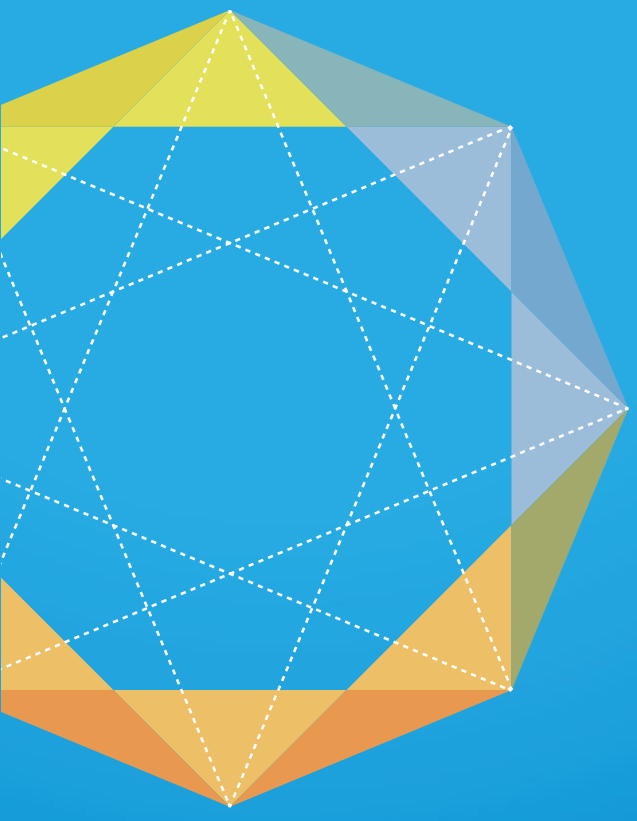
European Commission

19th ETIP SNET Regional Workshop

Integrating Renewable Energy Capacity While Ensuring Grid Flexibility - Proceedings of the meeting



ETIP SNET

European Technology and Innovation Platform
Smart Networks for Energy Transition

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1. Context

As part of the ETIP SNET initiative, 2 regional workshops are organised for each energy market region (Western Region, Central Region Workshops, South-Eastern Region, Northern Region Workshops) to identify trends relevant for the energy sector and foster discussions among stakeholders along the energy value chain on specific topics. The main objectives of the ETIP SNET Regional Workshops are:

- To **present national and regional research and innovation projects** that tackle energy system integration challenges;
- To **highlight unresolved research topics**;
- To **ensure coherence between national and European perspectives**;
- To **promote knowledge sharing** among stakeholders and Member States.

The 19th ETIP SNET Regional Workshop involved the countries of the South-Eastern Europe region, namely Bulgaria, Croatia, Cyprus, Greece, Hungary, Italy, Malta, Romania and Slovenia. The main theme of the event was *Integrating Renewable Energy Capacity while Ensuring Grid Flexibility*, which focused on the challenges and opportunities faced by Transmission System Operators (TSOs) and Distribution System Operators (DSOs) as they work to integrate increasing levels of Renewable Energy Sources into the grid.

The workshop attracted over 120 participants, including 75 in person and 45 online. Attendees represented different stakeholder categories: Non-ICT suppliers (e.g., consultancy) (38), Research and Academia (36), ICT and network solutions providers (11), Distribution System Operators (10), Transmission System Operators (9), European Commission representatives from DG ENER, CINEA and JRC (4), Market participants (trading, utilities) (4), other companies (4), Equipment manufacturers and suppliers (2), Renewable energy providers (1), Sector interfaces (Heat, Transport, Gas, etc.) (1).

The agenda of the event is presented below.

14:30	**Opening remarks** *By Francesco Gargani, Partner PwC and Giorgio Biscardini, Partner PwC*
14:40	**EU policies for Renewable Energy Sources integration** *By George Paunescu, Policy officer DG ENER*
14:50	**Overview of ETIP SNET initiative** *By Luis Cunha, ETIP SNET Chair and Antonio Iliceto, ETIP SNET Vice-chair*
15:00	**R&I priorities and needs in the Southern-Eastern Europe region with a focus on flexibility provision through the integration of RES** *Moderation by Giorgio Biscardini, Partner PwC* *Keynote speech by Fabiola Roccatagliata, Manager RINA* *Panel discussion: George Paunescu, Policy officer DG ENER; Fabrizio Penna, Head of NRRP Unit at the Italian Ministry of Energy; Marco Forteleoni, Vice-Chair of the Research, Development and Innovation Committee at ENTSO-E and Charles Esser, Secretary General E.DSO*
16:30	**Case study Italy: Focus on TSO-DSO cooperation and technological solutions to manage flexibility** *Moderation by Massimo Leonardo, Partner PwC* *Panel discussion: Luciano Martini – Director T&D technologies RSE; Enrico Carlini – Head of Electric System Planning and Permitting Terna; Ercole De Luca, Head of Regulatory and Public Finance Areti and Sergio Olivero, Energy Center of the Politecnico di Torino*
17:15	**Case study Greece: Focus on digital tools to empower consumers in the energy market and innovative business models** *Moderation by Yannis Vougiouklakis, Director PwC* *Panel discussion: Nikos Nikolopoulos, Research Director Mechanical Engineer CERTH; Professor Vaggelis Marinakis, NTUA; Professor Dimitrios Katsaprakakis, Minoan Energy Communities; Marios Bompoulos, Director of the Innovation Hub, Public Power Corporation.*
18:00	**Closing remarks** *By Francesco Gargani, Partner PwC and George Paunescu, Policy officer DG ENER*

The workshop started with an introduction by George Paunescu, Policy Officer at the European Commission's DG ENER, outlining key policy tools which provide support to the integration of renewable energy sources into the grid. Emphasis was placed on the importance of policy programs as a primary driver of change, particularly in addressing the energy trilemma of sustainability, affordability, and security. George emphasized that, while platforms like ETIP SNET foster stakeholder collaboration, primarily focusing on knowledge-sharing, policy

programs such as the European Green Deal and REPowerEU, establish foundational frameworks and binding targets that guide innovation, renewables integration, and energy transition efforts. He also discussed the importance of "going beyond regulation" with detailed action plans (e.g. EU Action Plan for Grids). Following George's introduction, Luis Cunha, EU DSO Entity and ETIP SNET chair representing the DSO perspective, along with Antonio Iliceto, ENTSO-E and ETIP SNET co-chair representing the TSO perspective, offered a comprehensive overview of the ETIP SNET initiative outlining the initiative's vision, scope, governance structure, and key milestones, detailing both completed deliverables and planned ones.

2. Panel Session #1: R&I priorities and industry needs

The panel aimed to gather insights on R&I priorities, map EU and national progress, and identify gaps in existing EU priorities that should further be addressed by European programmes, platforms and initiatives.

The discussion opened with a presentation by **Fabiola Roccatagliata** (RINA Consulting and part of the ETIP SNET/BRIDGE Secretariat). She provided an overview of projects financed under Horizon 2020 and Horizon Europe focused on integrating renewable energy sources (RES), highlighting robust ongoing regional collaboration across Southern-Eastern European countries. Several critical technologies were analyzed, particularly those enhancing flexibility, demand response, and grid stability. Fabiola emphasized the role of R&I projects in shaping European policy and delivering valuable insights for future initiatives, setting a strong foundation for the panel discussion to follow.

Following, a presentation from an institutional perspective focused on R&I priorities for integrating more renewable energy sources into the grid to achieve a net-zero energy system. The presentation outlined key R&I priorities established at the EU and national levels to enhance grid flexibility and explored ongoing collaborations between the EU, Member States, and industry stakeholders to align these priorities with practical needs for effective grid integration.

- **George Paunescu**, policy officer at DG ENER, presented the EU's funding priorities for advancing grid modernisation, renewable integration, and flexibility, emphasising the importance of digitalisation, grid resilience, and support for active consumers and energy communities. He highlighted the need for direct input from experts to shape relevant research and innovation (R&I) priorities, an effort undertaken through initiatives such as ETIP SNET and BRIDGE, with attention to future TSO and DSO perspectives.
- **Fabrizio Penna**, Head of the PNRR Mission Unit at the Ministry of Environment and Energy Security, provided, via a video statement, an overview of Italy's renewable integration priorities, focusing on the National Recovery and Resilience Plan and the Integrated National Energy and Climate Plan. He underscored the significance of innovation, strategic interconnections such as the Sicily-Sardinia-Corsica-Italy link, and the need to implement sustainable grid management practices.

The second half of the panel session, centered on Industry-level R&I needs, examined key innovations essential for advancing renewable energy integration into the grid, with an emphasis on achieving both flexibility and reliability of the energy grid. The discussion also highlighted areas where industry needs may remain unmet, identifying potential gaps between existing R&I priorities and the practical requirements of the sector. These insights aimed to inform adjustments in EU and national agendas for R&I programmes to better support industry-specific advancements and foster a more resilient, adaptable energy infrastructure.

- **Marco Forteleoni,** Vice-Chair of the Research, Development and Innovation Committee, shared ENTSO-E's perspective, emphasising two primary objectives: preparing for a carbon-neutral future and meeting the immediate demands of the power grid. He presented the recently published ENTSO-E roadmap for 2024-2034, which explores technological solutions aimed at enhancing grid flexibility and stability. The need for additional research and funding programmes was strongly emphasised, suggesting that, while certain innovations are underway, there is also a demand for mature, deployable solutions. He noted the importance of recognising industry gaps compared to current research and innovation priorities, with a particular focus on digitalisation and data management as key areas to improve operational efficiency across the grid.
- **Charles Esser,** Secretary General at E.DSO, offered the distributors' perspective, highlighting specific innovations critical to integrating renewable energy sources into the grid while maintaining flexibility and reliability. He showed the results of an E.DSO internal survey that showed where DSOs are focusing

their innovation efforts. These include the use of flexibility markets, smart meter technologies, improved data utilisation, and the integration of electric mobility and storage solutions. A notable example shared was the Hellenic Electricity Distribution Network Operator (HEDNO) in Greece, which developed a 3D digital model using AI to advance network digitisation and efficiency. However, he pointed out a significant workforce management challenge due to skill shortages, which needs to be addressed within EU and national agendas. Additionally, Charles underscored the importance of stronger coordination among sectors to maximize overall effectiveness.

3. Panel sessions #2 and #3: Case study from Italy and Greece

The second and third panel sessions, presented case studies from Italy and Greece, with the key objectives to:

- Presenting R&I projects of significant added value for energy system integration i.e., mainly national and regional projects but also European projects active in the relevant region, in order to enhance exchanges between all projects and communities, notably between EU and nationally funded projects.
- Exploring the local needs that are not address by the national / EU agenda.
- Launching a call to action regarding policy / financing support needed at EU/ national level to promote the adoption of RES innovations.

3.1 Case study Italy: TSO-DSO cooperation and technological solutions to manage flexibility

In Italy's electricity system, distribution is managed by various regional and local companies, with Terna serving as the sole TSO responsible for connecting all parties requesting grid access. This structure poses several technical challenges for integrating renewable energy sources into the grid. The issue is particularly pronounced as southern regions experience a higher volume of connection requests for energy production, while northern regions face greater energy demand due to their substantial industrial base. This dynamic highlights the need for strong cooperation between the TSO and DSOs to effectively manage the complexities of an increasingly distributed energy landscape.

The first part of the panel discussion focused on gathering insights from TSOs and DSOs regarding the challenges and opportunities associated with integrating renewable energy sources into the grid.

- **Enrico Carlini**, Head of Electric System Planning and Permitting at Terna, presented the perspective of Italy's TSO: Terna is capitalizing on opportunities by planning to invest over €16.5 billion in transmission infrastructure and €2 billion in innovation and digitalisation under the 2024-28 Industrial Plan to enhance grid performance. Capital-light interventions like dynamic thermal rating have allowed to increase transmission capacity by 400 MW between some key market areas of Italy. However, integrating renewable energy—particularly solar and wind—presents significant challenges for grid security and flexibility. A major issue is the disparity between generation in the south and consumption in the north, requiring substantial upgrades to transmission capacity. Close collaboration with distribution companies is essential for efficiently connecting new renewable projects.
- **Ercole De Luca**, Head of Regulatory and Public Finance at Areti, presented the case of Rome, where current summer peak demand of around 2.2 gigawatts is projected to rise to 3.3 gigawatts by 2032, with additional demand expected on winter evenings when renewable generation is low. A primary challenge for DSOs is balancing local renewable energy, as approximately 80% of RES is connected to distribution networks. The anticipated rise in peak consumption due to the energy transition further complicates this balance, making effective local flexibility markets essential. This underscores the importance of coordination between TSOs and DSOs, especially for managing the energy flow from south to north. The RomFlex project was presented as a successful case, enabling distributed resources in Italy to participate in a coordinated platform. Key opportunities for enhancing flexibility include new technologies like energy storage systems, electric vehicles, and home heating, along with European initiatives, all contributing to a more efficient and market-ready system.

The second section of the panel explored the R&I actions implemented to support increased flexibility for high-RES penetration, showcasing examples of innovative solutions aimed at enhancing grid flexibility.

- **Luciano Martini,** Director of the T&D Technologies Department at RSE, emphasized the value of partnerships with key industry players who provide assets and infrastructure essential for

implementing impactful, innovative solutions. He noted the significant role of European projects, especially those focused on smart charging and Vehicle-to-Grid (V2G) technologies, which allow for long-term testing and data collection across different seasons to demonstrate solution effectiveness. Additionally, Luciano highlighted digitalisation as a critical strategy for optimising existing assets without the need for extensive new investments. He concluded by underscoring that the transition to a high-RES grid presents complex challenges that cannot be solved without the collaboration among TSOs, DSOs, and other stakeholders.

- **Sergio Olivero,** professor at the Energy Center of the Politecnico di Torino, emphasized the university's bottom-up approach to enhancing flexibility for high-RES penetration through a company-driven funding model. PoliTo is currently focusing on two main initiatives: 1) Creating an open-source platform powered by AI to improve operational efficiency; 2) Building a network of EnCs as private entities that can self-manage and participate in the energy market. The objective is to collaborate with companies to build robust balancing capacity, develop API platforms for load management, and align European Commission directives with grassroots initiatives.

A final discussion invited all panelists to address the primary regulatory, financial, and technological challenges limiting the widespread adoption of these solutions. From a financial perspective, substantial capital investments are required from TSOs and DSOs, typically funded through regulated tariffs. Easier access to financing, particularly for large-scale investment projects, was emphasized as essential. Additionally, lengthy permitting processes for renewable energy projects present a barrier to the timely deployment of these solutions. On the regulatory front, the discussion highlighted the need for cohesive and consistent regulations that align national and EU directives, facilitating market participation for energy communities and smaller, distributed producers. A lack of standardisation in data exchange between TSOs and DSOs further complicates the integration of distributed energy resources. From a technical standpoint, the importance of achieving interoperability among diverse technologies to enable seamless data sharing and effective resource management was underscored. Leveraging digital solutions and AI for real-time monitoring and control presents significant opportunities to enhance operational efficiency.

3.2 Case study Greece: Energy islands transition to net-zero energy system through the energy communities

Greece’s power system is distinct due to its many islands, several of which have isolated electricity networks disconnected from the mainland grid. These islands often rely on local diesel generators but are increasingly incorporating renewable energy sources. Pilot RES installations and microgrid management schemes have already been deployed on some non-interconnected islands, with a national target to connect most islands to the mainland system or transition them to rely almost entirely on RES systems by 2030. This ambitious goal reflects Greece’s commitment to reducing dependency on fossil fuels and achieving nearly 80% RES in electricity consumption by the end of the decade. Several decarbonization initiatives for Greek islands are currently underway or planned, such as the GR-eco Islands initiative and the Fund for the Decarbonization of the Greek Islands. Additionally, under the Clean Energy for EU Islands initiative, nine Greek islands were selected in the first cluster to mature specific actions. These initiatives focus on hybrid RES systems, energy storage facilities, e-mobility infrastructure, desalination systems, cold ironing, RES auto-consumption schemes, energy communities, and microgrid management. The session first presented successful examples of energy communities and tools developed to empower consumers to actively participate in the energy market.

- **Nikos Nikolopoulos,** Research Director at CERTH, shared insights from the IANOS project, which supports island energy communities through a digital platform that combines planning and operational tools. This platform aids decision-makers with environmental assessments and facilitates peer-to-peer energy trading, allowing community members to participate in the energy market and optimize self-consumption—a scalable approach for islands with limited connectivity.
- **Dimitrios Katsaprakakis** of the Minoan Energy Community discussed its main achievements, including digital tools for upgrading municipal building energy performance and collaboration with local authorities on renewable energy projects like biogas production and biomass district heating. Although initially benefitting from net metering for member consumption compensation, recent regulatory changes in Greece have removed this advantage, challenging further growth.
- **Vangelis Marinakis,** Professor at NTUA, presented the ENPOWER initiative, aimed at transforming

Greece's energy market from a supplier-centric to a consumer-centric model. The project includes tools for energy modeling, demand response, and consumption optimization for communities and individuals. A key focus is on isolated areas, such as Halki island, where a 1 MW photovoltaic plant enhances data availability and energy management, supporting demand-response services particularly valuable for regions impacted by seasonal tourism. The project also addresses energy poverty and promotes citizen engagement, fostering potential cross-border partnerships.

These presentations were followed by a discussion on the regulatory, financial, and technological challenges that limit the widespread adoption of energy communities and explore potential solutions to overcome them.

- **Marios Bompoulos,** Director of the Innovation Hub at PPC, emphasised that a primary technical barrier is the absence of standardised certification processes and compliance assessments, which hinders the integration and scalability of energy communities. According to the panelist, EU and national policies should prioritise standardizing certification and compliance to create a cohesive framework for EnCs and related technologies. Policymakers should also facilitate easier data access for EnCs by establishing unified, secure protocols for data sharing that balance privacy with operational needs.
- **Vaggelis Marinakis** highlighted the challenges in accessing timely, relevant data, especially in established communities. Fragmented data access policies limit energy optimisation, demand forecasting, and strategic planning, impacting how data is shared and utilized across EnCs.
- **Dimitrios Katsaprakakis** pointed to inconsistencies in the regulatory framework across EU and national levels, which restrict financing options and complicate investment for smaller communities.
- **Nikolaos Nikolopoulos** concluded the discussion by noting that EnCs have untapped potential to actively manage local energy, reduce peak loads, and enhance resilience. To encourage investment, the panelist suggested offering subsidies, low-interest loans, or tax incentives, particularly for smaller communities, alongside streamlined regulatory processes to reduce complexity and accelerate EnC establishment and growth. Finally, he emphasised the importance of supporting R&I initiatives focused on EnCs, including backing pilot projects that demonstrate EnCs' potential and can serve as scalable models for wider adoption across Europe, while being of importance to smooth the friction between EnCs and big power producers, explaining that the main scope of ECs should be lying on offering social and environmental benefits as well.

4. Conclusions

In the event's wrap-up, Francesco Gargani, partner in PwC, and George Paunescu, stressed the need for strong regulatory, technical, and financial support to drive the green transition, leveraging distributed energy production and enhanced cooperation among system operators. In this sense, the discussion provided valuable insights into the types of support required to accelerate the commercialisation and broad adoption of innovative solutions which support the integration of RES into the grid.