



**Beyond the Crisis:**

**REsilience**

**REconstruction**

**REcovery**

Dr Ievgeniia Kopytsia

Since the start of full-scale invasion in 2022, Russian armed forces has been deliberately targeting energy infrastructure facilities. Primarily target: power substations responsible for electricity transmission across the country, and some power generating facilities.



**March – August 2024:**  
**Biggest (9-wave) targeted attack on energy infrastructure**



# FACILITIES ATTACKED BY REGION

*The boundaries and names shown and designations used on this map do not imply official endorsement or acceptance by the United Nations.*



**Prior 2022, Ukraine could generate up to 32 GW of power, with actual generation around 25 GW.  
Today, Ukraine struggles to produce 9GW.**

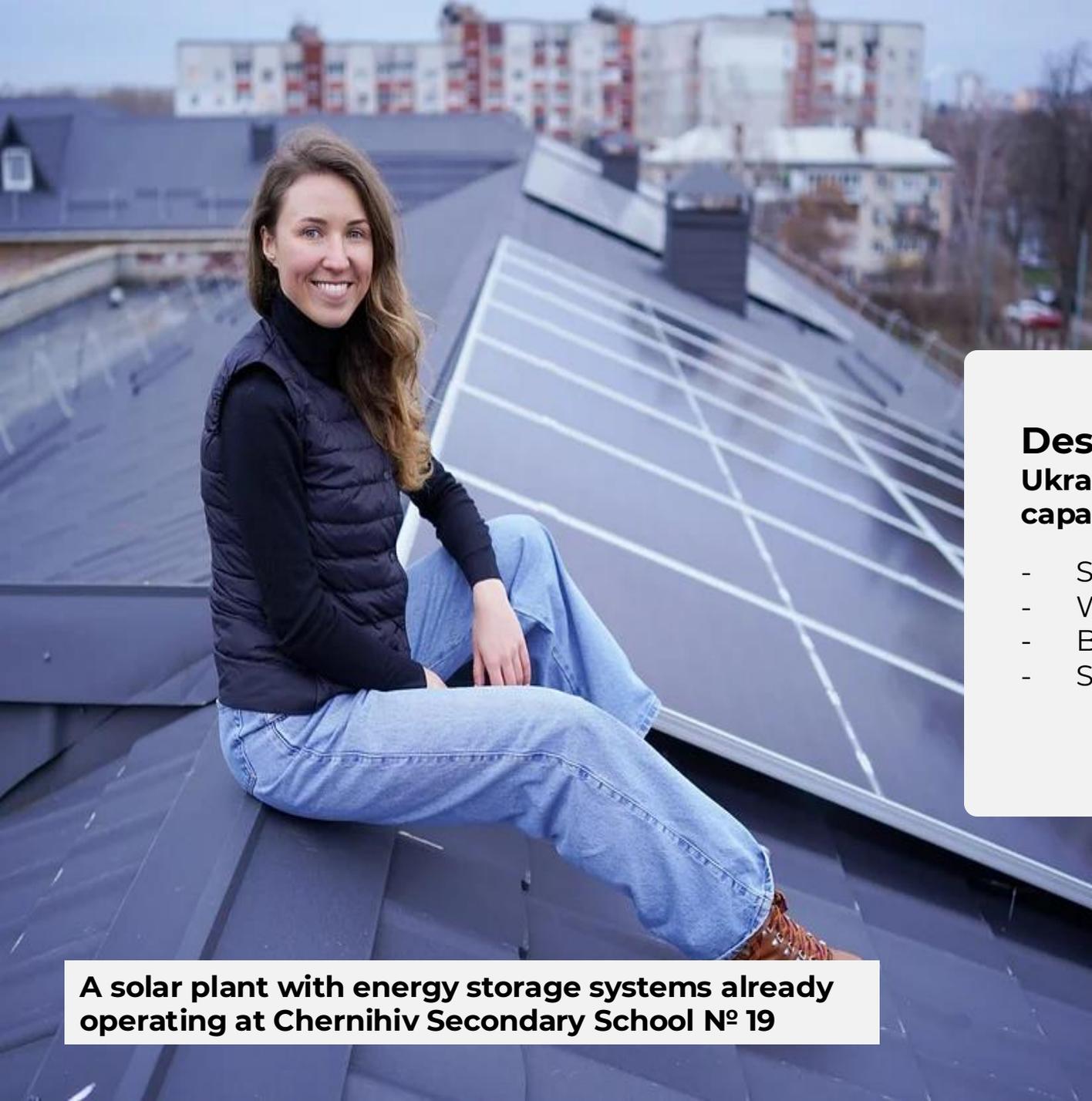
## Lessons Learnt

- **Centralized infrastructure is vulnerable**
- **Traditional energy systems struggle to balance security and sustainability**
- **Interlinked strategies are essential**, focusing on:
  - Building community energy resilience.
  - Phasing out fossil fuel dependence.
  - Supporting locally managed, people-centered infrastructure
- **Renewables-oriented reconstruction enhances energy security and accelerates net-zero transition efforts.**

**Lessons Learnt:**

**Energy Transition is NOT a luxury**

**We do not have the luxury of time**



**A solar plant with energy storage systems already operating at Chernihiv Secondary School № 19**

**Despite active war phase, Ukraine commissioned 650 MW of new renewable capacities (2022–2023):**

- Solar Power Plants: **371 MW** (287 MW from households).
- Wind Power Plants: **227 MW**.
- Bioenergy Facilities: **50 MW**.
- Small Hydropower Plants: **1 MW**.

**30 kilowatt solar power plant installed on the roof of Boryslav Hospital.**

Opened on January 7, 2024, it will produce ~ 25,000 kWh per year, saving up to 35% of the electricity needed to operate the building.

Funder: Ukrnafta, in cooperation with the City Council



# Solar-plus-storage systems inaugurated at two Ukrainian hospitals

Two Ukrainian hospitals recently hosted inauguration ceremonies for hybrid solar and storage systems that have been installed through an initiative spearheaded by the RePower Ukraine Charitable Foundation.

AUGUST 2, 2024 **PATRICK JOWETT**

COMMUNITY

INSTALLATIONS

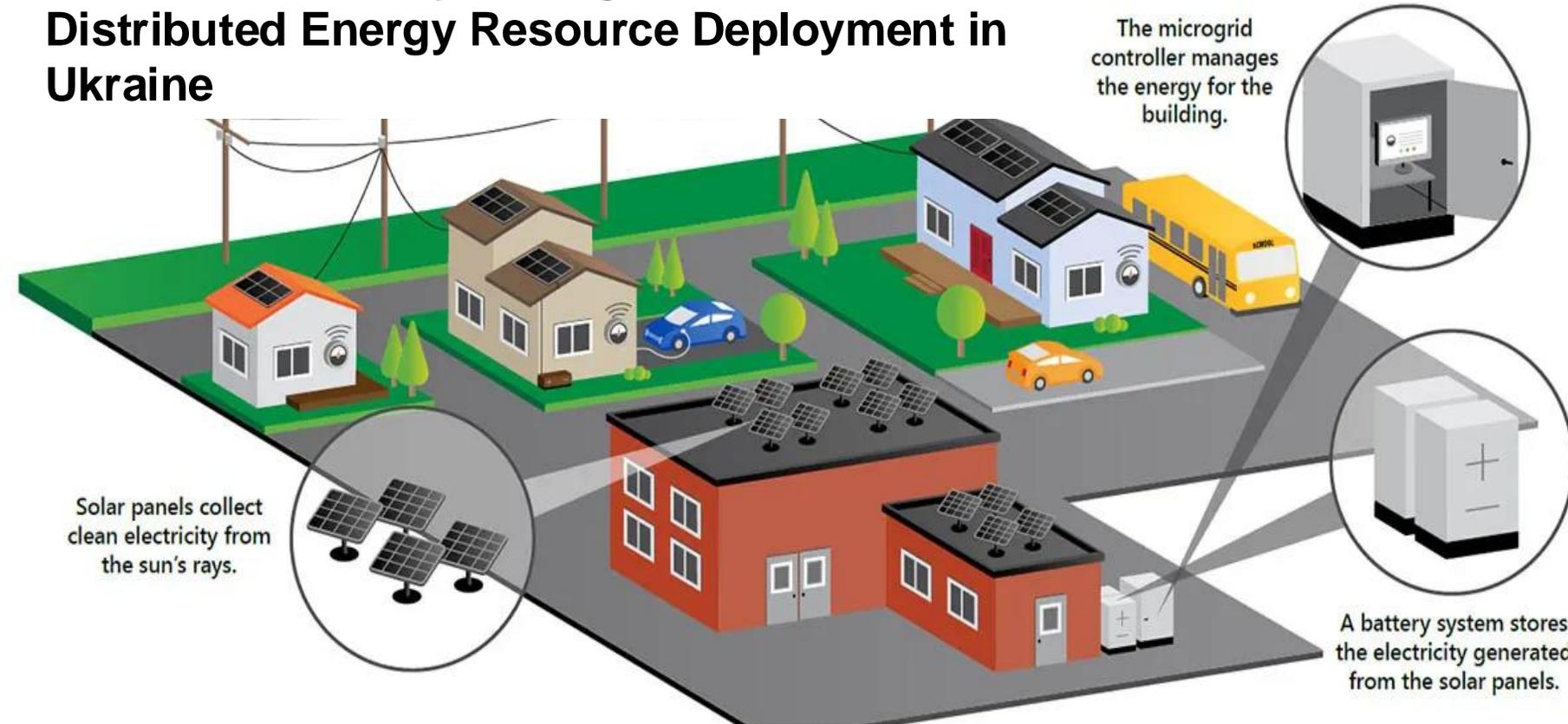
MARKETS

UKRAINE



Hospitals in the Ukrainian cities of Kharkiv and Brovary have begun benefiting from solar-plus-storage energy systems, installed through an initiative led by charitable foundation RePower Ukraine.

# Merefa Community Microgrid: Distributed Energy Resource Deployment in Ukraine



The project by National Renewable Energy Laboratory, supported by the U.S. Agency for International Development (USAID) and the Net Zero World Initiative.

A 6.06 MW-DC PV system, with 4.4 MW of assets - already operational or under construction, a 2.5-MW battery energy storage system with 4-hour capacity and dual 532-kW natural gas reciprocating engine generators, plus balance-of-plant equipment.

A total estimated capital cost of \$9.85 million USD, with projected annual operations and maintenance costs of \$1.02 million USD, while anticipated first-year wholesale market participation revenues are estimated at \$0.65 million USD.

The microgrid's resilience capabilities are demonstrated by its 87% probability of maintaining critical load service during extended 96-hour outage periods, ensuring reliable power supply during grid disruptions.

# Energy Transition is a key PILLAR of UKRAINE's Reconstruction and EU accession



## Net-Zero

A market-based approach could boost net-zero transition efforts in the long term and provide energy security. These achievements could drive net-zero technologies down their respective cost curves and build a pathway to faster decarbonization in other countries of the EU.



## Energy security

Developing a strongly renewables-oriented energy sector in Ukraine and its integration into the EU energy market will contribute to European supply diversification.



## Innovation

Ukraine offers a special opportunity to concretely develop a leading model for decarbonization through technological change.



## Just transition

Technical and policy solutions supporting rapid low-carbon transition in post-war Ukraine will result in significant net socio-economic and ecological benefits.

## 4 SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL PROTECTION

### AREA: GREEN TRANSITION AND ENVIRONMENTAL PROTECTION, CRITICAL RAW MATERIALS



#### PURPOSE

The integration of build-back-greener and no one left behind principles in all sectors, to decarbonize the main carbon-intensive sectors of the economy and build climate change- adapted infrastructure in the course of reconstruction, aligned with EU standards, to accelerate sustainable development, spread of circular economy practices and stimulate economic growth

#### 8 CONDITIONALITIES AND RECOMMENDATIONS

- Ensuring climate policy in accordance with the Paris Agreement and the UN SDGs, preparation and adoption of the Climate Law
- Adopt the law on environmental control and the legislation harmonising with the industrial emissions acquis
- Support for nature restoration measures aimed at protecting biodiversity, preserving ecosystems, ensuring sustainable forestry, reducing water pollution
- Adopt primary and secondary legislation to continue the reforms initiated in water.
- Implementation of circular economy principles: approval and implementation of the Strategy and the corresponding action plan, adopt primary and secondary legislation to continue reforms initiated in the field of waste management
- An upgraded e-cabinet of subsoil users with additional functionalities of access to national register of special permits for subsoil use allowing requesting and obtaining e-licences and providing access to digital geological data is operational

#### KEY EXPECTED RESULTS

- The Law of Ukraine "On the Basic Principles of State Climate Policy" adopted.
- The Law on environmental control adopted
- The Law on Prevention, Reduction and Control of Industrial Pollution adopted
- Laws and CMU acts adopted to continue waste management reforms
- Law adopted amending the national program for Ukraine's mineral resource development until 2030

**7** laws to be adopted

# #1

**Short-term rebuilding of mission-critical infrastructure with a focus on timeliness & minimized budgets.**

- energy efficiency technologies, decentralized structures of supplying units
- Bringing national grids to the EU level digitalization for transmission system operators and distribution system operators
- Decentralised systems based on energy cells will help to establish new economy models like energy communities based on a tailored regulatory framework

**Creation of the preconditions for attracting funding from public and private sources to support the re-building.**

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# #2

**The installation and the use of renewable energy across the country, with a focus on rural or agricultural landscapes.**

**New facilities and industrial objects are created :**

- based on the “green economy” principle
- aiming to reduce environmental risks and ecological scarcities
- focusing on sustainable development without degrading the environment.

**Ukraine can become a role model for the EU**

# Important Legislative Updates | Promotion of RES

## Joint Law "On Amendments to Certain Laws of Ukraine on the Restoration and Green Transformation of the Energy System of Ukraine" - "Green Transformation Law"

adopted 30 June 2023

### Development of small distributed generation, in particular on the consumer side

- Incentives for wind turbines, small SPPs until the end of 2023 and long-term preservation of incentives for small domestic SPPs.
  - the Net Billing option for households
  - RES facilities can supply electricity to neighboring enterprises at contractual prices during periods of emergency or planned restrictions in the power system
- An opportunity for investors to install generation capacity on the site of consumer enterprises with the subsequent supply of electricity for the needs of these enterprises at contractual prices.

### Guarantees of Origin

- The launch of a domestic GO market provides a fast track for additional income for RES producers under a new market model from 2026
- Allows Ukraine to avoid additional taxation of its goods imported into the EU countries from 2026
- Confirms the "green" status of Ukrainian electricity generated from RES (solar, wind, biomass, biogas, hydroelectric power plants) and exempts goods produced with its use from import tax

### Auction Model to support for the development of commercial (large-scale) RES

- Auction winners receive compensation from the Guaranteed Buyer for the difference between the feed-in tariff or auction price and the market value of electricity.
- The model reduces the need for balancing reserves in the system
- It reduces the price of "green" electricity on a competitive market basis
- It allows the state to regulate the amount of introduction of new RES capacities, their types (solar/wind/biomass) and locations in accordance with the capabilities and needs of the power system.

### The Establishment of direct Corporate Power Purchase Agreements

- enables industries to directly purchase green electricity, facilitating the decarbonization of production chains in line with the GHG protocol
- is particularly relevant for exporters, considering the introduction of the EU CBAM
- implies that unmodernized enterprises in Ukraine with significant GHG emissions will be required to pay a fee at the EU border (CBAM) to export products to the EU

## Energy Storage | Legal updates

### Law of Ukraine “On Amendments to Some Laws of Ukraine Regarding the Development of Energy Storage Facilities”

- creates the state enterprise Energy Storage Operator
- launches an energy storage system
- enables RES producers to install power batteries without applying for a license
- Expects a need for system capacity of 0.5 – 2 GW.

**The law is meant to motivate energy producers to install their own battery storage facilities to mitigate issues with imbalances in the system.**

# National Renewable Energy Action Plan until 2030

**Envisages an almost 10 percent increase in the total share of renewable energy in gross final energy consumption by 2030**—from 17.3 percent in 2025 up to 27.1 percent by 2030.

In order to achieve such an ambitious increase, the following investments will be required:

- **US\$11 billion for generating capacity**
- **US\$1.4 billion for balancing capacities**
- **US\$6.6 billion for heating production from renewables**
- **US\$1.2 billion for increasing the share of renewables in the transportation sector**

In August 2024, the Ukrainian transmission system operator ran two auctions for long-term ancillary services contracts, to attain the construction of more than 1.1 GW of balancing capacity.

By the end of 2024, it plans to run pilot auctions to distribute a quota of support for 110 MW of new renewable energy facilities. The Ukrainian government also launched a tender to build 700 MW of new high maneuverable generation.

# **National Energy and Climate Plan (NECP) 2025-2030**

**Aligns with European Commission guidelines (Regulation (EU) 2018/1999) and focuses on economic recovery and decarbonisation.**

**Critical for unlocking financial assistance from the EU, particularly through the Ukraine Facility.**

## **Key objectives include:**

- Reducing GHG emissions by 35% by 2030, relative to 1990 levels.
- Achieving climate neutrality by 2050 in the energy sector.
- Phasing out coal generation by 2035 and increasing renewable energy share in final energy consumption to 27% by 2030.

## Legal Challenges



**Fixed price caps limiting Ukraine's ability to import electricity from Europe as the country lives with a severe shortage of generation capacity after Russian air strikes on energy infrastructure.**



The transition to a green and sustainable energy industry needs an **overarching legal framework** that consolidates the legal status quo of Ukrainian energy law with the requirements of the EU and international agreements and sets out a corresponding transformation path.



Approximation with EU regulations on transparency and stability in the European energy markets must be developed. **Financial and political independence of the energy regulators must be ensured.**



**Energy efficiency** is a fundamental principle for ensuring long-term sustainability and resilience in the energy sector of Ukraine, that should be properly embedded within a cross-sectoral legal framework.



Ukraine must improve its alignment with the EU acquis in various energy policy domains and enhance administrative capacity to ensure effective implementation and foster sustainable and equitable economic development.

### **Market limitations:**

Structure of the Ukrainian market, energy prices are being further suppressed for household consumers, while there is not enough state funding available to cover the difference and power Ukrainian homes with electricity imported from the EU.

### **NECP implementation:**

Current bans on natural gas exports and technical issues related to cross-border energy trade must be addressed for Ukraine to fully integrate with EU markets.

Limited access to financing for certain projects, such as those related to gas and oil, poses a challenge. Ukraine is pushing for inclusion in EU-funded programs like the European Hydrogen Bank.

War-Related Uncertainty: Ongoing military aggression adds a layer of unpredictability, particularly concerning the timeline for rebuilding damaged infrastructure and the country's ability to attract international investment.

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# Preliminary Legal Study



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Roadmap for a climate-neutral,  
sustainable Ukrainian energy sector  
and its role in an integrated EU  
energy market



## Learn more:





# Europe-Ukraine Energy Transition Hub (EUETH)

The Europe-Ukraine Energy Transition Hub (EUETH) aims to leverage the reconstruction of Ukraine's energy sector through technological innovation and legislative and regulatory modernization to help bring about a prosperous and vibrant economy in the postwar period.

By bringing together an interdisciplinary team of experts, the EUETH aims to support the efforts of European and international institutions to strengthen Ukraine's governance, regulatory frameworks, and market mechanisms in the field of energy, sustainability, and climate action. The initiative establishes a permanent research hub situated in Berlin and Kyiv, dedicated to continued research and policy dialogue on Ukraine's energy transition.