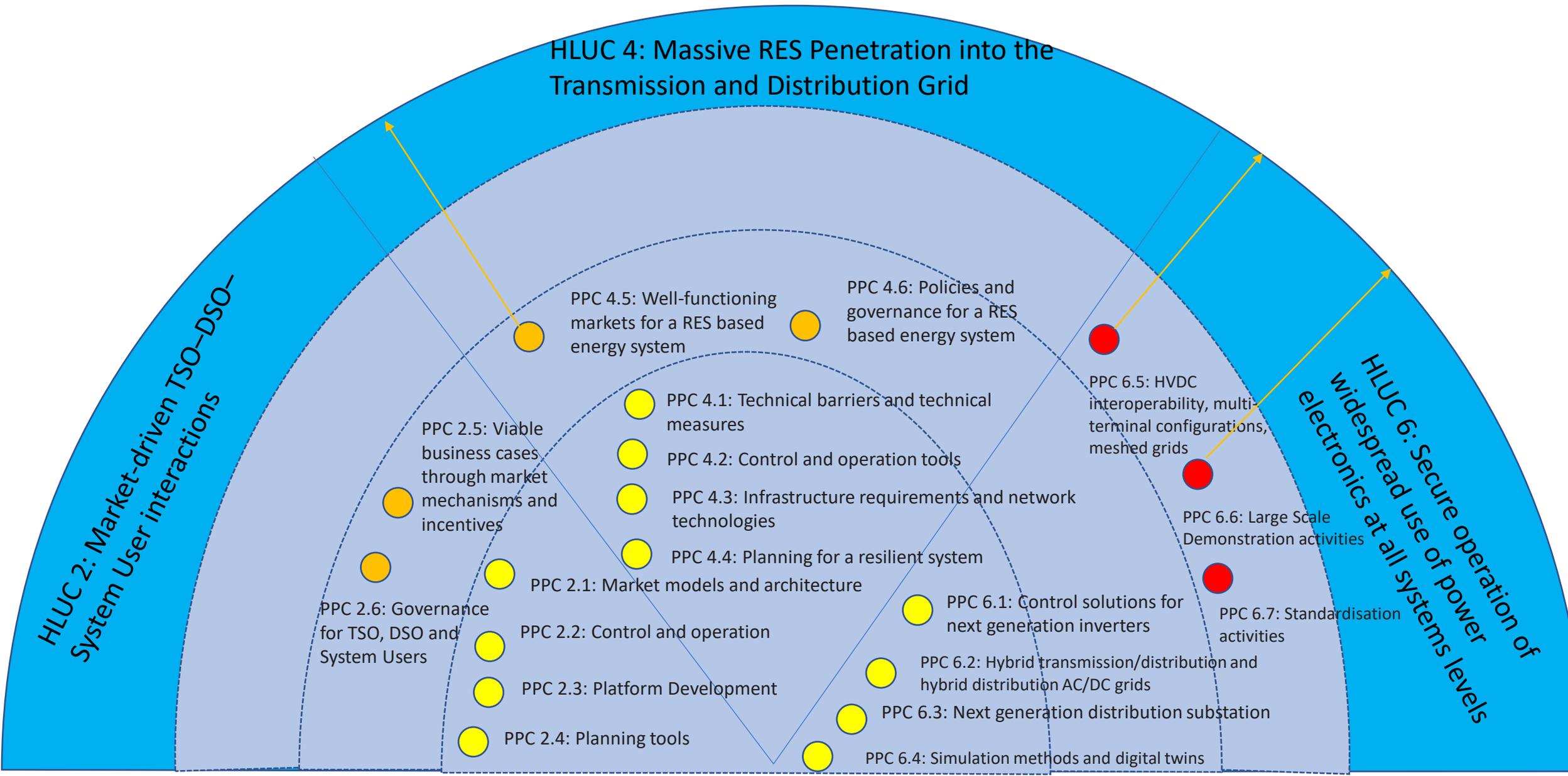
ETIP SNET IP 2024+

ETIP SNET IP 2026+

Later IPs



HLUC 4: Massive RES Penetration into the Transmission and Distribution Grid



Later IPs	ETIP SNET IP 2026+	ETIP SNET IP 2024+	ETIP SNET IP 2022-2025	ETIP SNET IP 2022-2025	ETIP SNET IP 2024+	ETIP SNET IP 2026+	Later IPs

Table 2.1 Overview on 2030 targets for RES (as defined in NECPs) and for RES-E (NECP ambition and assumptions taken in modelling)

Overview on 2030 targets for RES and RES-E Country	RES share ¹	RES-E share ²			
	NECP Target 2030	Ambition indicated in NECP	Ambition assumed in modelling		Status Quo 2019
			RefRES scenarios (National Planning)	HighRES scenarios (EU Green Deal Needs)	
Albania			99%	101%	88%
Austria	46%	92%	92%	97%	75%
Bosnia and Herzegovina			58%	62%	45%
Bulgaria	27%	30%	37%	39%	24%
Croatia	36%	64%	69%	73%	50%
Greece	35%	61%	71%	79%	31%
Hungary	21%	21%	24%	28%	10%
Italy	30%	55%	58%	62%	35%
Kosovo*			18%	21%	5%
Moldova			19%	19%	3%
Montenegro			62%	65%	53%
North Macedonia	38%	66%	32%	35%	24%
Romania	31%	49%	58%	61%	42%
Serbia			40%	43%	30%
Slovakia	19%	27%	29%	30%	22%
Slovenia	27%	43%	46%	49%	33%
Ukraine			16%	19%	2%
CESEC			ca. 49%	ca. 53%	32%

Note: 1 ... Share of renewable energies in gross final energy demand,

2 ... Share of electricity generation from renewables in gross electricity demand

Figure 3.6 Overview of assessed PV electricity potentials in GWh

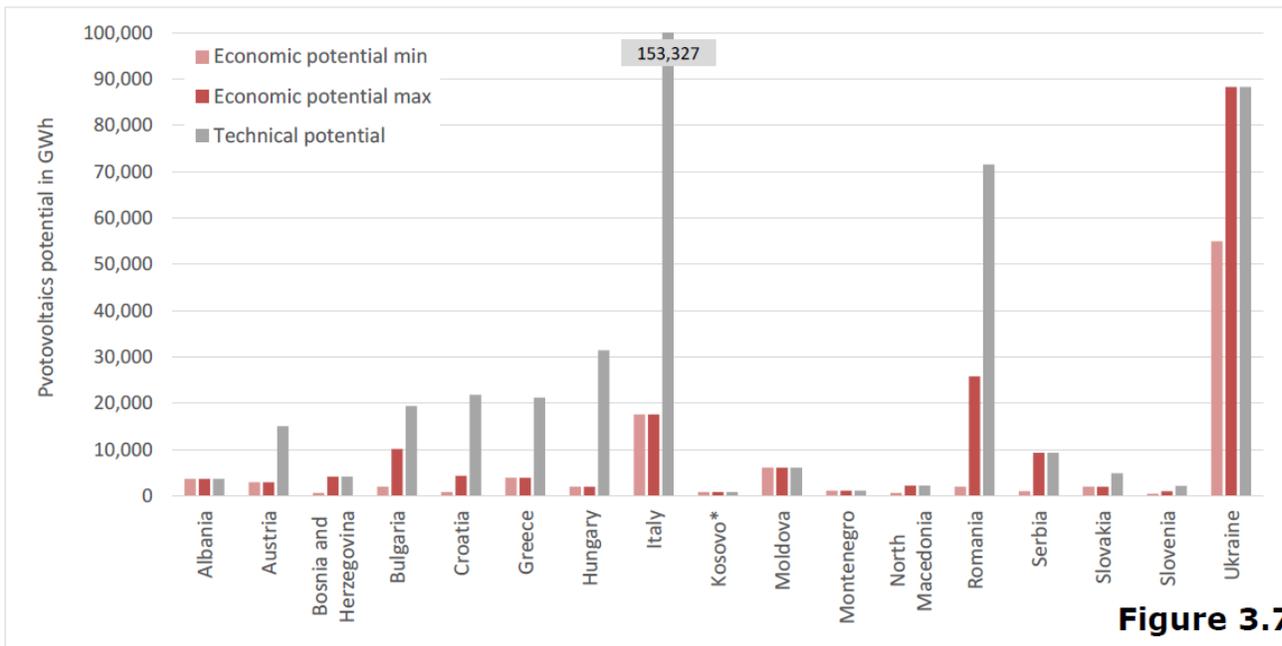
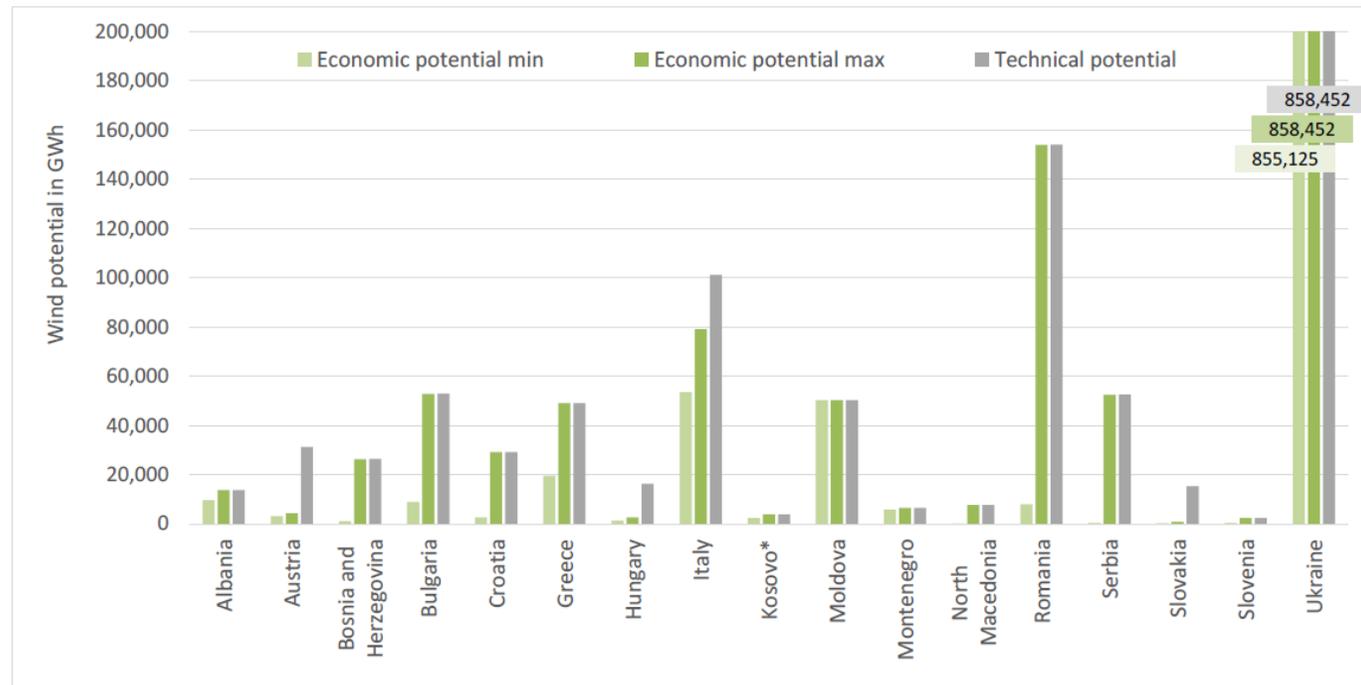


Figure 3.7 Overview on assessed wind onshore electricity potentials in GWh





ENLIT: ETIP SNET Regional Workshop, Dec 1, 2022



TRINITY / HORIZON 2020
Álvaro Nofuentes



TRINITY



TRINITY



SCENARIOS

South-Eastern Europe



SCENARIOS

Increased reliability, security and coordination of the Transmission System Operators



SCENARIOS

Renewable Energy Sources in South-Eastern Europe

- Replication scenario
- Demonstration scenario





HLUC relevance for region xxx / program xxx / project xxx



<i>project / program</i>	HLUC 1	HLUC 2	HLUC 2	HLUC 3	HLUC 4	HLUC 5	HLUC 6	HLUC 7	HLUC 8	HLUC 9	other
TRINITY	n/a	●		●●●	●●●	n/a	●	●	n/a	n/a	

- extremely relevant
- highly relevant
- relevant to some degree
- n/a – don't know



Key findings from project / program xxx



<i>project / program</i>	finding(s)	relevant for HLUC(s)
TRINITY	<ul style="list-style-type: none"> In some countries, RES producers aren't allowed to get incomes from GoO if receiving other incentives such as FiT. 	4
TRINITY	<ul style="list-style-type: none"> To optimize the installation of new RES plants according to grid capacity limits. 	4,7
TRINITY	<ul style="list-style-type: none"> Preliminary demo of ID Market with 15mins granularity (Serbia-Hungary) 	3



Proposals from project / program xxx



<i>project / program</i>	proposal(s) / recommendation(s)	relevant for HLUC(s)
TRINITY	<ul style="list-style-type: none"> Repowering process of RES plants. 	4
TRINITY	<ul style="list-style-type: none"> GoO market design to allow higher incomes for RES installation (eg. facilitate participation of medium/small actors). 	3, 4



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ELAND (H2020)

Isidoros Kokos (Intracom Telecom)



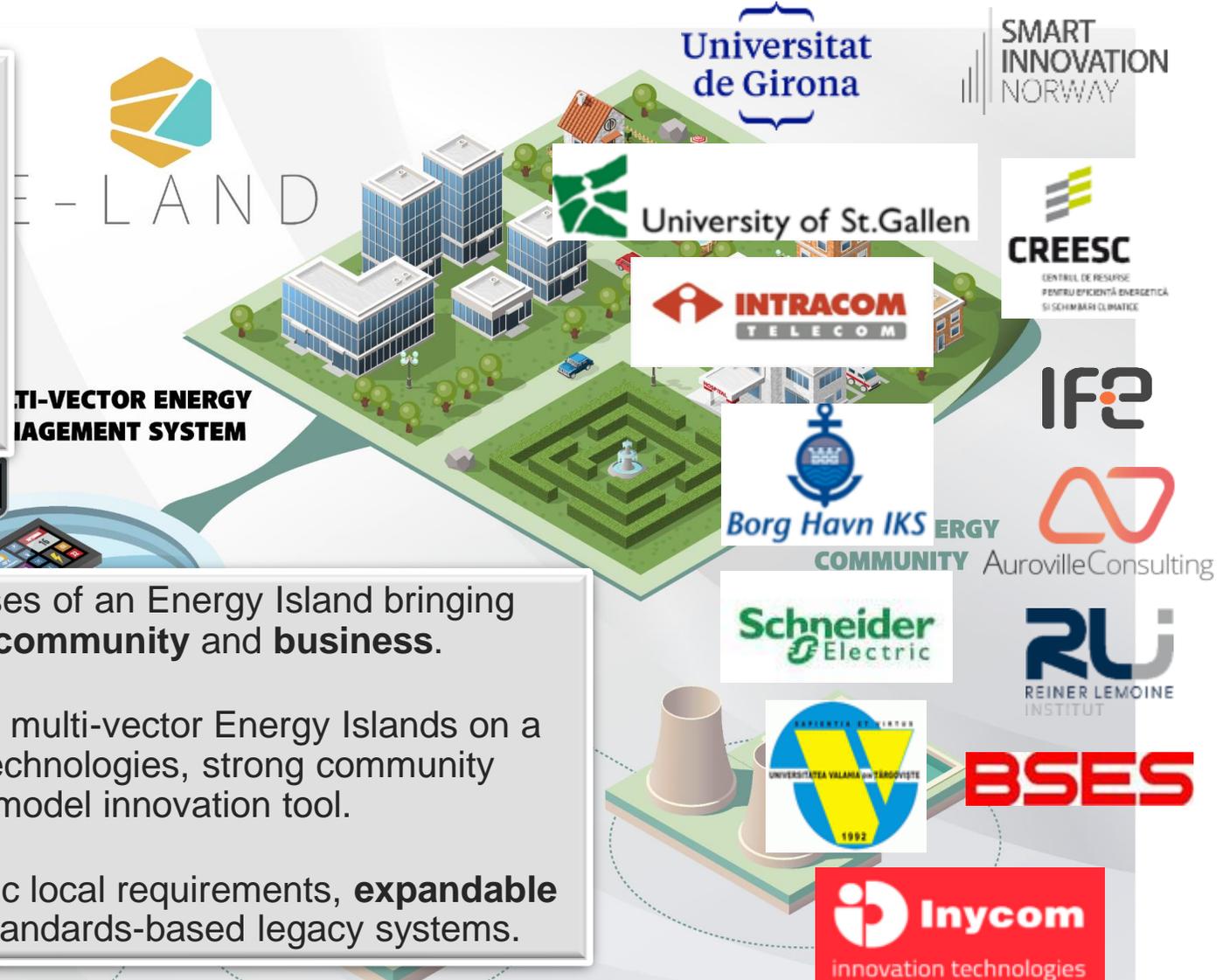
E-LAND in brief

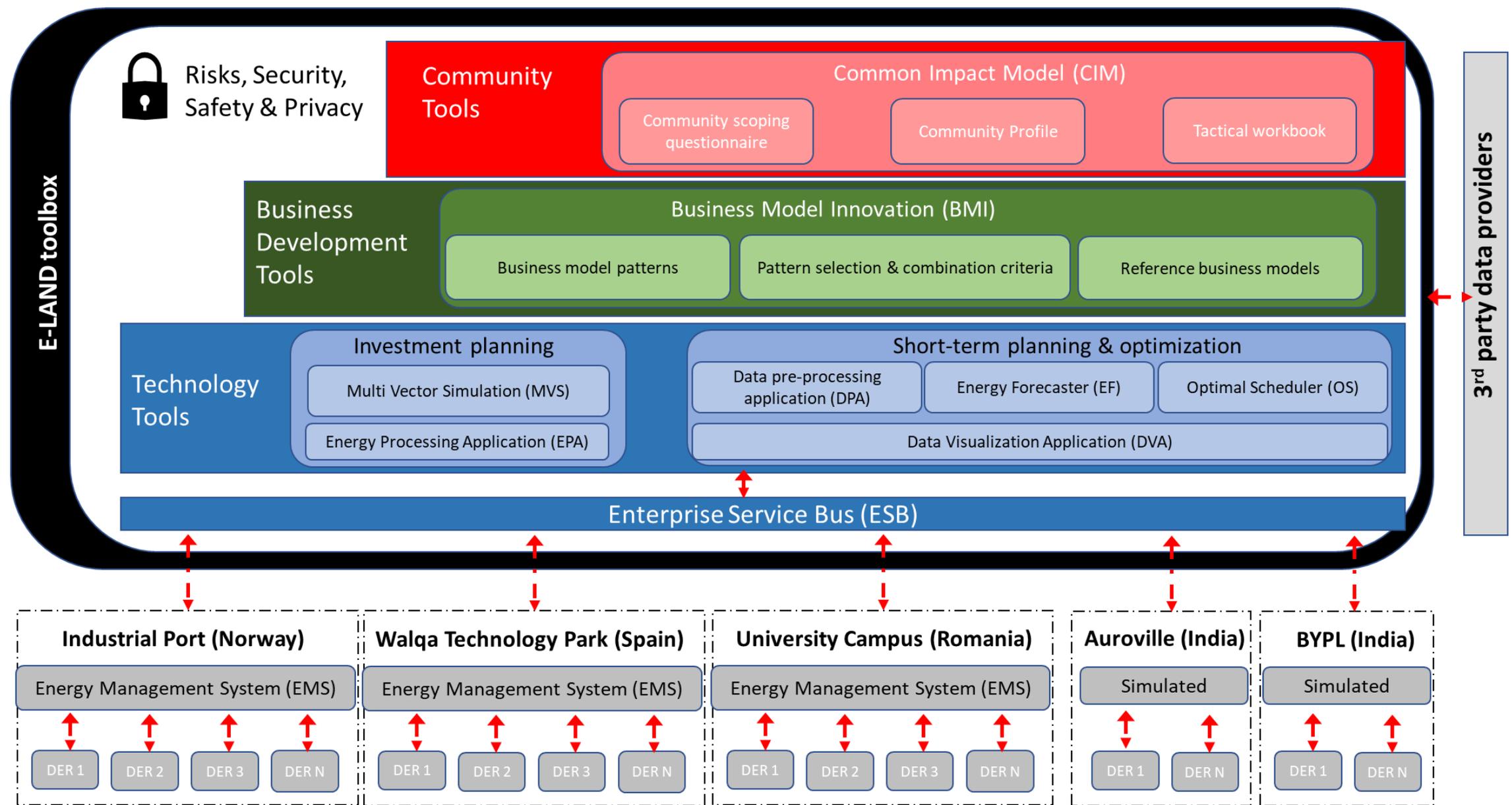
- H2020 Innovation Action
- December 2018 - November 2022 (48 Months)
- 6.2 M€ project with 5.4 M€ EC funding
- 11 European partners – 2 Indian partners
- 3 pilots in Europe and 2 simulated pilots in India
- Open innovation through collaboration with stakeholders and citizens connected to the pilots from the beginning of the project

E-LAND aims to transform energy related processes of an Energy Island bringing innovation across three planes: **technology**, **community** and **business**.

A **toolbox** consisting of tools to build decarbonised, multi-vector Energy Islands on a foundation of advanced ICT and data analytics technologies, strong community engagement tools and a solid business model innovation tool.

The toolbox is **modular** and **customisable** to specific local requirements, **expandable** to incorporate new tools and **interoperable** with standards-based legacy systems.







HLUC relevance for ELAND H2020



	HLUC 1	HLUC 2	HLUC 3	HLUC 4	HLUC 5	HLUC 6	HLUC 7	HLUC 8	HLUC 9
Overall	●●●		●	●	●			●	●●●
Romanian Pilot	●●●		●	●	●				●●●
Spanish Pilot	●●●		●	●	●			●	●●●
Norwegian Pilot	●●●		●	●	●			●	●●●

- extremely relevant
- highly relevant
- relevant to some degree
- n/a – don't know



Key findings from ELAND H2020



ELAND Pilot	Finding(s)	Relevant for HLUC(s)
Romanian	<p>Operational Co-Optimisation: Electricity (incl. battery, PV), Gas & Heat (Gas Boiler, Heat pump, Chiller, Solar Thermal, Storage)</p> <p>Future planning: PV, Heat Pump replacement, micro-hydro power</p> <p>Outcomes: Solutions/tools developed/validated in pilot environment on the value of cross-sector optimization leveraging RES with positive results; increase energy efficiency & decarbonisation, reduce energy costs</p>	<p>1, 9 [1.1, 1.2, 9.1 9.2]</p>
Spanish	<p>Operational Co-Optimisation: Electricity (incl. Wind, PV), Heat (Heat pump), Transport (EV charging), Hydrogen Storage</p> <p>Future planning: PV, EV chargers, battery, biomass, solar thermal</p> <p>Outcomes: idem</p>	<p>1, 8, 9 [1.1, 1.2, 9.1 9.2]</p>
Norwegian	<p>Operational Co-Optimisation: Electricity (incl. PV and storage), Heat (Heat pump, solar thermal), Transport (EV charging) and industrial processes (cranes movement) [1.1, 1.2, 9.2]</p> <p>Future planning: ship-to-shore el. conn., heavy duty EVs, (locally produced H₂-to-ship)</p> <p>Outcomes: idem</p>	<p>1, 8, 9 [1.1, 1.2, 9.1 9.2]</p>
All	Framework for community engagement	?



Proposals from ELAND H2020



<i>ELAND</i>	Proposal(s) / Recommendation(s)	relevant for HLUC(s)
Romanian Energy Market	<ul style="list-style-type: none"> • Incentivize RES investments (prices, taxes) • Adopt legislation for flexibility • Better definition on Energy Storage in regulation • Incentivize/Finance investment on energy infrastructure in public buildings and assign/train personel as energy managers • Adopt measures to address energy poverty • National Energy Strategy (SER) might be able to address some of these topics 	1, 3,4 9



CENTER FOR
THE STUDY OF
DEMOCRACY

The Great Energy and Climate Security Divide

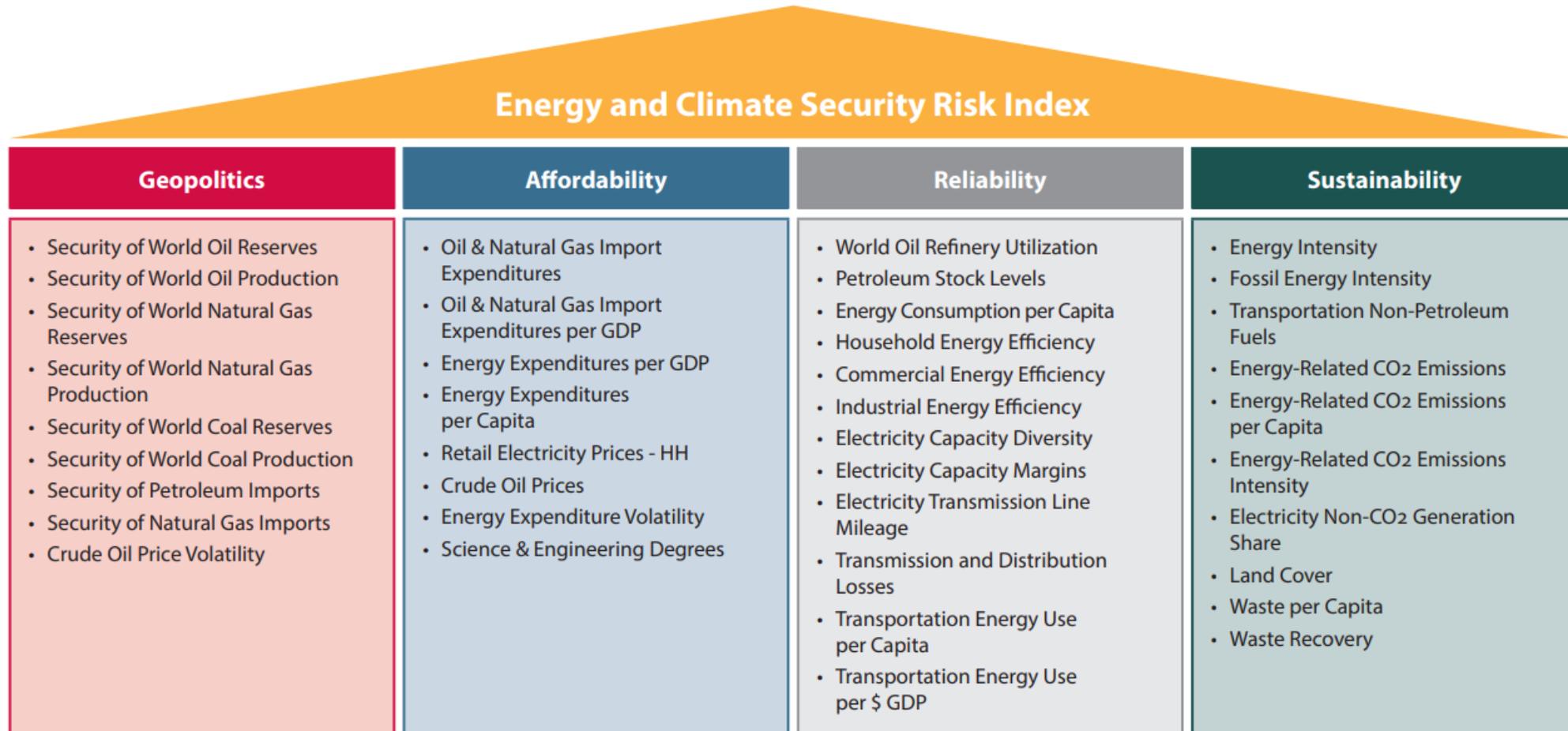
Accelerated Green Transition vs. the Kremlin Playbook in Europe

Martin Vladimirov

30/11/2022

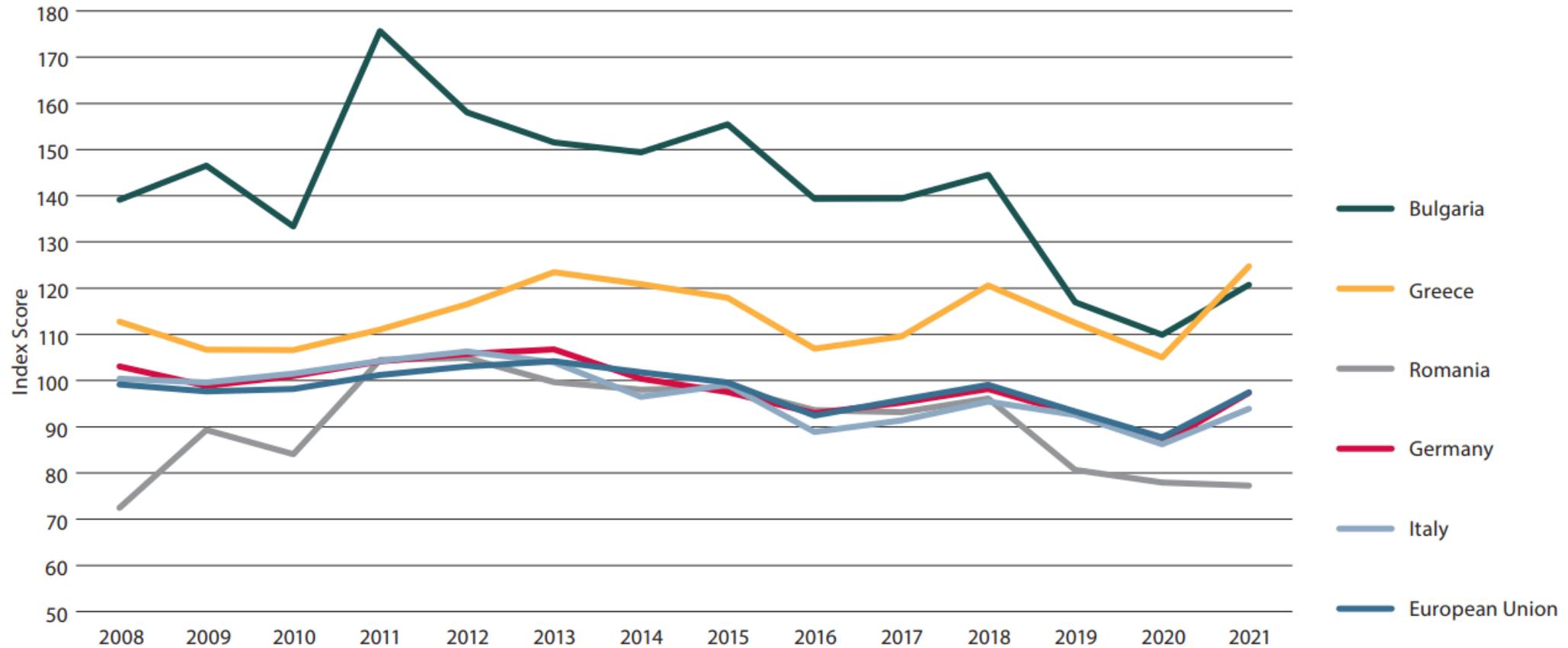


The Dimensions of Energy and Climate Security



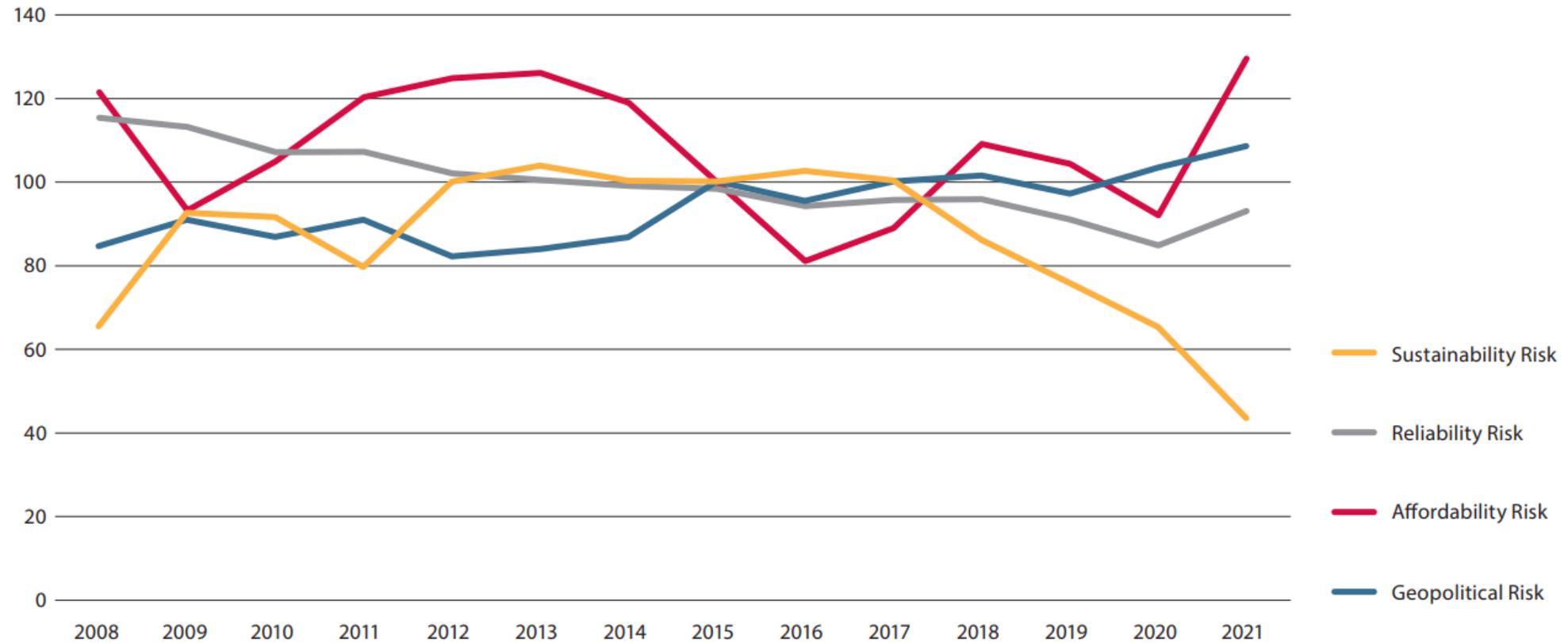
Source: CSD.

Evolution of Energy and Climate Security Risks in the EU-27 and Selected European Countries (2008-2021)



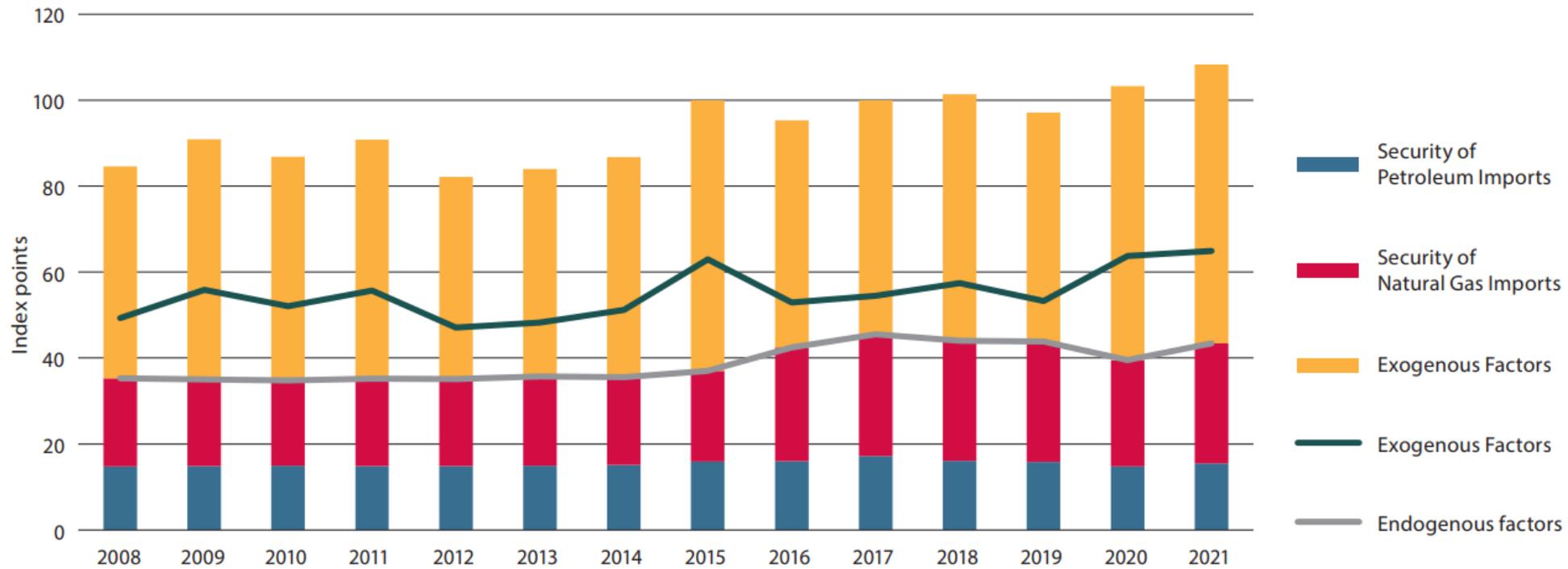
Source: CSD.

Deterioration of the EU's Energy and Climate Security Risks on the Eve of the Russian Invasion of Ukraine



Source: CSD.

Key Factors for the Geopolitical Risks to the EU's Energy and Climate Security

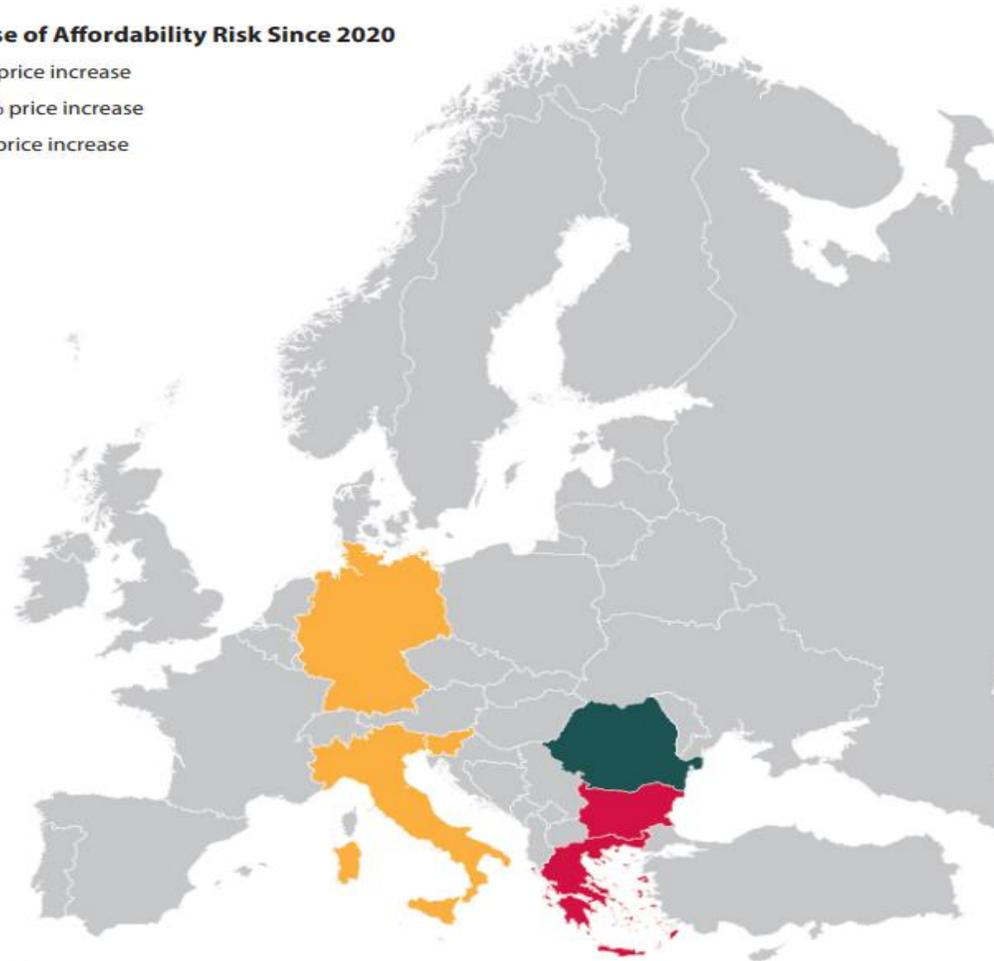


Source: CSD.

Affordability Risks Surging Across Europe Since 2021

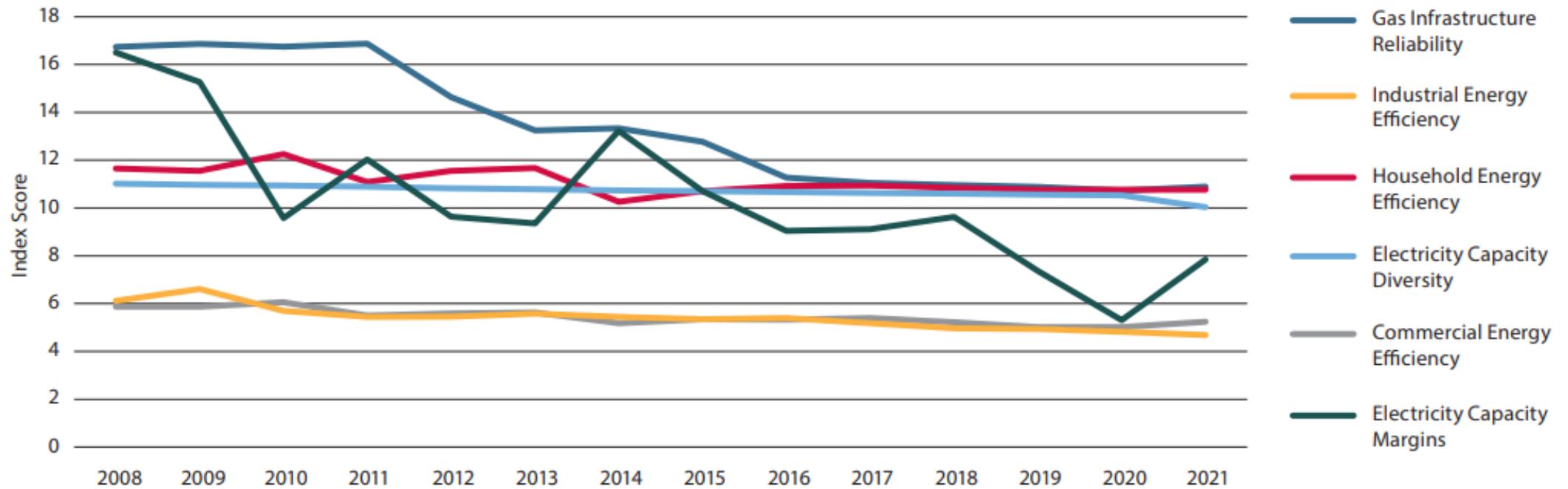
% Increase of Affordability Risk Since 2020

- 0 – 25% price increase
- 25 – 50% price increase
- > 100% price increase



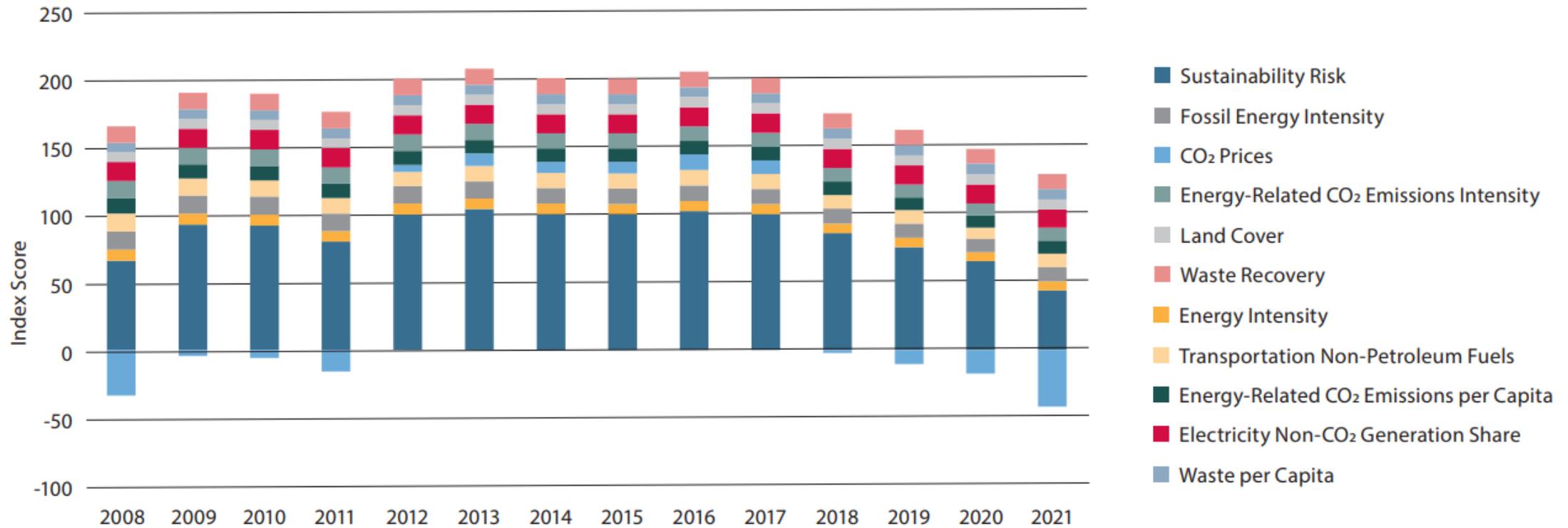
Source: CSD.

Key Factors for the Decline of Reliability Risks in the EU but Russian invasion upends the situation



Source: CSD based on Eurostat Data.

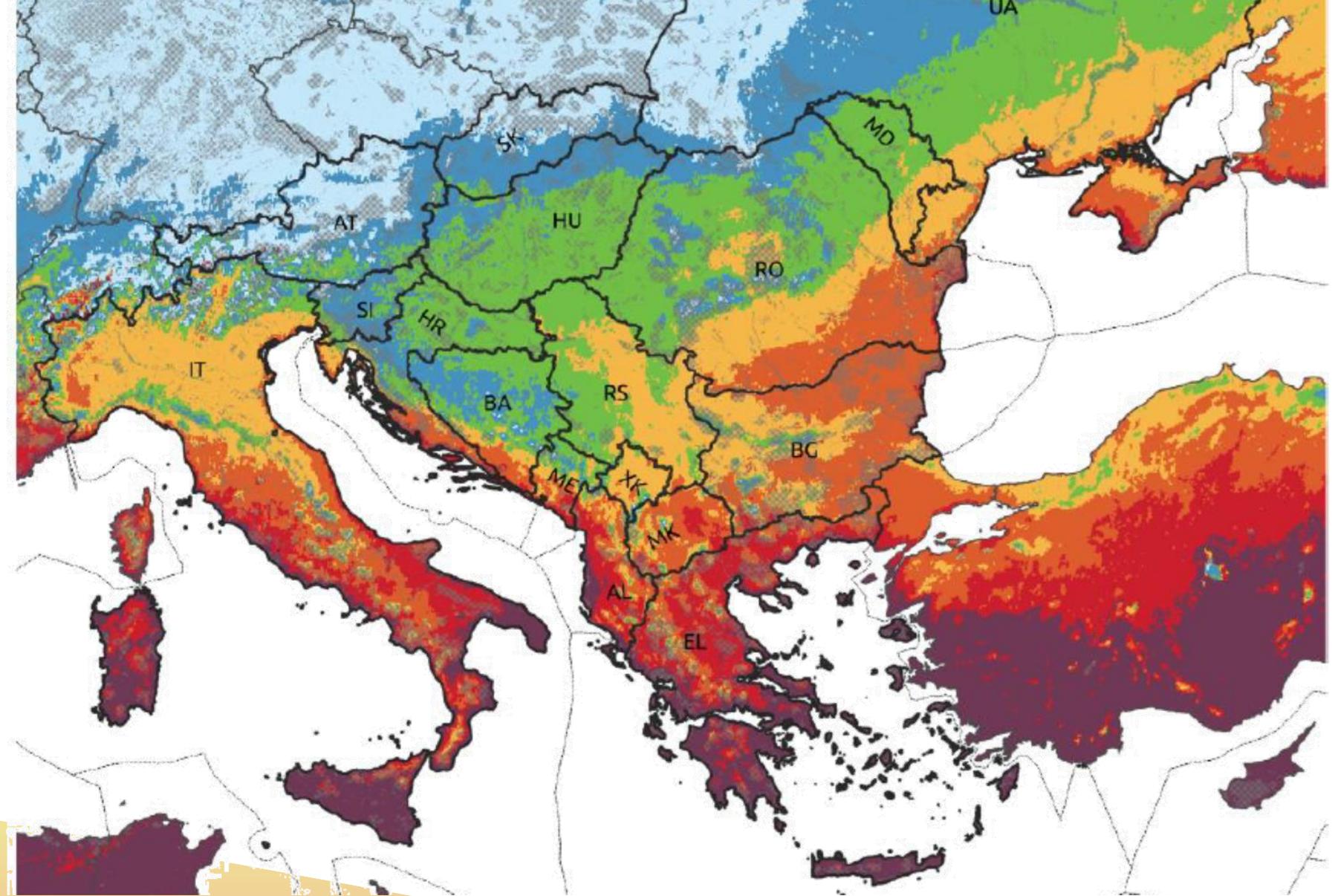
Decline of Sustainability Risks due to Rising CO2 Prices and Energy Efficiency Improvements



Source: CSD.

Region

Bulgaria
Croatia
Cyprus
Greece
Hungary
Italy
Malta
Romania
Slovenia



High Level Use Cases

HLUC 1: Optimal Cross sector Integration and Grid Scale Storage

HLUC 2: Market-driven TSO–DSO–System User Interactions

HLUC 3: Pan European Wholesale Markets, Regional and Local Markets

HLUC 4: Massive Penetration of RES into the transmission and distribution grid

HLUC 5: One stop shop and Digital Technologies for market participation of consumers (citizens) at the center



HLUC 6: Secure operation of widespread use of power electronics at all systems levels

HLUC 7: Enhance System Supervision and Control including Cyber Security

HLUC 8: Transportation Integration & Storage

HLUC 9: Flexibility provision by Building, Districts and Industrial Processes

Exploring further:

**The Energy & Climate Security Risk
Index**



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DEMOCRACY

Thank you!

Martin Vladimirov

Director, Energy and Climate Program

Center for the Study of Democracy

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ENLIT: ETIP SNET Regional Workshop, Dec 1, 2022



DISTRHEAT
Mirko Morini



Our scope: implement and demonstrate a **smart controller** for a multi-energy plant that feeds a small-scale district heating and cooling network

Application

Hospital of Cona

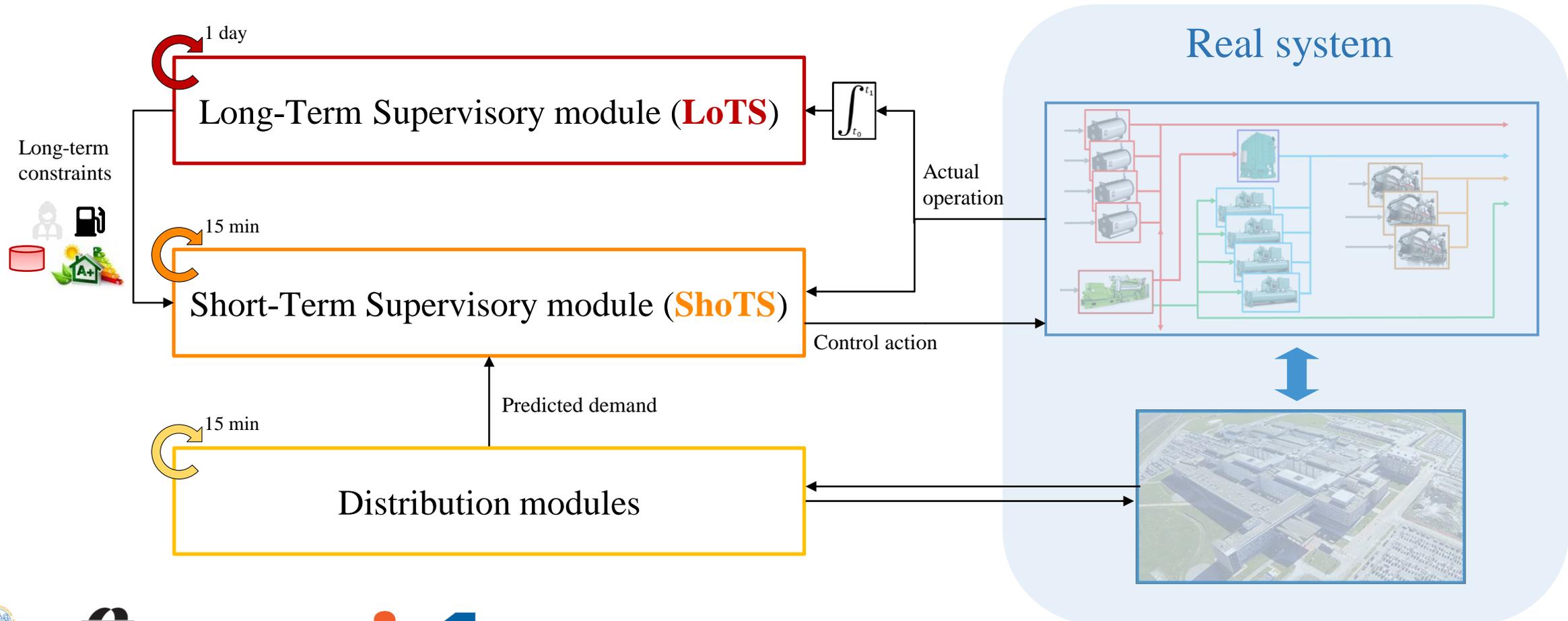
- Small-scale district heating and cooling
- Multi-energy conversion system



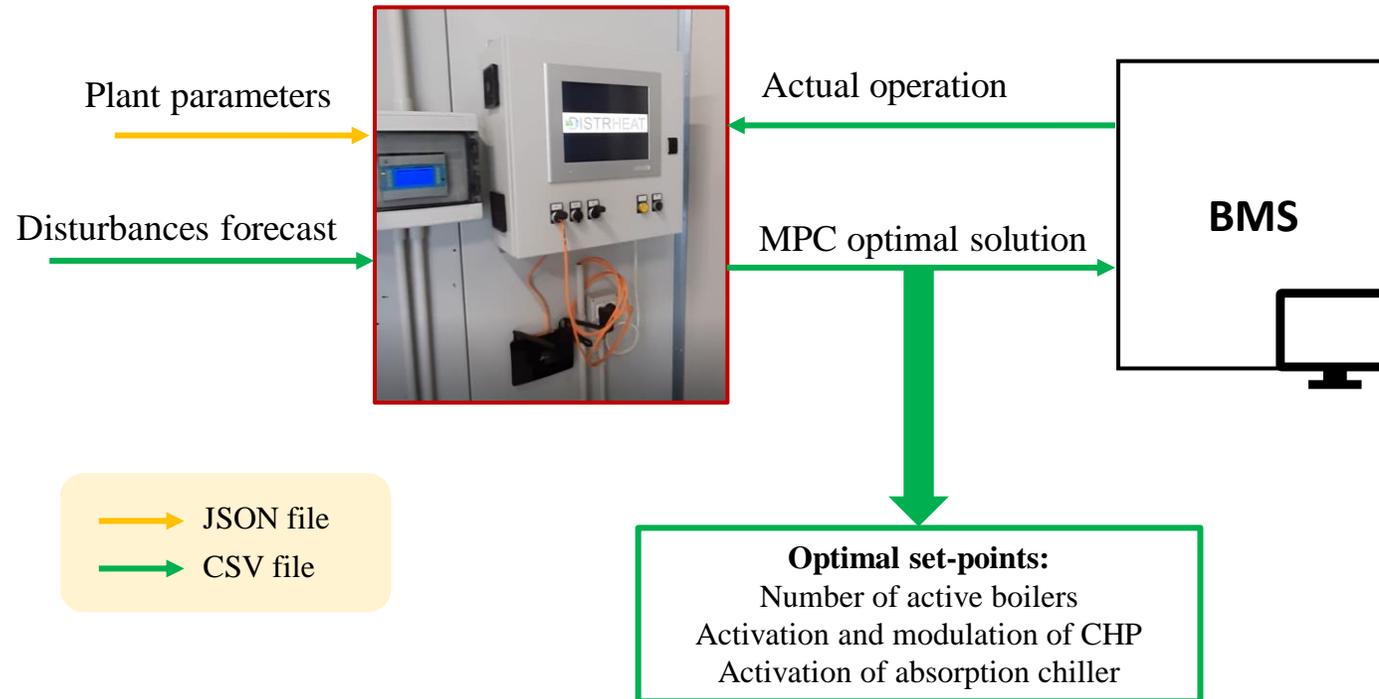
Goals

- Optimize **energy distribution** and thermal station **management**
- Minimize operating cost 
- Include **short-term** objectives 
- Comply with **long-term** (yearly) incentives 

Our solution: a multi-level optimal controller with a double time-scale which provides the control action every 15 minutes



Our result: the controller prototype has been operating at the Hospital since March 2022 and showed very good performance



March to August

	2021 - old	2022 - MPC
Natural gas for heating	-1.6 %	3.4 %
Electricity from grid	30.5 %	4.5 %
Economic balance	23.5 %	7.8 %

Percentage differences compared to the benchmark



HLUC relevance for project DISTRHEAT



<i>project / program</i>	HLUC 1	HLUC 2	HLUC 3	HLUC 4	HLUC 5	HLUC 6	HLUC 7	HLUC 8	HLUC 9	other
DISTRHEAT	●●●	●●	n/a	●●	●	n/a	●	n/a	●●●	n/a

- extremely relevant
- highly relevant
- relevant to some degree
- n/a – don't know



Key findings from project DISTRHEAT



<i>project / program</i>	finding(s)	relevant for HLUC(s)
DISTRHEAT	A smart controller that manage a multi-energy system by exploiting building flexibility and by providing it to the network	1, 2, 4, 7, 9
DISTRHEAT	Evaluation of people engagement to provide flexibility	5



Proposals from project DISTRHEAT



<i>project / program</i>	proposal(s) / recommendation(s)	relevant for HLUC(s)
DISTRHEAT	Waste heat recovery (e.g. datacenters, electrolyzers)	1, 8, 9
DISTRHEAT	Gamification for people engagement	5



Introduction

CRESYM – *Collaborative Research for Energy SSystem Modeling*

June 2022

A shared understanding : energy systems are facing a fast-evolving environment with increasing complexity and uncertainty



The **massive penetration** of intermittent renewable energy sources



The **high level of automation** (controllers) through digitalization of all network components



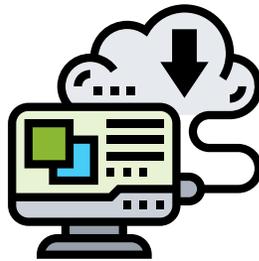
The **increasing level of interconnection**



IN THIS CONTEXT, CHANGING THE WAY WE OPERATE **BY SIMULATING WITH MAINLY MORE FLEXIBILITY, TRANSPARENCY AND COLLABORATION** WILL ALLOW US TO **BETTER OBSERVE, CONTROL AND ANTICIPATE**

The 3 key ambitions of CRESYM

A R&D collaborative association for the development of open-source energy system simulation tools for energy system players



DEVELOP SCIENTIFIC & TECHNOLOGICAL EXCELLENCE



FEDERATE AN ECOSYSTEM OF PARTNERS & FOSTER COLLABORATIONS



ENCOURAGE THE DISSEMINATION & TRANSFERT OF KNOWLEDGE AND TECHNOLOGICAL BUILDING BLOCKS

Partners involved in this initiative



P. Palensky
M. Cvetkovic
D. Gusain

M. Van der
Meijden



D. Strauss-Mincu
M. Braun

A. Monti
M. Mirz

J. Bos



E. Colombo



G. Bareux
F. Xavier

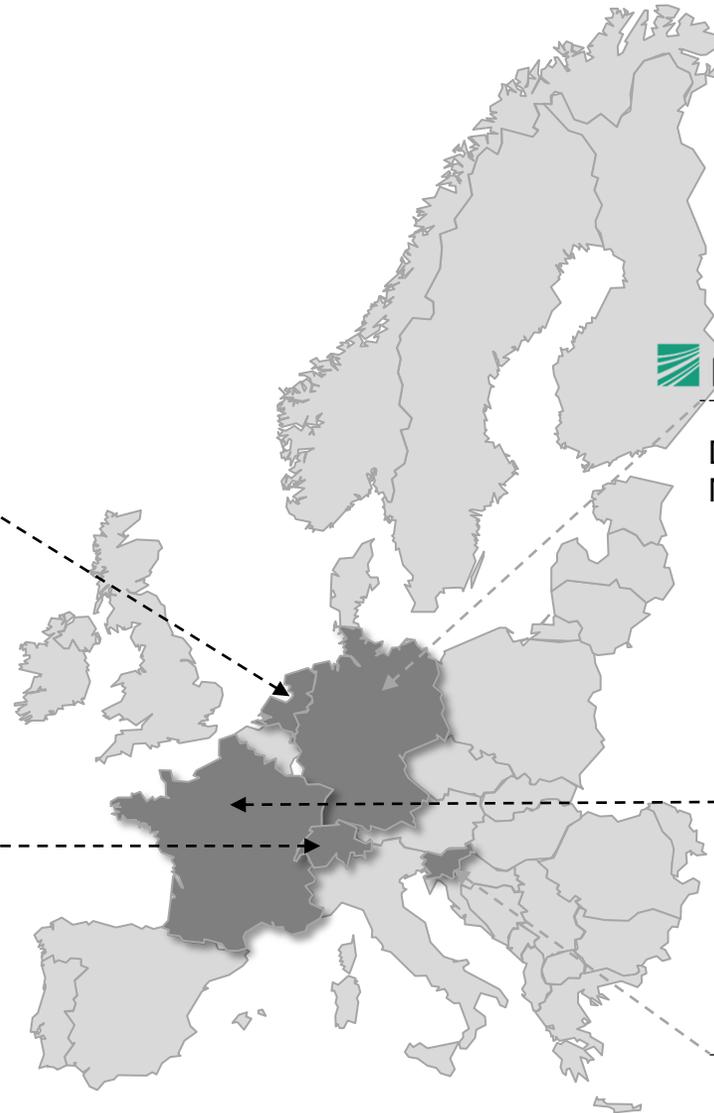
W. Phung



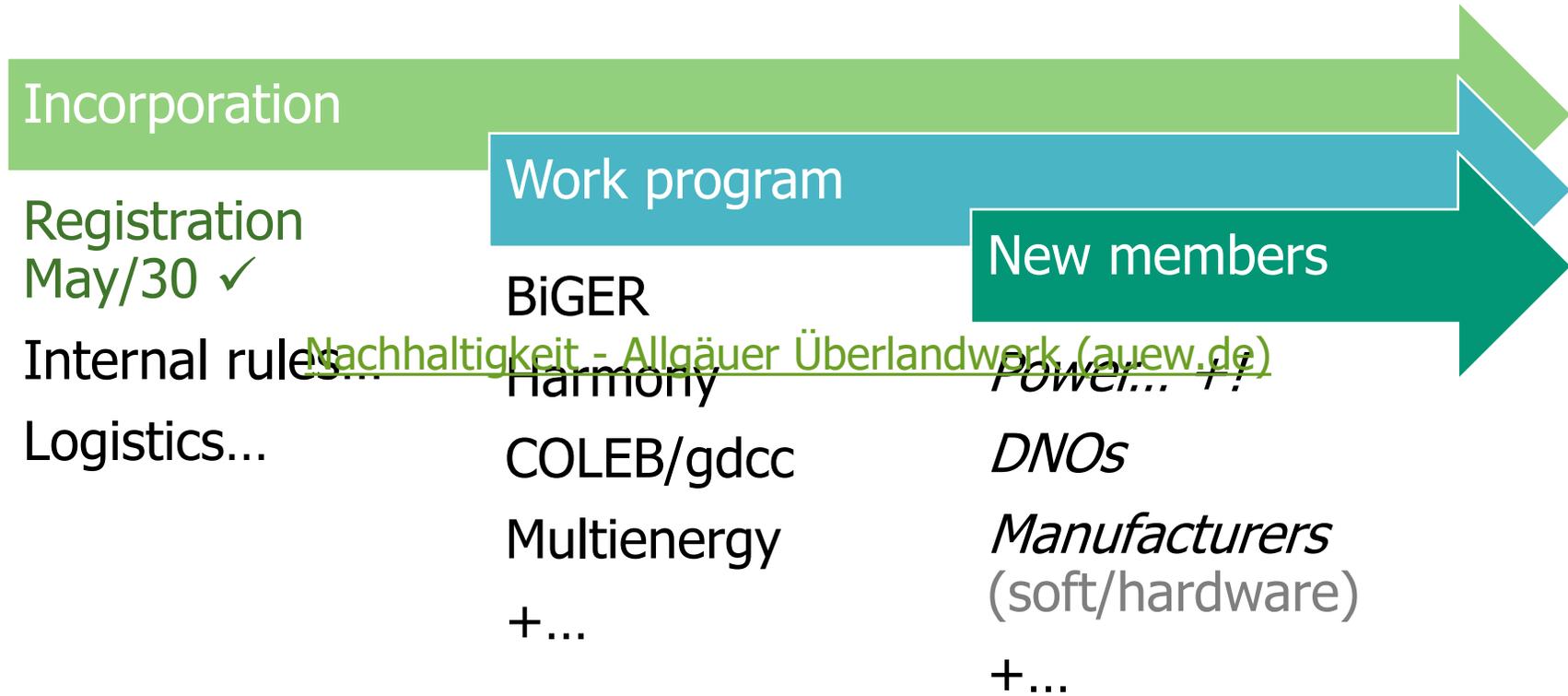
University of Ljubljana

U. Salobir
I. Papič

B. Blažič
L. Herman



Next steps





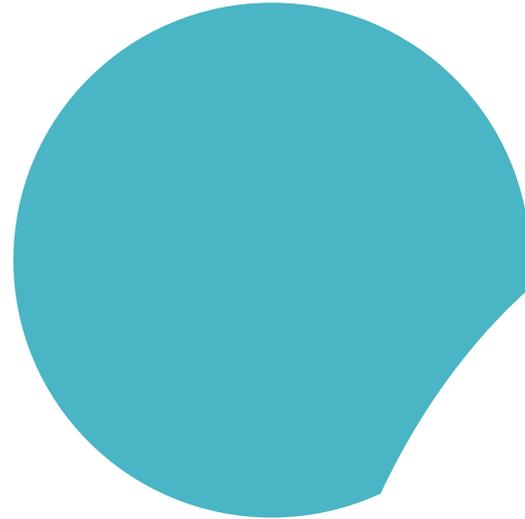
HLUC relevance of CRESYM



<i>project / program</i>	HLUC 1	HLUC 2	HLUC 3	HLUC 4	HLUC 5	HLUC 6	HLUC 7	HLUC 8	HLUC 9	other
CRESYM	●●●	●	●	●●●	●●	●●●	●●●	●	●●●	●●

- extremely relevant
- highly relevant
- relevant to some degree
- n/a – don't know

How to contact us?



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