

**RENEWABLE COLLECTIVE SELF-CONSUMPTION:
ENERGY COMMUNITIES AND MINI GRIDS****October 14, 2025 | Ankara, Türkiye****Summary of ERRA Workshop on Renewable Collective Self-Consumption and Energy Communities**

The Energy Regulators Regional Association Workshop on Renewable Collective Self-Consumption and Energy Communities, held on 14 October 2025 and hosted by the Energy Market Regulatory Authority of Türkiye, offered a comprehensive platform to explore how collective energy initiatives can transform power systems towards greater decentralisation, flexibility, and citizen engagement. Regulators and experts from Europe, Africa, and North America discussed how community-based generation and sharing schemes can support decarbonization objectives while maintaining affordability, reliability, and system efficiency.

The discussions highlighted that self-consumption, both individual and collective, continues to hold strong relevance in liberalised electricity markets. The presentation of Zero Carbon Hub demonstrated that locally generated and consumed electricity enhances flexibility, reduces network losses, and contributes to resilience.¹ A central conceptual idea was illustrated through a simple yet powerful metaphor: some people prefer to grow their own tomatoes rather than buy them at the market. In energy terms, this reflects that even when markets are efficient, consumers value autonomy, resilience, and the satisfaction of local generation. The analogy captured the essence of why self-consumption remains meaningful—because it combines economic rationality with a personal and community dimension of

Alternatives to serve demand: market vs. self-production

vs.



¹ Presentation by the Peter Kaderjak (Zero Carbon Hub, Hungary)

participation. By aligning network tariffs with the temporal value of electricity, distributed generation can coexist harmoniously with wholesale markets.² Hungary's geothermal and solar developments illustrated how localised energy use strengthens communities while reducing grid pressure.

The European legislative framework was explored through comparative assessments of different national implementations of the Clean Energy Package. The comparative overview included Italy, Portugal, Spain, and the Netherlands, which have transposed the provisions on Renewable Energy Communities and Citizen Energy Communities in diverse ways, introducing models such as net-billing, cashback mechanisms, and time-of-use remuneration.³ The comparative analysis concluded that coherent legal definitions, predictable tariff schemes, and data transparency remain the principal enablers of citizen participation and market integration.

One of the key analytical contributions came from Central Europe, where research⁴ findings indicated that collective optimisation through shared storage and coordinated consumption can substantially improve hosting capacity for variable renewable generation. Modelling results showed that when prosumers operate collectively, distribution losses are minimised and network reinforcement costs are deferred. The adoption of tariff structures based on time-differentiated or shared consumption values was identified as a promising instrument for aligning individual incentives with system-wide efficiency.

Austria presented a mature example of integrating community energy within national legislation.⁵ The country now hosts thousands of Renewable and Citizen Energy Communities, encompassing over one hundred thousand participants. These initiatives have proven that citizen-driven generation can operate safely within existing network frameworks while delivering social and environmental value. Austria's case confirmed that regulatory clarity, transparent data exchange with distribution operators, and technology-neutral market rules are vital to ensure both scalability and legitimacy.

Armenia showcased its progress outside the European Union framework through the introduction of "Autonomous Groups," allowing consumers and producers to share electricity under a single arrangement.⁶ Within three years, participation expanded dramatically, reflecting strong public engagement. The Armenian approach demonstrated that even in smaller and emerging markets, collective self-consumption can flourish when compensation mechanisms and network charges are transparent and equitable. The forthcoming transition from net-metering to net-billing is expected to align financial incentives with actual system conditions further.

Greece provided valuable insights from its regulatory evolution.⁷ The country's initial energy-community law generated substantial public interest but also revealed governance gaps, prompting a comprehensive reform in 2023. The new legislation

² Presentation by the Palma Szolnoki (Zero Carbon Hub, Hungary)

³ Giulia Taramboli (Politecnico di Milano, Italy)

⁴ Referencing Central European research findings presented by Pálma Szolnoki (Zero Carbon Hub, Hungary)

⁵ Presentation by the Harald Proidl (E-control, Austria)

⁶ Presentation by the Sergey Aghinyan (Public Services Regulatory Commission (PSRC) of Armenia)

⁷ Presentation by the Komninos Komnios (Regulatory Authority for Energy, Waste and Water (RAAEY) of Greece)

established two distinct legal entities, Renewable Energy Communities and Citizen Energy Communities, each with clear cooperative principles, voting rights, and obligations for social reinvestment. Greece's experience emphasised that regulatory precision and effective oversight are indispensable to safeguard the authenticity and long-term sustainability of community-based energy operating models.

The Czech Republic presented one of the most technologically advanced frameworks for electricity sharing.⁸ Its new legislation institutionalises both active-customer groups and registered energy communities, all coordinated through a centralised national data platform known as the Electricity Data Centre. This system performs static ex-ante settlement of shared volumes based on predefined allocation profiles that can be updated periodically, typically every month. Although this mechanism does not reflect instantaneous energy flows, it provides forecasting and balancing benefits for suppliers and distribution operators. The Czech model represents a forward-looking approach to balancing digital governance, consumer empowerment, and market integrity.

Türkiye demonstrated a forward-thinking approach to integrating distributed energy resources and community participation through market aggregation.⁹ The national framework enables licensed aggregators to coordinate generation, consumption, and storage resources across several market segments, including day-ahead, intraday, balancing, and ancillary-service mechanisms. The aggregation model complements Türkiye's rapidly expanding portfolio of unlicensed renewable generation and provides a transition pathway for small producers once feed-in tariffs expire. The Turkish case underlined that enabling aggregation and community participation will be essential to unlock flexibility and support the country's ambitious renewable-expansion targets.

The workshop also examined experiences from regions where community-based energy is closely linked to access to electricity and social inclusion. In West Africa (ECOWAS region), the representative or regional association of electricity regulators reported progress in expanding solar-based mini-grids under harmonised licensing, tariff, and technical standards.¹⁰ These measures, supported by regional policies and a recently adopted electricity code, are creating conditions for private investments and integration with the regional power pool. In East Africa, the Tanzanian regulatory framework for small-

ECOWAS Success Stories on Community Programs



- **Senegal** – Concession/PPP model via **ASER** targeting ~1,000 villages; universal access push to 2029.



| 30 |

⁸ Presentation by the Alexandr Cerny (Energy Regulatory Office (ERU) Czech Republic)

⁹ Presentation by the Ahmet Husrev Ipekli (Energy Market Regulatory Authority (EMRA) of Türkiye)

¹⁰ Based on Kocou Tossou's presentation of the West African regional framework (ECOWAS Regional Electricity Regulatory Authority (ERERA)).

power projects has accelerated rural electrification through simplified licensing, standardised contracts, and clear compensation rules for operators when the main grid arrives.¹¹ The Nigeria regulator complemented this perspective by illustrating how its mini-grid regulations have transformed community energy into a commercially viable access strategy.¹² More than one hundred operational projects now serve around six million people, supported by transparent tariff negotiations, blended financing, and strong regulatory credibility.

A broader international perspective was added through insights from the United States,¹³ where community-solar programs have reached more than ten gigawatts of installed capacity across forty-four states. This figure is verified by the National Renewable Energy Laboratory's 2024 dataset, which recorded 3,764 projects in forty-four states and localities, including the District of Columbia. The success of this model lies in state-level legislation that enables virtual net-metering and ensures equitable access for low- and moderate-income households through capacity carve-outs and targeted financial incentives. The United States experience demonstrated that clear legal mandates and inclusive program design can expand renewable participation while maintaining market discipline.

Across all regional and national perspectives, a consistent narrative emerged. Empowering citizens and communities to participate actively in the energy transition requires not only technological innovation but also adaptive regulation. Future-ready tariff structures must reward flexibility and efficiency rather than consumption volume. Transparent data management, reliable settlement systems, and cost-reflective pricing are indispensable for integrating local initiatives into formal electricity markets. Equally, lasting participation depends on public trust—regulation must be transparent, fair, and stable.

This workshop underscored a distinctive aspect of the Energy Regulators Regional Association: its diverse composition and the broad spectrum of perspectives brought by regulators and experts from around the world. It demonstrated that participants from diverse countries, employing traditional regulatory approaches as well as innovative ideas, can engage in mutual learning and contribute to meaningful advancements in regulatory practices.

Furthermore, the Ankara workshop reinforced the notion that energy communities and the shared self-use of energy are not merely experimental initiatives but are integral to the future energy landscape. They play a crucial role in promoting cleaner energy solutions, ensuring social equity, and delivering economic benefits, all within a cohesive global regulatory framework.

Source: <https://erranet.org/erra-workshop-energy-communities/>

¹¹ Drawn from Lwila Azaria Nathan's overview of Tanzania's small-power projects (Energy and Water Utilities Regulatory Authority (EWURA) of Tanzania)

¹² Reflecting Umar Mohammed's case study on Nigeria's mini-grid regulations. (Nigerian Electricity Regulatory Commission (NERC))

¹³ From Simon Sandler's presentation "A U.S. Perspective via Community Solar." (National Renewable Energy Laboratory (NREL) of the USA)