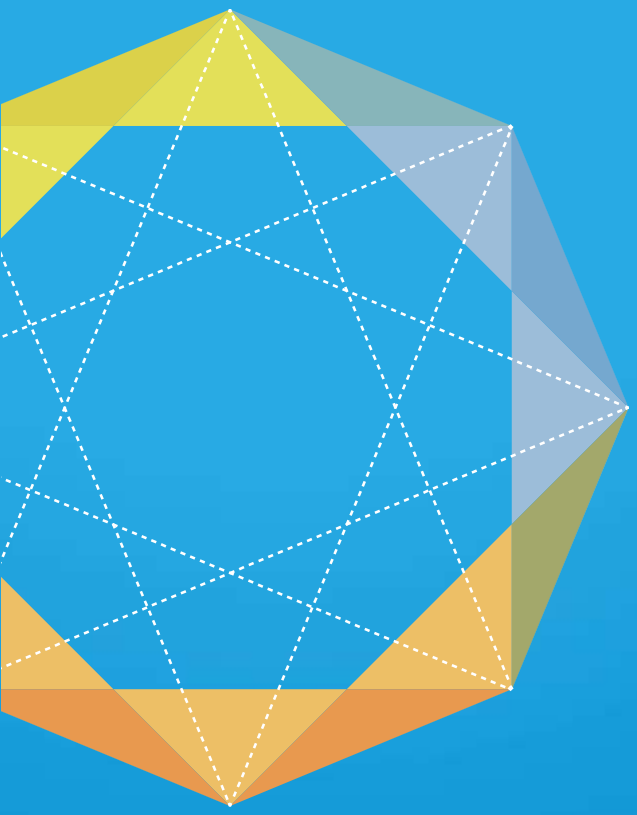
European Commission

15th ETIP SNET Regional Workshop

Key Conclusions & Recommendations



ETIP SNET

European Technology and Innovation Platform

Smart Networks for Energy Transition

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ETIP SNET

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1. Introduction

The 15th Regional Workshop invited owners/mangers of national or regional funding programs in the South-Eastern Region to present and discuss their national energy and innovation programs. The Workshop's goal was to shed light to actual challenges and key topics of sustainable energy system in Europe.

The Workshop was organised on 1st December, over one session (09:30-11:30), as part of the Enlit Europe conference in Frankfurt, allowing for the participation and attendance of a wider range of stakeholders and actors in the energy field.

This session aimed to bring together owners and managers of national and regional funding and development programs with the European Commission and ETIP SNET representatives from research and industry. This exchange fostered direct exchanges between the EU and the regional/national representatives for a common understanding of national and EC programs proposed in the ETIP SNET Implementation Plan (IP) and Roadmap (RM). The moderated discussion was based on the High-Level Use Cases (HLUC) and Project Priority Concepts (PPCs) defined within ETIP SNET IP. Many topics of our future energy system in Europe were covered. Representatives of national and regional funding and support programmes met in order that European Commission and representatives of European Associations in (ETIP SNET) learn from each other, streamline their approaches and create synergies.

The following structure was designed to bring a more coordinated exchange between member state level and EU level state level with respects to the research areas of the ETIP SNET Working Groups and the BRIDGE initiative, as well as with a view to contributing to the ETIP SNET Implementation Plans and Road Map. The workshop also focused on Research Development and Innovation (RDI) programmes in South and South-East Europe (SE-EU), namely the S-EU and SE-EU projects of Joint Programming Platform ERA-Net Smart Energy System.

The first part of the workshop included an introduction to the overall structure of ETIP SNET and Bridge and an overview of the ETIP SNET Implementation Plan for 2022-2025. The platform's vision for 2050 and the two main concepts – High-level Use Cases (HLUC) and Priority Project Cases (PPC) were shared with the attendees. After a more in-depth analysis of HLUC, from HLUC 1 to HLUC8, national/regional representatives were invited to elaborate on funding priorities for national/regional projects in South-East Europe.

Panel Session 1 of the workshop saw the discussion around S-EU and SE-EU projects of Joint Programming Platform ERA-Net Smart Energy System, particularly ANM4L, EVA, ZEHTC and FINSESCO. Speakers elaborated on the project details, main concept, achievements and progress, as well as barriers and perceived challenges. Additionally, the projects' contributions to the different HLUC were highlighted.

Panel Session 2 consisted of presentations from invited speakers regarding projects with respect to HLUC. The speakers were asked to provide a 3-minute pitch about their respective project, which was then followed by feedback and discussions from the audience. The session involved presentations of projects TRINITY, E-LAND, and DISTRHEAT, which was proceeded by the analysis of energy and climate security risks, their contributing factors and how to overcome them. Finally, the session was closed out by the presentation of Joint RDI activities and the CRESYM Initiative.

2 Structure of this Document

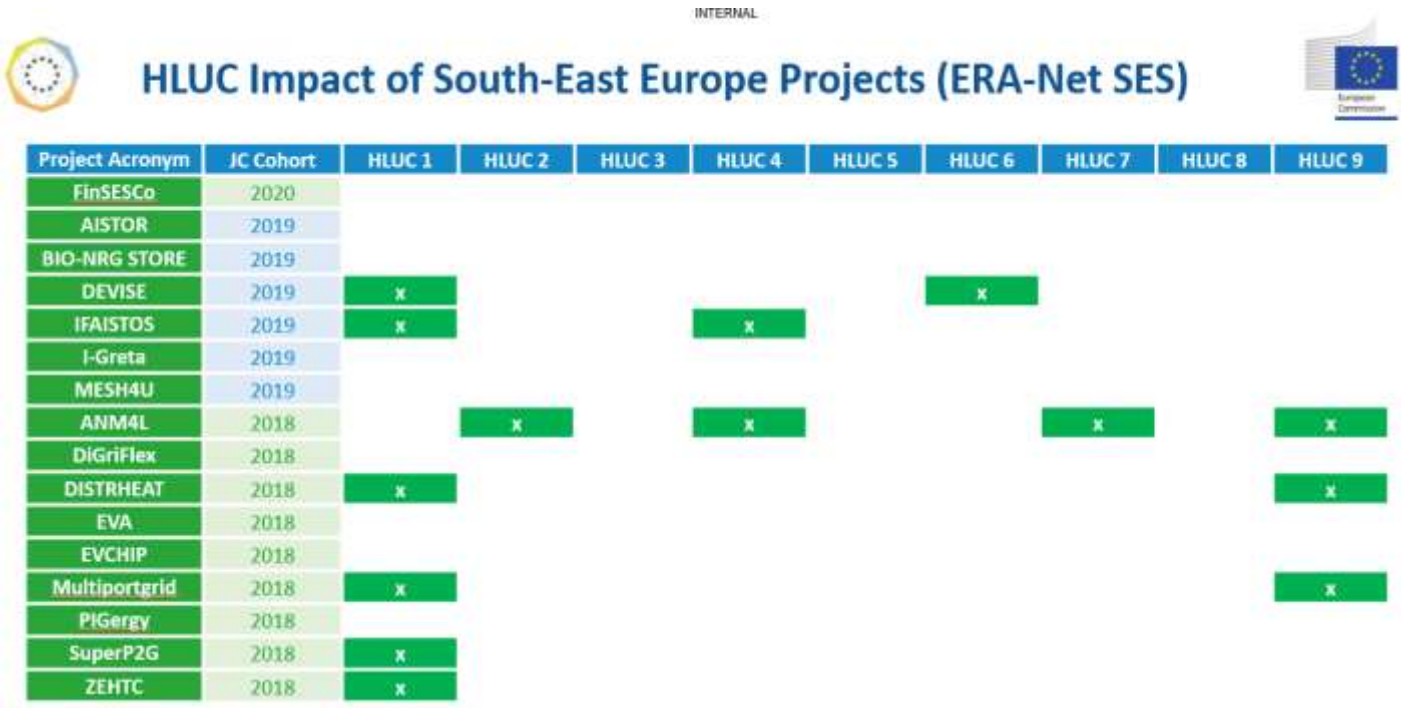
The document is split into the conclusions and recommendations of each of the sessions. These recommendations are typically mapped onto the 9 HLUC of the ETIP SNET but may deviate due to the information provided by the speakers fitting a wider recommendation.

3. Conclusions & Recommendations

3.1 Joint Programming Platform ERA-Net Smart Energy System

Presenter: Julia Chenut, Support Team to JPP SES

The Joint Programming Platform Smart Energy Systems (JPP SES) consist of multiple ERA-Net focus initiatives, all dealing with systematic approaches the future energy generation and supply. Below is the summary of the HLUC mappings with respect to the various JPP SES projects and their respective proposals/recommendations



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								

Figure 1: South-eastern projects impact on ETIP SNET HLUC

Relevance: Four projects have been presented in detail since they have been or are still dealing with HLUC aspects:

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

Table 1: JPP SES Projects mapped onto HLUC

Key findings:

Projects	Key Findings or Expected Results	Relevant HLUC(s)
ANM4L	• 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**	Direct: 2,4,7,9 Indirect: 1,3,5
EVA	• 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	Direct: None Indirect: 1,2,3,4,7,8,9
ZEHTC	• A **demonstration plant** is built to show how hydrogen, gas turbines, renewable energy	Direct: 1 Indirect: 3,4,8,9

	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.	
FinSESCo	• Using data from **building permits** and **energy audits**, the platform offers: • 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.	Direct: None Indirect: 1,2,3,4,5,8,9

Table 2: Key findings of projects and impact on HLUC

Proposals / Recommendations:

Projects	Proposal(s) / Recommendation(s)	Relevant HLUC(s)
ANM4L	• 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	• 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	• 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	• 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

Table 3: Projects mapped onto HLUC

3.2 Project BERLIN and funding programme ENI CBCMED

Presenter: Venizelos Efthymiou, FOSS, Cyprus

ENI CBC Med is the largest Cross-Border Cooperation (CBC) initiative implemented by the EU under the European

Neighbourhood Instrument (ENI). Through calls for proposals, ENI CBC Med finances cooperation projects for a more competitive, innovative, inclusive and sustainable Mediterranean area. The programme shall foster fair, equitable and sustainable economic, social and territorial development, which may advance cross-border integration and valorise participating countries' territories and values. The strategy is based on the following two overall objectives.

In ENI CBC Med, the BERLIN project with partners in Cyprus, Greece, Israel and Italy deals with "Cost-effective rehabilitation of public buildings into smart and resilient nano-grids using storage" (full title of the project). The project implements 8 energy rehabilitation pilot actions which bring effectively together photovoltaic, energy storage, smart grid elements, home automation, etc. to achieve a self-sufficient nano-grid. In its core it fosters system integration of three key technologies:

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

Pilot characteristics		
Location	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
Eilot, Israel	High school	350 kWp/300 kWh
Cagliari, Italy	University buildings	40 kWp/70 kWh

Figure 2: BERLIN project

Below is the summary of the HLUC mappings with respect to the various JPP SES projects and their respective proposals/recommendations.

Relevance of 3 key focus areas of Berlin for ETIP SNET:

BERLIN	HLUC 1	HLUC 2	HLUC 3	HLUC 4	HLUC 5	HLUC 6	HLUC 7	HLUC 8	HLUC 9
Self Resilient Buildings	N/A	N/A	N/A	●●	●●	N/A	N/A	N/A	●●●
Intelligent inter-connected systems (nanogrids)	N/A	N/A	N/A	●●	●●	N/A	N/A	N/A	●●●
Demand Response to provide flexibility	N/A	N/A	N/A	●●	●●	N/A	N/A	N/A	●●●

Table 4: Key findings of projects and impact on HLUC

Proposals / Recommendations:

The key recommendation of BERLIN is: "Go for market responsive buildings". Buildings should be allowed to participate with their flexibility potentials on respective markets. To that end "Smart Nodes" should be developed, formed by intelligent buildings or a combination of buildings. This integration of built environment is fundamental in the emerging needs of the electricity market. Action would be required in HLUCs 2, 3, 9.

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

Presenter: Rainer Bacher - ETIP SNET Core Team

The ETIP expert presented the concepts and outcomes of the Central and South Eastern Europe Energy Connectivity (CESEC) works to accelerate the integration of gas and electricity markets in the region. He referred to the Study on the Central and South Eastern Europe energy connectivity (CESEC) cooperation on electricity grid development and renewables which has been published in 2022. Many countries of the South East region have been involved as partners or contracting parties:

Involved funding agencies and programmes:

- CYPRUS – Research and Innovation Foundation (RIF)
- ITALY
    - Ministero Dell'universita' E Della Ricerca (MUR)

  - Ministero dello sviluppo economico (MISE)
- GREECE – GENERAL SECRETARIAT FOR RESEARCH AND INNOVATION (GSRI)
- HUNGARY – National Research, Development and Innovation Office (NKFIH)
- MALTA – Malta Council for Science and Technology (Programme Manager) (MCST)
- ROMANIA – Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI)

After analysing how the CESEC region positions itself with respect to clean energy challenges and barriers, an overview of the relation of the Horizon Europe Work Programs 23/24 (draft) and the ETIP SNET HLUC can be found below:

	Cluster topics	HLUC
Cluster 5	• Cross-sectoral solutions for the climate transition	1
	• Clean and competitive solutions for all transport modes	8
	• Transformation towards the climate-neutrality	3, 4, 5, 6
	• Sustainable, secure and competitive energy supply	2, 3, 4, 6, 7
	• Efficient, sustainable and inclusive use of energy	5, 9
	• Safe, resilient transport and smart mobility services for passengers and goods	8, 5, 3, 9
Cluster 3	• Increased cybersecurity	7
	• Disaster-resilient society for Europe	2, 5, 7
Cluster 4	• A human-centred and ethical development of digital and industrial technologies	5, 2
Cluster 6	• Innovative governance, environmental observations and digital solutions in support of the green deal	3, 5

Table 5: Cluster topics of Horizon Europe Work Programs (23/24) and their overlap with ETIP SNET HLUC

3.4 TRINITY Project

Presenter: Álvaro Nofuentes Prieto, ETRA

Horizon funded project TRINITY strives for "Solutions for increased regional cross-border cooperation in the transmission grid". It enhances cooperation and coordination among the Transmission System Operators of South-Eastern Europe (SEE). The SEE region is still to tackle substantial barriers in order to catch up with the more experienced EU regions. From 1/10/2019 to 30/09/2023, the project strives to improve the current situation and facilitate the interconnection of South-Eastern electricity markets – among themselves and within the current Multi Regional Coupling area (MRC).

Here below are key findings and recommendations;

Key findings:

finding(s)	relevant for HLUC(s)
In some countries, RES producers aren't allowed to get incomes from GoO if receiving other incentives such as FiT.	4

To optimize the installation of new RES plants according to grid capacity limits.	4,7
Preliminary demo of ID Market with 15mins granularity (Serbia-Hungary)	3

Table 6: Key findings of TRINITY project and ETIP SNET HLUC Relevance

Proposals / Recommendations:

	relevant for HLUC(s)
Repowering process of RES plants.	4
GoO market design to allow higher incomes for RES installation (e.g. facilitate participation of medium/small actors).	3, 4

Table 7: Proposals Recommendations from TRINITY

Feedback has been given that it is astonishing that the project does not contribute to HLUC 2. The answer is that TSO-DSO technology (also in the sense of HLUC 7) is of course involved but the research focus is on markets.

3.5 E-LAND Project

Presenter: Isidoros Kokos. Intracom (Greece)

E-LAND is a H2020 Innovation Action which ran December 2018 to November 2022. It aimed to transform energy related processes of an Energy Island bringing innovation across three planes: technology, community and business. The project had 3 pilots in Europe (Romania: university campus, Spain: technology park, Norway: industrial port) and 2 simulated pilots in India.

A toolbox has been developed 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.

Here below are E-LAND's key findings and recommendations

Key findings:

ELAND Pilot	Finding(s)	Relevant for HLUC(s)
Romania	**Operational Co-Optimisation**: Electricity (incl. battery, PV), Gas & Heat (Gas Boiler, Heat pump, Chiller, Solar Thermal, Storage) **Future planning:** PV, Heat Pump replacement, micro-hydro power **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	1, 9 [1.1, 1.2, 9.1 9.2]
Spain	**Operational Co-Optimisation**: Electricity (incl. Wind, PV), Heat (Heat pump), Transport (EV charging), Hydrogen Storage **Future planning**: PV, EV chargers, battery, biomass, solar thermal Outcomes: idem	1, 8, 9 [1.1, 1.2, 9.1, 9.2]

Norway	**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] **Future planning**: ship-to-shore el. conn., heavy duty EVs, (locally produced H_2-to-ship) Outcomes: idem	1, 8, 9 [1.1, 1.2, 9.1, 9.2]
All	Framework for community engagement	?

Table 8: Key findings of E-Land

Proposals / Recommendations for the Romanian Energy Market:

Proposal(s) / Recommendation(s)	relevant for HLUC(s)
• 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

Table 9: Recommendations from E-LAND

In the feedback discussion it was noted that countries move with different speeds and starting points into energy transition. Projects and products need to respect that and adapt. The project did not focus on HLUCs 2, 6, 7.

3.6 DISTRHEAT Project

Presenter: Mirko Morini, Universita di Parma

The project "Digital Intelligent and Scalable conTrol for Renewables in HEAting neTworks" is a research project funded by ERA-Net Smart Energy Systems (SES). It started the in November 2019 and ended in October 2022. The project has been led by University of Parma (Italy) and involved Mälardalen University (Sweden), Siram by Veolia (Italy), Mälarenergi AB (Sweden) and First Control Systems AB (Sweden).
With respect to the regional focus only the Italian pilot has been presented. The test site was the hospital of Cona with its small scale DHC network supplied by an integrated energy conversion system.

The scope was to implement and demonstrate a new control prototype based on Model Predictive Control (MPC) up to TRL 7. The goals of the controller were to manage both the distribution of energy and its production in the thermal power station in real-time, to minimize the operating cost, and to achieve this by satisfying short term objectives (for example the user demands over a daily time horizon) but also complying with long-term factors such as yearly incentives.
As the experts pointed out in their feedback, the MPC is an industrial prototype, not yet a fully sellable product. To turn it into a product, a serious obstacle needs to be overcome: people do not like to lose control over the "heat provision" - they want "the heater to be hot in the morning".

Here below are the key findings and recommendations

Key findings:

finding(s)	relevant for HLUC(s)
A smart controller that manages a multi-energy system by exploiting building flexibility and by providing it to the network	1, 2, 4, 7, 9

Evaluation of people engagement to provide flexibility	5

Table 10: Key findings of DISTRHEAT

Proposals / Recommendations:

Proposal(s) / Recommendation(s)	relevant for HLUC(s)
Waste heat recovery (e.g. datacenters, electrolyzers)	1, 8, 9
Gamification for people engagement	5

Table 11: Reccomendations from DISTRHEAT

Demos in Italy and in Sweden on co-generation / multi-energy plants for district heating networks; delivers controller (for controlling multi-energy plant), incentives people engagement; ;
(only Italian demo was presentec; Swedish demo was not presented but seems to go into community heat management); Lesson learned: Involve people, e.g. by gaming incentives via Smart phone; Contributes to HLUC 1,4,9; does not contribute to HLUC 3

3.7 Joint RDI projects with Central and South-East Europe and the CRESYM Initiative

Presenter: Prof. Antonello Monti, RWTH Aachen / FH Gesellschaft

Collaborative Research for Energy SYstem Modeling (CRESYM) is a non-profit association, gathering industrial & academic research organisations and aiming at solving the coming challenges for the future, fast-evolving European energy system. Partners foster efficient collaborations on low-TRL R&D issues of general interest. They promote and rely on open-source principles. They strive to maintain useful technological building blocks available for all researchers & engineers. Involved partners are from research and industry:

Active collaboration projects include:
BiGER to bridge the gap between EMT and RMS modelling, for stability studies and daily operation of fast, active components-dominated power systems
DiSST to expand the SOGNO platform to help distribution companies meet their 3D goals (digitalisation, decarbonation, decentralisation)
MUESSLI, aiming at "smart-linking" simulation tools to perform cross-sector, actually scalable, simulations and enable the optimal development and operation of an holistic "energy system" (power, heat, transportation, etc.) with electricity and hydrogen as main carriers
Restoration, exploring the advantages and disadvantages of power-electronics interfaced components during network restoration procedures, and to outline recommendations for BESS-based restoration plan
Harmony, a toolkit for easy harmonic analyses of (local EMT), to assess multi-terminal HVDC power systems, TSO-DSO interface, controller interoperability and HVDC protection
COLib, library of opensource, verified energy network component models and test cases.

The broad CRESYM initiative equally covers almost all HLUCs:

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

Table 12: CRESYM mapped onto the ETIP SNET HLUC

Key findings and discussion:
Paid memberships include RWTH Aachen, TU Delft and University of Ljubliana. The initiative could attract first TSO members (ELES, Swissgrid), but further membership is needed. The work plan packages should possibly be linked to HLUC to attract industrial stakeholders.

3.8 Energy and Climate Security Risk Index (financed by the European Climate Foundation)

Presenter: Martin Vladimirov, Center for the Study of Democracy (CSD), Sofia

A newly developed study "The Great Energy and Climate Security Divide - Accelerated Green Transition vs. the Kremlin Playbook in Europe" has been presented. The study includes a comprehensive "Energy and climate security risk index".

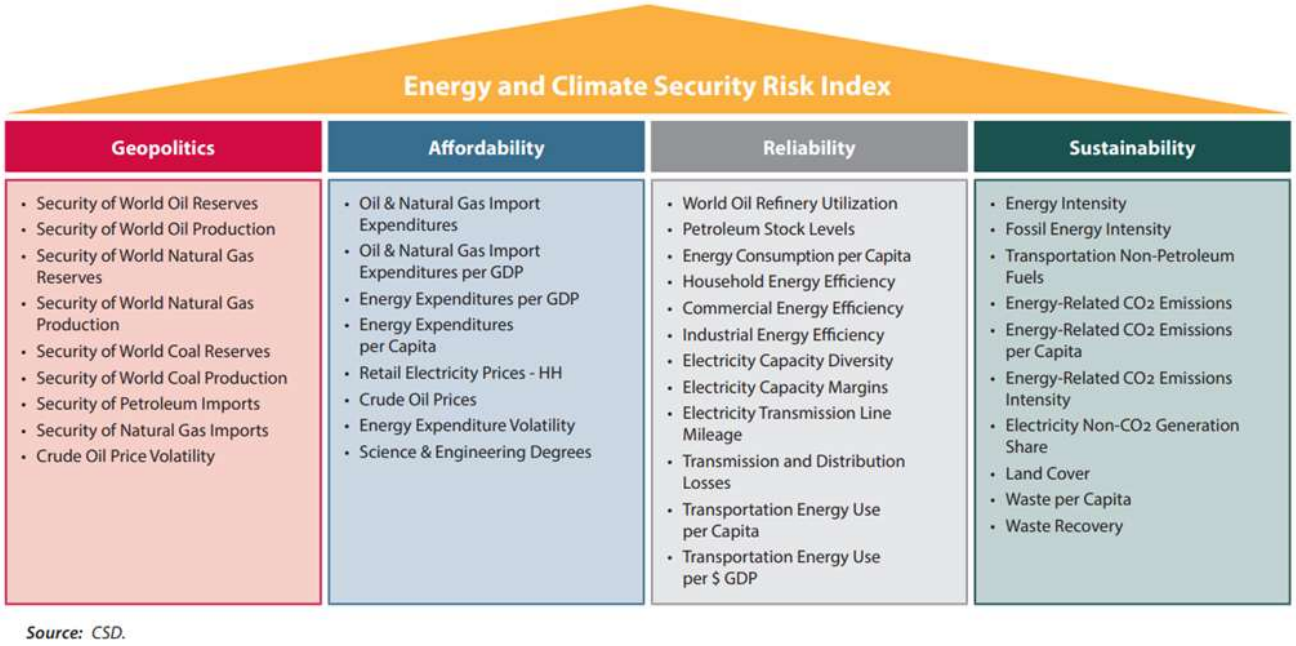
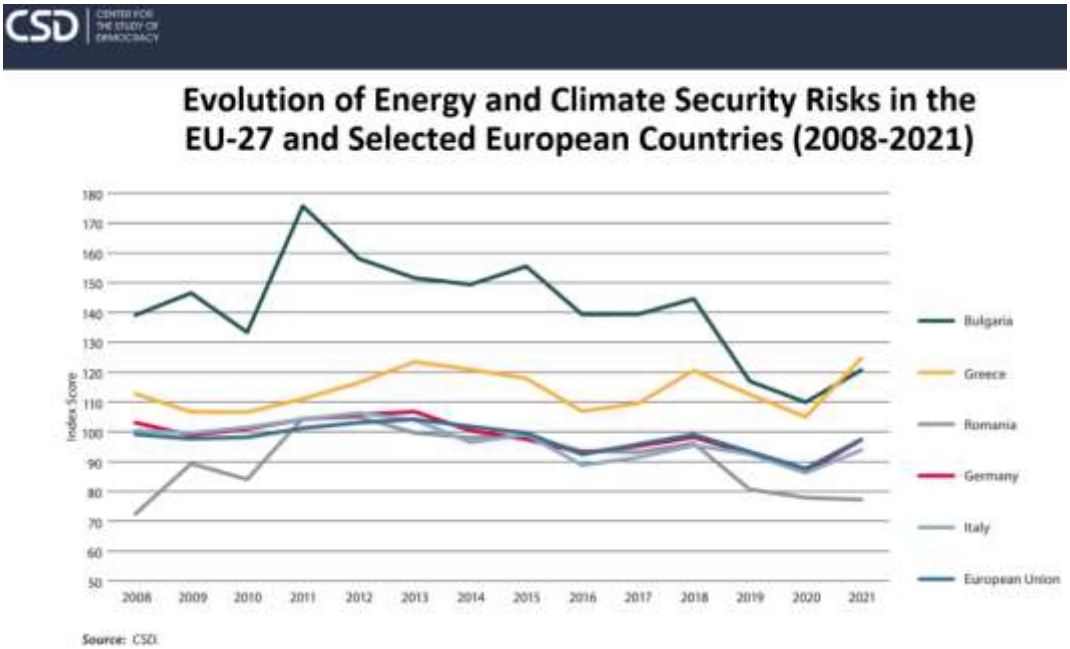


Figure 3: Energy & Climate Security Risk

For multiple countries the CSD has assessed the development of risk up until the "the Eve of the Russian Invasion of Ukraine":



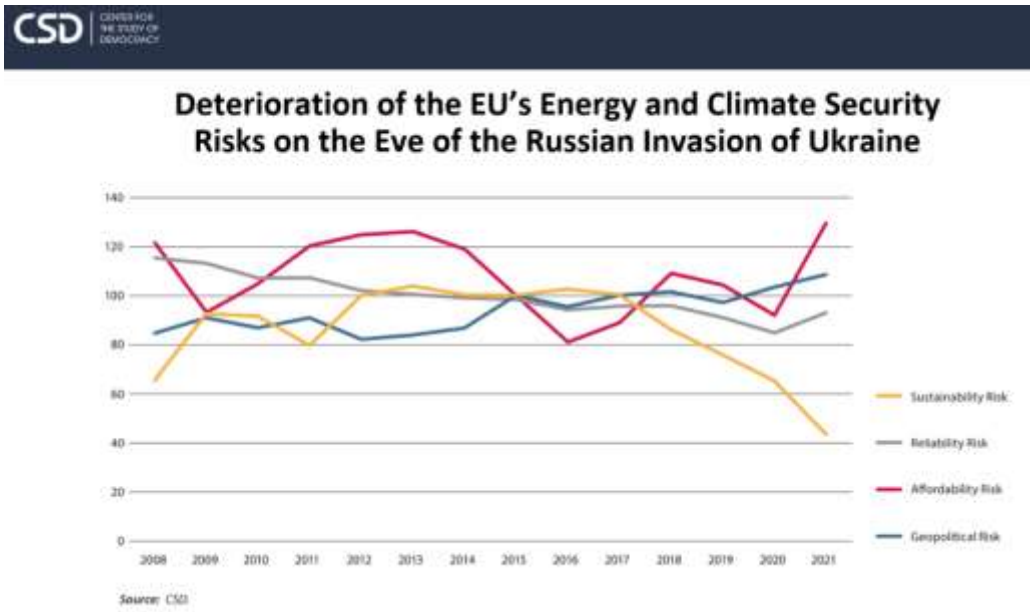


Figure 4 & 5: Evolution of Energy Climate Risks in Europe & Deterioration of these risks

Findings include:

- Gas dependency has grown drastically (not the least in DE and IT).
- In order to accelerate energy transition, "good governance" is needed; but many EU-countries obviously do not want to implement the right governance e.g. on TDO-DSO cooperation.
- Lack of or reduced affordability hinders energy transition. It is sensible in the South-East region and also in Germany

On the up-side, sustainability risks decline due to rising CO2 prices and energy efficiency improvements:

Figure 6: Risk Index, cumulated by sector, over the years

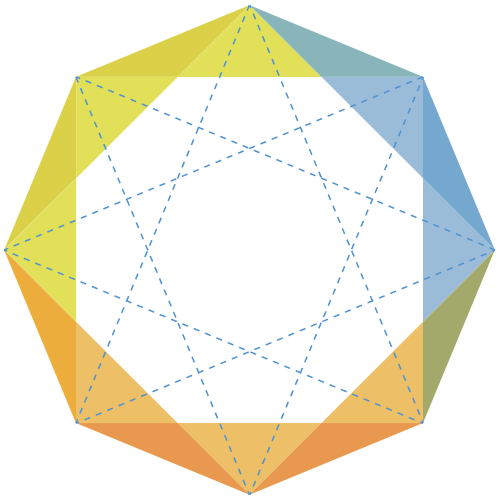
In terms of contribution to ETIP SNET, the study points out the necessity of activities in HLUC 3 and 4. Possibly the Implementation Plan and/or Roadmap should get a new RDI focus area: "Fostering good Governance".

3.9 Panel 2: Projects with respect to HLUC

In total, projects presented covered a broad variety of the ETIP SNET HLUCs, the mapping of their importance can be found below;

project / programme	HLUC 1	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	
ELAND (Romanian Pilot)	●●●		●	●	●				●●●	
DISTRHEAT	●●●	●●	n/a	●●	●	n/a	●	n/a	●●●	n/a
CRESYM	●●●	●	●	●●●	●●	●●●	●●●	●	●●●	●●

Table 13: Panel 2 Projects overlap with ETIP SNET HLUCs



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