



Policy Brief

# How Local Energy Ambition Meets Investment



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# Executive Summary

Ukraine is institutionally and legally ready to deploy Hybrid Renewable Energy Systems (HRES). The most important objective is to demonstrate that regional HRES systems can deliver bankable projects that are scalable both in size and, especially, in number. This document is structured to provide a clear pathway from conceptual methodology to the immediate deployment of community-scale HRES.

This document was prepared by analysts of Ukraine Facility Platform and TNO, commissioned by the Netherlands Enterprise Agency (RVO).

We outline **a comprehensive four-step methodology** encompassing community energy audits, energy mix design, legal and organizational structuring and finally, aggregation and pipeline building to scale from single communities to regional clusters.

This study demonstrates that a substantial portion of the necessary preconditions for such projects is already in place. **There is a legal base for** prosumer model, aggregation mechanisms, self-generation, and net-billing models, thereby creating broader opportunities for distributed renewable generation and local energy participation. **Cable-pooling mechanism** allows different generation technologies and, later, battery energy storage systems (BESS) to operate through a shared grid connection point, which is especially important under wartime conditions. As a result, **the updated regulatory environment** enhances the HRES feasibility. And the remaining milestones are entirely achievable.



# Strategic context for regional-scale HRES in Ukraine

Ukraine already has substantial operational experience with renewables. What the HRES model adds is not new technology but the integration of existing technologies into a regional configuration designed to meet community energy demand year-round.

As for the strategic outlook for the energy system rebuild, Ukrainian transmission system operator NPC Ukrenergo has put a concrete figure on what the needs are: according to its data, Ukraine will require approximately **9.5 GW** of new generation in the near term, and the estimated investment requirement for such exceeds **EUR 8 billion<sup>1</sup>**.

This generation mix is being seen as a composition of highly maneuverable gas-fired units, biofuel-based thermal plants, energy storage, and renewable generation, with the appropriate mix differing by region, depending on solar and wind resources, and on the capacity to wheel nuclear output across the grid.

**Renewables are gradually being integrated into a broader resilience model, especially when combined with storage.**

The configurations and economic logic described in this document, therefore, focus on how HRES installations can realistically be designed, sized, and implemented under Ukrainian conditions.

A typical HRES portfolio combines complementary generation and storage assets integrated across both the electricity and heat sides of the local energy system. **The result is a system that can deliver electricity and heat within available grid constraints with much lower storage requirements than a fully electricity-based renewable system.**

A city with approximately 200,000 inhabitants and associated industrial demand can realistically require around 100 MW of installed HRES capacity, associated with a regional scale. The scale thresholds are driven by economics: cost-effective bio-CHP facilities generally require at least 10 MWth input, while competitive onshore wind turbines are commonly around 5 MWe each.

Overall, given the favorable levelized costs of energy (LCOE) of individual renewable energy technologies in the Ukrainian context, compared with high electricity prices and rising gas prices, the economic fundamentals of HRES systems are very positive. Ukraine's legal, organizational, and financial framework for HRES projects has matured

<sup>1</sup> Ukrenergo. (2026, February 18). [V. Zaichenko: Approximately 9.5 GW of new generation will be needed for Ukraine's energy system in the near future.](#)



rapidly and now offers a set of instruments broadly sufficient for deployment at community and regional scales.

## “Low-hanging fruits” for potential pilot projects

The potential scale of HRES projects is high. According to the European Commission’s study on CESEC cooperation<sup>2</sup>, Ukraine’s technical solar capacity potential stands at around 416 GW, and its onshore wind potential at around 134 GW. But this potential should be unpacked. And for this purpose, the “low-hanging fruit” as business options should be used. The most obvious model for pilots is behind-the-meter “self-production” projects.

Municipal-owned enterprises (MoEs) can acquire the status of a prosumer and use the “self-production” support model. Such municipal enterprises as hospitals, schools, kindergartens have enough space to accommodate PVs and BESS. But urban electric transport, metro, water utilities, treatment plants, district heating power plants are much bigger consumers. The need to provide such facilities with electricity creates a huge field for the development of distributed generation.

**A huge underestimated resource is the availability of permitted electricity consumption capacity in the MoEs, which is largely unused.** This resource can be used both for the construction of generation and for installing BESS with a greater capacity than required for self-production.

**One option** for creating prosumers is to establish generation facilities at the expense of the relevant community within the framework of a targeted program, or with assistance from IFIs. Such MoEs can create generation facilities and BESS that are directly connected to their internal electrical networks within the connected capacity and consume most of the generated electricity. Servicing such a generation portfolio can be carried out by a special entity, either created by the community or attracted by it on competitive terms. This option will make it possible to reduce the cost of purchasing electricity and make the community’s energy system more sustainable.

**The second option** is to make by the municipalities a register of locations where the private investors have the right to create generation units and BESS, and connect such generation units to the internal grids of the MoE, which will allow such MoE to obtain the status of a prosumer.

<sup>2</sup> [Study on the Central and South Eastern Europe energy connectivity \(CESEC\) cooperation on electricity grid development and renewables, 2022.](#)



The municipalities can hold open competitions for investors, providing them with the opportunity to build a new generation at a certain point with a certain capacity, guaranteeing investors that the relevant MoE, within a certain period, undertakes to purchase all the electricity produced by such a generating unit at a certain price.

**Municipalities lack understanding of these opportunities to implement such projects. At the same time, businesses have been doing this since 2024.**

## Bottlenecks and risk landscape

What blocks HRES deployment in Ukraine today is not the legal toolkit (that is largely in place), and not the capital appetite: foreign investors consistently report that capital availability is well ahead of the supply of bankable projects. The real blockers are five concrete issues:

### 1. The missing universal offtaker

**Solution: political risk insurance as a bridge**

Foreign investors evaluating Ukrainian HRES projects consistently describe the same preferred structure: a long-term offtake contract covering the full output (or a defined share) of the project. The problem is that no such universal offtaker exists for distributed HRES today.

The principal source of investors' anxiety is political. The gap is bridgeable through Political Risk Insurance. For example, MIGA has issued USD 561 million in new guarantees for Ukraine since February 2022, backed by the Support for Ukraine's Reconstruction and Economy Trust Fund (SURE TF), which de-risks up to 75% of MIGA cover<sup>3</sup>.

### 2. Asymmetric commitment between investor and municipal offtaker

**Solution: cross-guarantees**

The investor commits CAPEX upfront before any electricity is delivered, while the municipal utility commits to pay over a 10-15-year horizon, funded by tariff revenue it does not control.

<sup>3</sup> World Bank, "[Donor Financing Mechanisms for Supporting Ukraine](#)," April 13, 2026



The mitigation is cross-guarantees inside the project architecture. Both parties post financial commitments. The investor side is a performance bond – bank guarantee or escrow account – that the HRES facility will be commissioned on time and will deliver the contracted volume of electricity and/or storage services<sup>4</sup>.

The municipal side is a payment guarantee from the utility; where the utility's own creditworthiness is weak, the guarantee can be substituted with one from the local self-government body (city/community council), funded from its own budget.

### **3. Underused community-owned grid infrastructure**

#### **Solution: local distribution systems reform and parallel-network building rules liberalization**

The concept of energy islands at the community level remains a theoretical exercise, because the framework for local distribution is fragmentary, and communities themselves rarely consider building alternative connections that would parallel or duplicate distribution system operators (DSO) infrastructure.

Two parallel regulatory tracks are required. Targeted amendments to the local distribution systems legislation need to clarify the rights, obligations, and tariff base of local distribution systems operators, how they connect to the main DSO grid, and the boundary conditions for island operation. In parallel, the rules for building and operating networks that parallel DSO infrastructure need to be liberalized.

### **4. Structural insolvency of the natural offtakers**

#### **Solution: solidary liability for sub-cost tariffs**

Critical-infrastructure operators in municipal ownership – water and heat utilities – are the natural counterparts to HRES projects. In practice, most of them operate at a planned loss with negative EBITDA. The cause is tariff regulation.

The proposed structural fix is joint and several liability of the local self-government body for the debts of utilities whose tariffs it sets, where those tariffs are shown to be below cost-reflective levels.

### **5. Bespoke contractual structuring for every project**

#### **Solution: procedural fix**

Every project today requires bespoke contractual structuring – separate agreements for installation, connection, electricity offtake, storage services, and any guarantees – and

<sup>4</sup> NPC Ukrenergo, [“Ancillary Services Market: To the Attention of Potential Participants of Special Auctions of NPC Ukrenergo,”](#) n.d.



the public-procurement procedure routinely requires annual re-tendering for each of these.

The fix is procedural and high-leverage. Amend Cabinet of Ministers Resolution No. 483 of 03.06.2020 “On Certain Issues of Lease of State and Municipal Property” (KMU, 2020) to create an explicit mechanism for installing generation and/or energy-storage assets – owned by third parties that are not themselves separate market participants – on state and municipal property, by way of leasing that property as the installation site<sup>5</sup>.

## Project realization methodology

This section sets out the four-step methodology that UAFP applies to facilitate HRES deployment, from a single community to a clustered pipeline. Every step’s output aims to support the optimal decision on the most suitable parameters for potential HRES projects: where, what, how, and why to build. The methodology is universal – technology-neutral and suitable for projects of different scales.

### Step 1. Community energy audit: asset inventory, consumption data, grid capacity

Ukrainian communities need to gather detailed dataset to begin developing energy projects. The consumption and energy assets audit is crucial – this is the fieldwork that must happen before any technology decision is made. Also, cross-sectoral project evaluation is urgently needed, especially for energy projects involving critical infrastructure assets.

#### Inventory of assets:

- Ownership structure. Analysis involves creating a data set of assets owned by the relevant community, including specific information on connection points. This block should collect information on legal entities and on individual real estate objects owned by the community, either directly or through one of its municipal utilities.
- Assessment of available resources. It should involve examining the energy resources available for use in the relevant location: electricity, heat, gas, and biomaterials that can be used as biofuels etc.
- Assessment of cross-sectoral projects’ potential (energy + water and energy + health, etc). Cross-sectoral projects can help increase resilience in municipalities and

<sup>5</sup> Resolution of the Cabinet of Ministers of Ukraine “[Some Issues of Leasing State and Communal Property](#),” No. 483 (2020, June 3)



have a long-term cumulative effect. For instance, behind-the-meter energy projects with water supply companies or hospitals will also increase the amount of energy for the needs of the municipality in periods of shortages.

### **Energy consumption profile**

This block requires studying electricity and heat consumption volumes and trends. If hourly consumption data is available, it should be preferred over aggregated monthly or annual data. It is important to analyze several annual periods to understand seasonal and intraseasonal patterns. It helps select the best technological solutions that meet consumer needs and yield the maximum financial effect.

### **Grid-connection capacity**

This part is about the audit of existing connections to electricity, gas, water, and heat supply networks. Given the gap between legally permitted and actually used capacity, examining existing permits is crucial. The unused margin is the community's biggest hidden asset: it makes prosumer and cable-pooling configurations cheaper and faster than building new connections.

## **Step 2. Energy mix design: technical-economic assessment, technology selection**

Energy-mix design is only possible after a usable dataset is created. It is worth considering that each technology has its own function, and each specific connection point can have several energy-mix scenarios. The desired output is tailored technology configuration/s for each candidate site.

Technology configuration should be sized to the community's hourly consumption profile, with each configuration evaluated for capital cost, operating cost, payback period, and technical fit with the available connection capacity. For modeling, it is always worth using hourly data on electricity consumption and generation (for solar and wind energy), if possible.

## **Step 3. Legal and organizational structuring: ownership model**

The purpose of this step is to convert a technical-economic design into a legal architecture that allocates risk and reward appropriately among the community, the utility, the private investor, and the operator.

The legal and organizational structure of a local energy project depends on its location, resource availability, and supply mechanics. Key prerequisites include verifying title ownership and property restrictions of community facilities and navigating public procurement rules.

Physical location and grid connectivity dictate the optimal model – prosumer for internal



networks, newly connecting directly to DSO networks, or employing cable pooling.

### Three drivers determine this architecture:

#### 1. Location of the asset

Facility location is critical, as these projects typically involve highly regulated municipal assets – whether situated on land plots or within existing real estate.

- **Location on a land plot**

Municipal utilities mostly hold land under the right of permanent use, which restricts subleasing. Therefore, fixed-term paid easements (servitudes) are highly recommended. This significantly streamlines the process and provides additional legal guarantees for the owner of the generation facility.

- **Location on/in a real estate facility**

It is advisable to use a property lease model, including the lease of state and municipal property. This legal framework is explicitly provided for by primary legislation and can be applied to formalize the physical presence of generating installations and energy storage on or in real estate assets, including those under municipal ownership.

#### 2. Connection model

Private businesses may connect the new generation to the grid through one of three options:

- **New connection:** the conventional approach, requiring the development of entirely new grid infrastructure.
- **Existing connection:** shared use of an existing connection point (cable pooling) – optimizing existing capacity.
- **Active consumer model:** connection to the consumer's own grid network. The fastest route for implementing decentralized solutions.

The connection model directly impacts the market interaction framework and the project's financial planning. For example, the behind-the-meter (prosumer) model, significantly limits the scope of market interaction. Conversely, cable pooling on an existing connection or establishing a new connection leaves a wide margin for market variation. However, this limitation should not be perceived as a disadvantage – in many scenarios, restricted market participation fully meets the project's needs.

Furthermore, the connection model dictates the viable structures for securing offtake and the potential pool of off-takers. When facilities operate as full market participants (via cable pooling or new connections), the range of entities is unlimited, allowing



electricity sales to any consumer. In contrast, under a behind-the-meter setup, the sole off-taker on a long-term private contract is typically the host consumer, who, upon formalizing their prosumer status, retains the right to sell only the surplus to their designated electricity supplier.

### 3. Ownership of generation and energy storage facilities

As a general principle, the generation or storage facility should remain under the investor's ownership. At the same time, the utility provides the necessary space and consumes the generated electricity under a long-term agreement.

Alternatively, ownership can be structured through a Joint Venture (a community-and-investor Special Purpose Entity), in which both the private business and the municipality hold equity. This model requires the municipal utility to change its organizational and legal form to a Limited Liability Company (LLC) or a Joint Stock Company (JSC). This Joint Venture structure is particularly advantageous for leveraging the financial resources of International Financial Institutions (IFIs) for the project.

## Step 4. Aggregation and pipeline building: from a single project to community scale and a regional cluster

Establishing individual generation and storage facilities creates a landscape of fragmented projects within a community. Aggregation turns these single projects into a portfolio. However, implementing this model requires a clear delineation of statutory market roles.

To build a legally compliant and commercially viable model, a local community must structure its energy management across several distinct functions:

- **Demand consolidation via Centralized Purchasing Organization (CPO).** Rather than a single entity buying and physically distributing electricity, the community can utilize a Centralized Purchasing Organization (CPO) to consolidate the demand of all its Municipal-owned Enterprises (MoEs). The CPO organizes centralized procurement to secure optimal wholesale pricing and reduce administrative burdens. Aggregated demand and a smoother load curve can improve the community's purchasing position, while concentrating procurement expertise at the CPO level reduces the need for each MoE to maintain its own specialized market team.
- **Dedicated local market operations (BRP and aggregator).** To unlock market benefits, the community may consider establishing or engaging a specific market entity. Provided this entity secures the necessary licenses and market statuses, it can operate as an electricity supplier, a Balance Responsible Party (BRP), and/or an aggregator. This licensed entity would be responsible for optimizing forecasting, managing imbalances, and potentially aggregating the MoEs' generation and storage installations. For MoEs that do not hold a market license, the BRP function is currently performed by their electricity supplier, so a basic configuration can operate under



the current market design. However, a more advanced community-level model would require a dedicated BRP/aggregator to manage the community portfolio as a single, optimized position.

- **Surplus management for prosumers.** MoEs with prosumer status can monetize their excess electricity primarily through the self-generation mechanism (net billing). In the future, the community's model may evolve to feature a properly licensed market entity that provides commercial optimization of these surpluses across organized market segments.
- **Storage and flexibility optimization.** MoEs with prosumer status may use battery energy storage systems within the limits of their permitted contractual capacity. Aggregating these storage assets would allow a community BRP or aggregator to optimize them as part of a wider flexibility portfolio, including for imbalance reduction and potential participation in ancillary services and balancing markets.