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EU4ENERGY PHASE II

Integrating Renewables and Flexibility in Ukraine's Power System

Ruslan SLOBODIAN
Commissioner, NEURC of Ukraine

November 13-14, 2025
Paris

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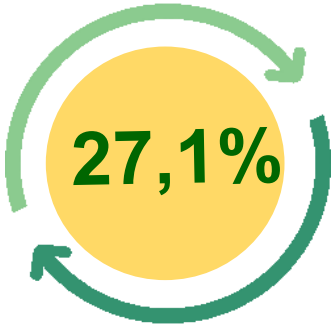
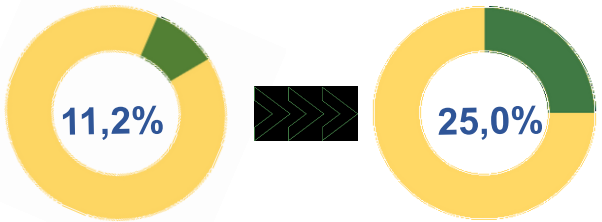
Context & National Targets

The National Energy and Climate Plan until 2030

Target-2030 for RES share in gross final energy consumption:

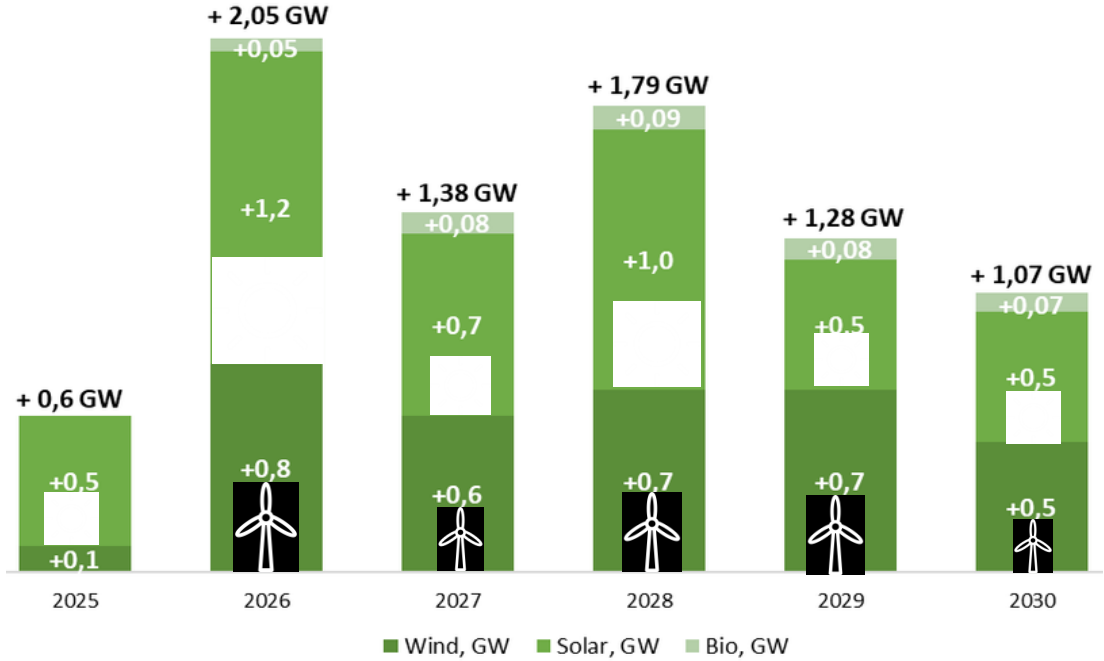


Target-2030 for RES share in total electricity mix:



2024 — 2030 (general national RES target)

Required capacity increase to achieve the 2030 targets:



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Impact of Attacks on Ukraine's Energy Infrastructure

In 2022 after the full-scale Russia's invasion of Ukraine:

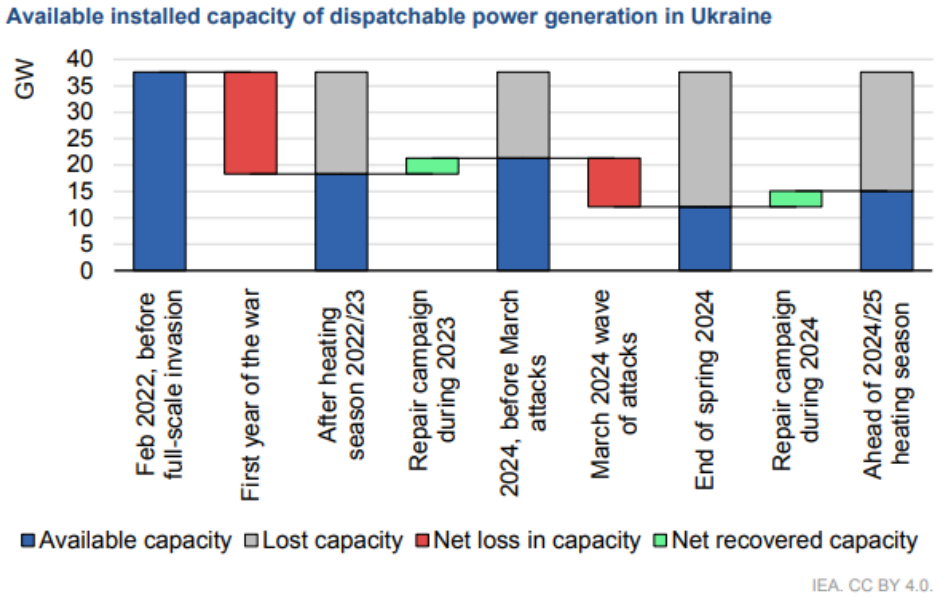
RES capacities occupied or damaged:

≈ 90% of wind
≈ 20% of solar

One of the war crimes:

In October 2025, **Russian drones damaged 3 wind turbines** at the Kramatorsk wind park, each with a capacity of 4.5 MW, produced **by the Ukrainian manufacturer of multi-megawatt wind turbines.**

Nearly 2/3 of Ukraine's dispatchable power capacity has been occupied, damaged, or destroyed



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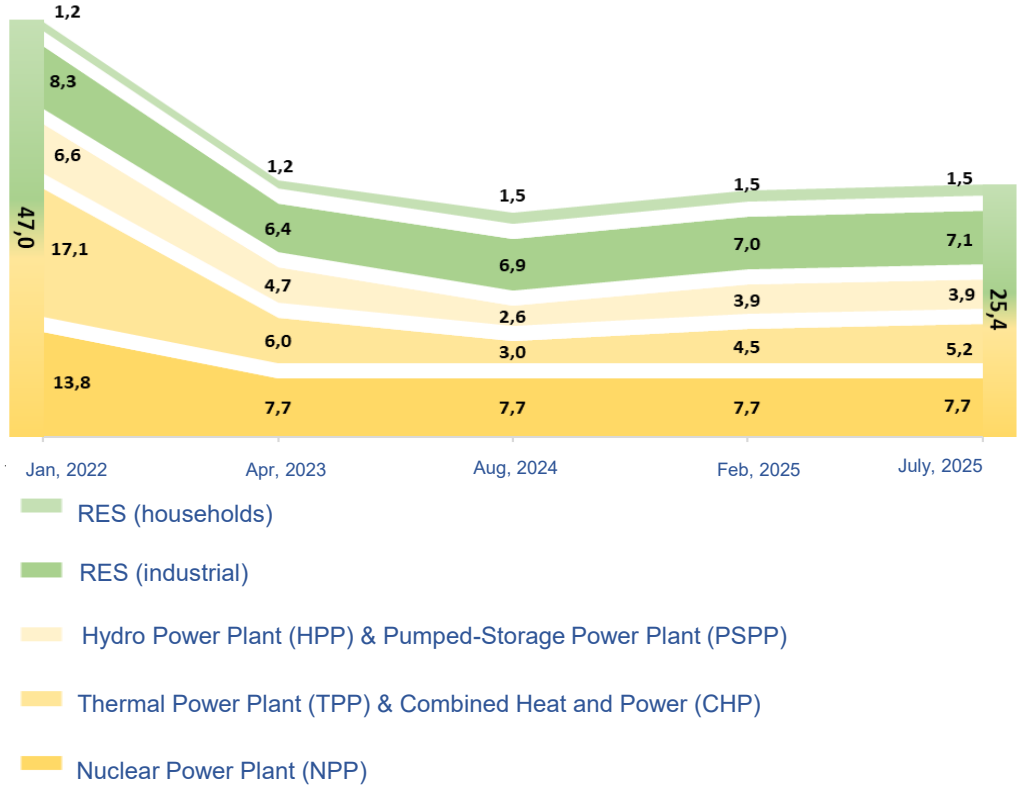
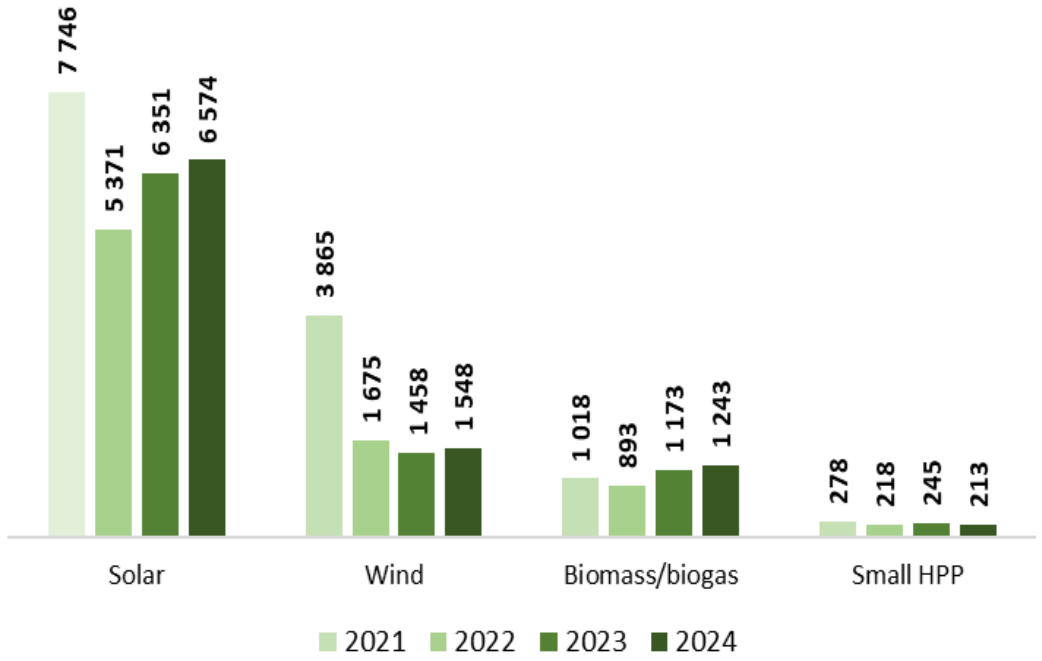
Flexibility Challenges

- Even before the 2022 invasion, Ukraine's grid lacked the flexibility to handle swings in demand and renewable supply.



Dynamics of electricity production from RES by technology for 2021–2024, thousand MWh



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RES development under various support schemes

Feed-in tariffs (FiT)

Est. in 2009, launched since 2013 and valid until 2030

Applicable for industrial RES producers and households

Feed-in Premium (FiP)

Est. in 2024

Applicable for existing RES producers under FiT or RES Auction winners

RES Auctions

Est. in 2024

Support contract duration - 12 years

Contract for Difference (CfD)

Est. in 2024

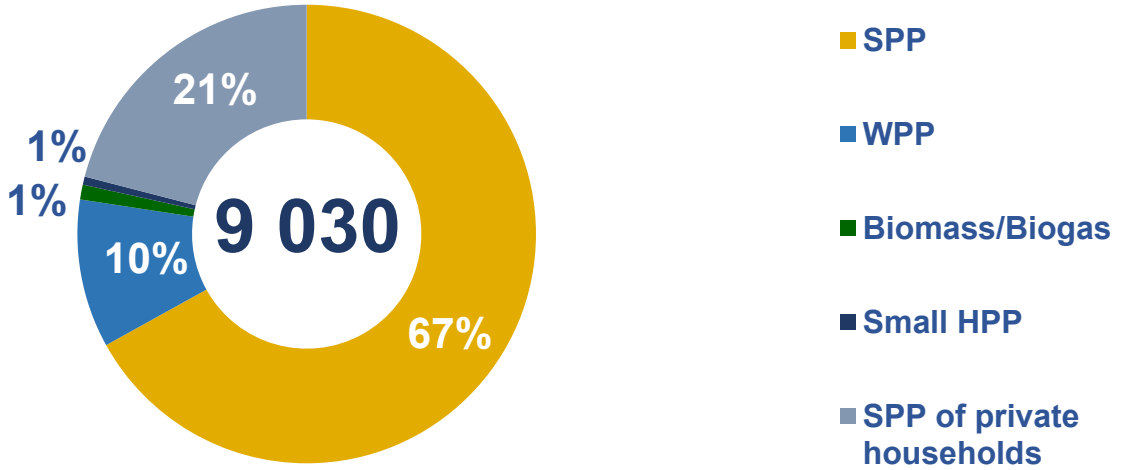
Non-supported RES producers are eligible

Net Billing

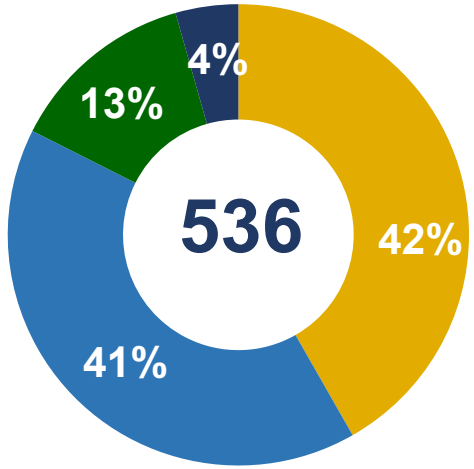
Est. in 2024

Supporting mechanism for active customers

Installed RES electricity capacity under the Feed-in Tariff, MW



Installed RES electricity capacity under the Feed-in Premium mechanism, MW



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Active Consumers

A consumer acquires the status of an ACTIVE CONSUMER when:

- a contract for the sale of electricity under **Feed-in-Tariff** has been concluded
- a contract for the sale and purchase of electricity under the **Net Billing mechanism** has been concluded
- **energy storage** has been installed

2 GW capacity of active consumers

142 MW generation facilities under NET-billing (651 units)

Active consumer and/or consumer has the right to install generating facilities

- Households (up to **50 kW** capacity) selling electricity under **FiT**
- Households (up to **30 kW** capacity) selling electricity under **Net Billing mechanism**
- Small non-household consumers (up to **50 kW**) selling electricity under **Net Billing mechanism**
- Non-household consumers (capacity not exceeding the contracted capacity) under **Net Billing mechanism**
- Other consumers, including energy cooperatives (up to **150 kW**), selling electricity under FiT

Sale of electricity:

- **With storage**: at the DAM price, but not exceeding the household consumer price
- **Without storage**: at the DAM price, based on the hourly balance between supply and consumption

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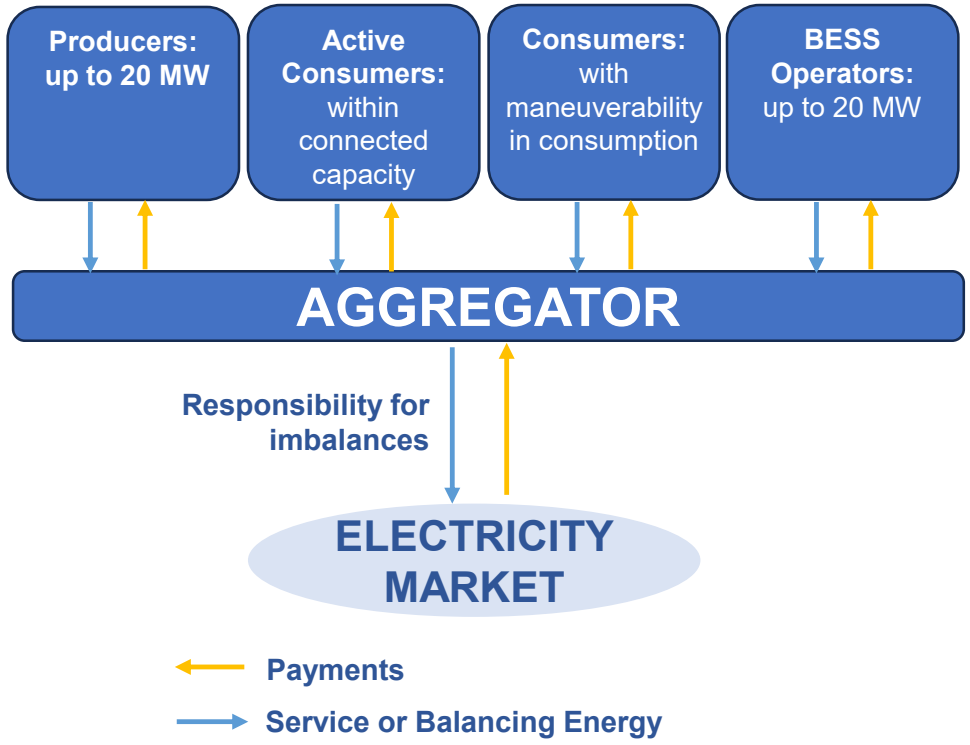
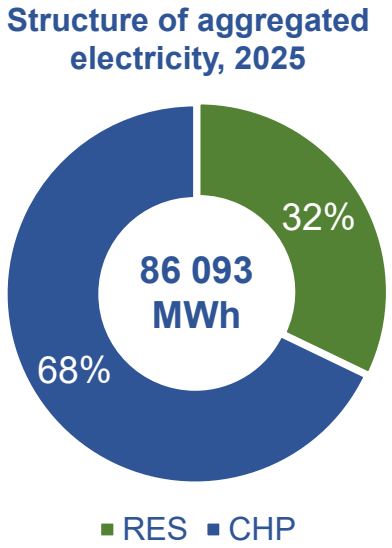
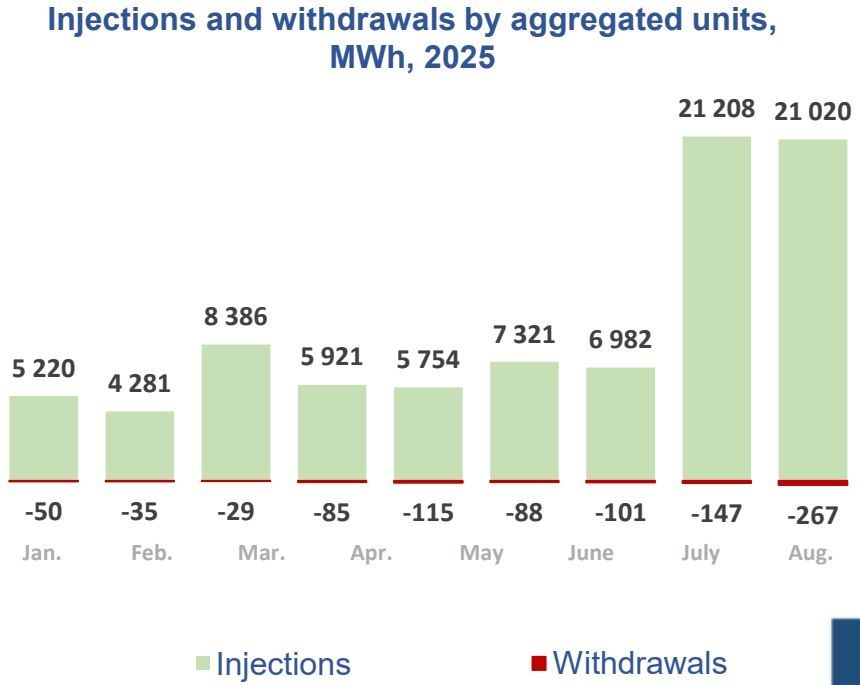
Aggregation Developments

- **First 4 active aggregators** uniting **55** generating facilities started to operate.





- Starting from August 2025, aggregators began **providing balancing services.**



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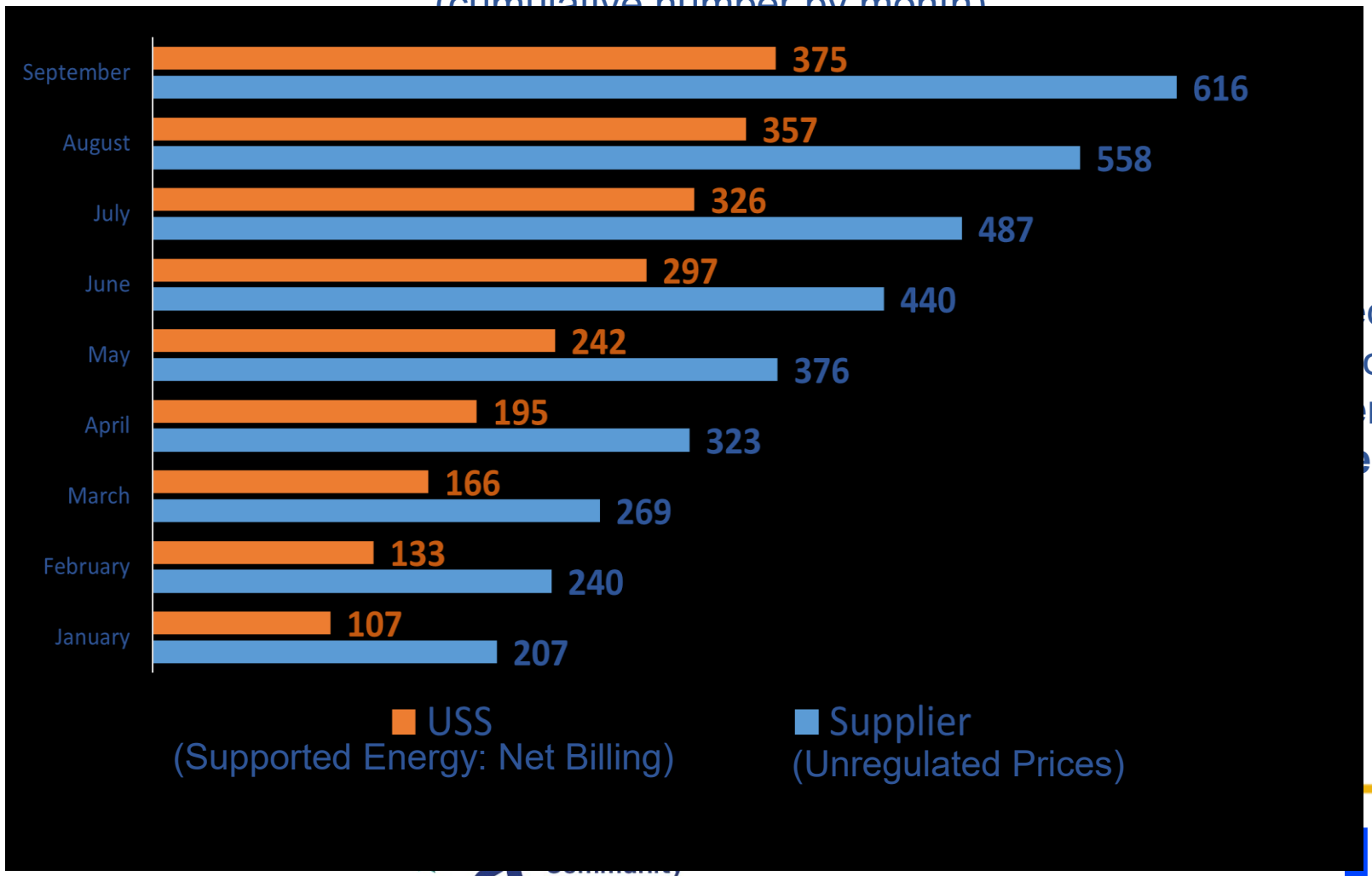
Dynamics of Net Billing contracts in 2025

Number of concluded Net Billing contracts

(cumulative number by month)



ed regulatory framework has boosted
of Net Billing mechanism, **tripling**
r of contracts signed since the
e year.

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Ancillary services

Special Long-Term Auctions for Ancillary Services were introduced

Purpose: TSO conducts auctions to procure frequency and active power control reserves (FCR, aFRR).
Contract duration: 1–5 years, with a possible service start delay of up to 3 years.
Payments: Fixed in EUR, settled in UAH at the official exchange rate at the time of service provision.

Results of 4 auctions

Auction dates		Capacity accepted	Auction Efficiency
15.08.2024 22.08.2024 24.12.2024 27.05.2025	FCR	96 MW	100%
	aFRR	648 MW	50%

Storage projects secured over **100 MW** of capacity

October 2025 – start of ancillary services provision

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Battery Energy Storage System (BESS)

- Simplified connections for storages: granted until 2025
- No separate license needed for RES producers to install BESS

Condition: Grid feed-in ≤ installed capacity

- Technical conditions issued for BESS connection:

3 GW

2.3 GW DSO

0.7 GW TSO

322,6 MW Completed connection to networks with total capacity

1 072,5 MW Ongoing connection

Recently commissioned BESS (Sept. 2025) with capacity 200 MW

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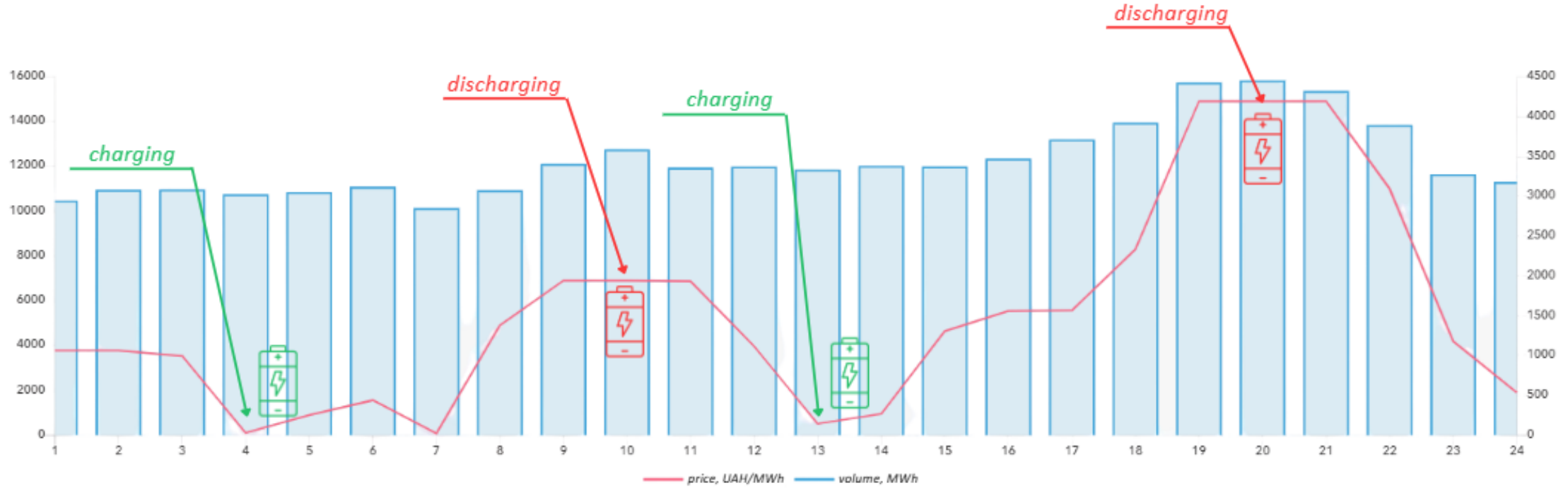
BESS Market Participation

Legislation allows storages to participate in the electricity market on the spot segment as well as through balancing and ancillary services provision.

New August 2025 price caps + growing deficit hours → BESS more appealing for market entry & investment



Example of BESS activity on DAM

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Demand Response Legal Framework

- Demand side management measures/Demand response are legislatively defined in the **Law of Ukraine "On the Electricity Market"** (amendments as of 2024)
- **Generation Adequacy Report** covers scenario-based forecasts of power & energy balances in energy system for short-, medium-, and long-term horizons, **should include DR measures**
- **Electricity Supply Security Monitoring Report** should include data on expected generation, supply, trade, cross-border exchange, and consumption to identify demand-side management measures
- Art. 29 of the Law of Ukraine "On the Electricity Market" provides for **competitive procedures for the construction** of generating capacity, energy storage facilities, and **implementation of DR measures**

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Main Demand Side Management Measures

Differentiated tariff

Reduced peak loads → grid stability + lower consumer costs

- Postponing energy consumption by private households to nighttime periods

2-Zone Meter:
Night (23:00–07:00): **0.5 discount**
Day (other hours): full tariff

3-Zone Meter:
Night (23:00–07:00): **0.4 discount**
Semi-Peak (07:00–08:00; 11:00–20:00; 22:00–23:00): full tariff
Peak (08:00–11:00; 20:00–22:00): **1.5 surcharge**

Real-time pricing

Enables industrial & large commercial enterprises to reorganize production and work schedules

- Price calculated from day-ahead market for respective settlement periods
- Fully automated metering ensures accurate real-time billing and is a precondition

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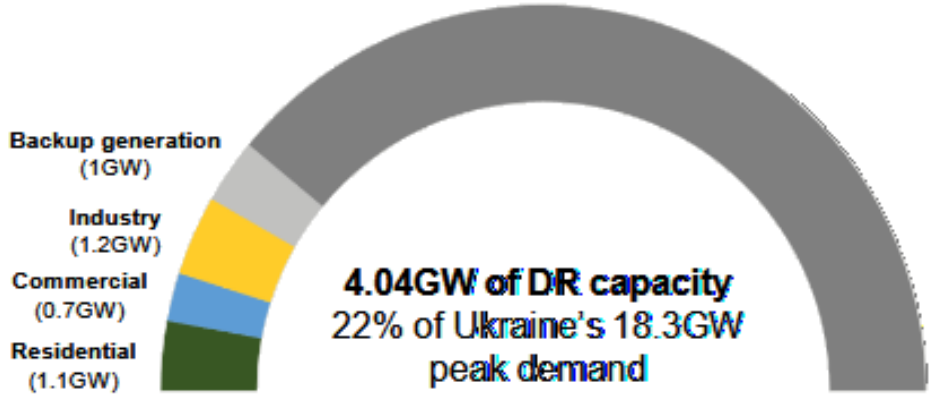
Demand Response as Flexibility Tool in Ukrainian Context

- Urgent need to recover lost electricity generation capacities (DR is complimentary to the new capacity covering)
- Expected decentralized RES electricity generation growth (also potential rising of RES curtailments)
- Minimize import needs arising from destroyed energy facilities
- Harmonization with the EU approaches (acquis transposition and implementation)

DR Potential Assessment Scenarios (ESP, 2025)



According to multiple forecast scenarios, there is DR potential across all consumption segments.

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Estimated DR potential in Ukraine

Explicit DR (for Wholesale Market)

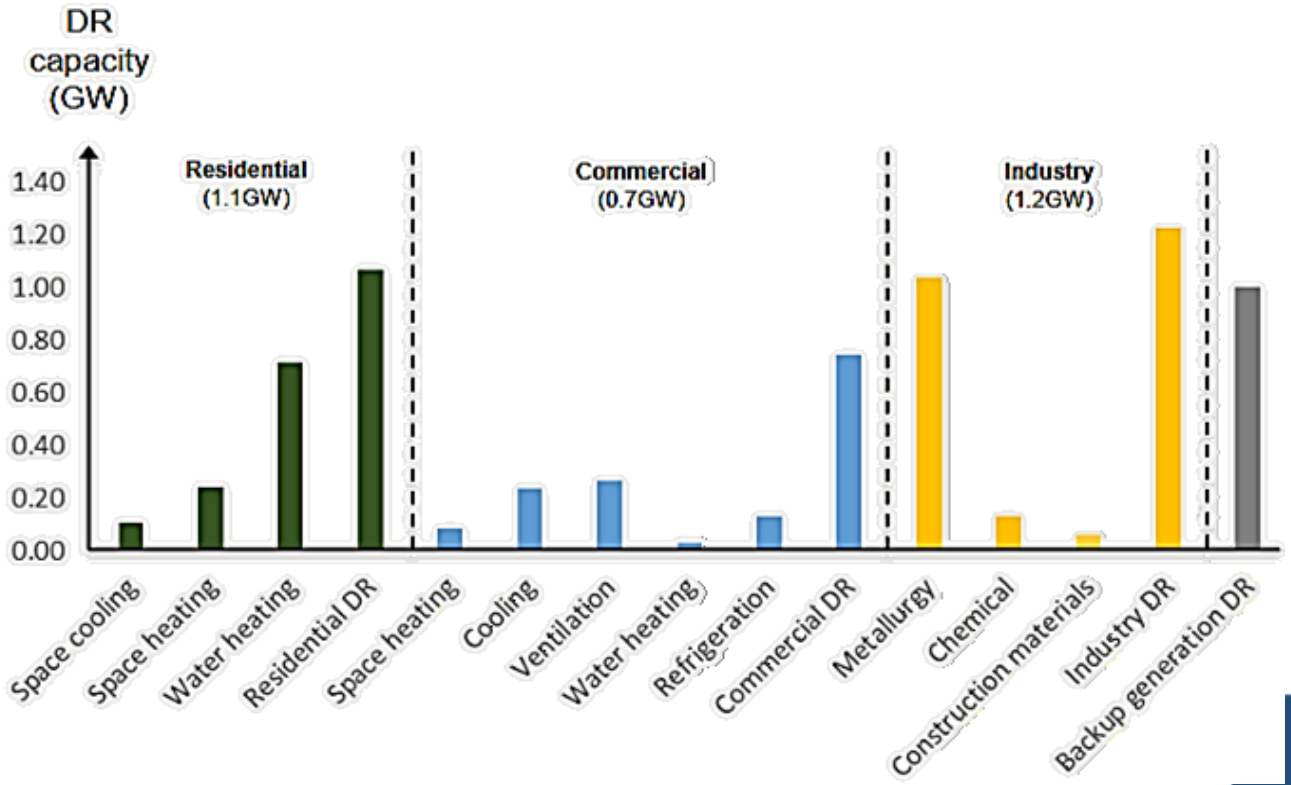
- Functioning of the balancing and ancillary services markets
- Participation in the Balancing Market does not require a mFRR reserve certification and is relatively easy to access by market participants and aggregators

Implicit DR (for Retail Market)

- Smart meters and automation are mandatory to facilitate consumers' participation.

Explicit and Implicit DR complement each other, fitting diverse consumer profiles and needs.

Ukraine DR potential estimates by sector and sub-sector (ESP, 2025)



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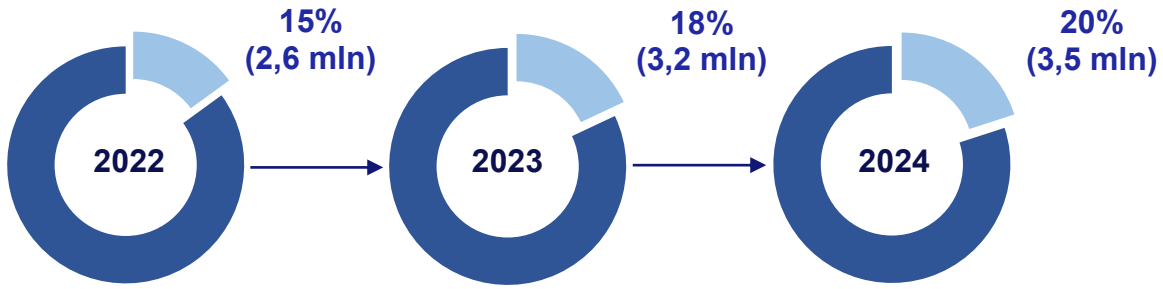
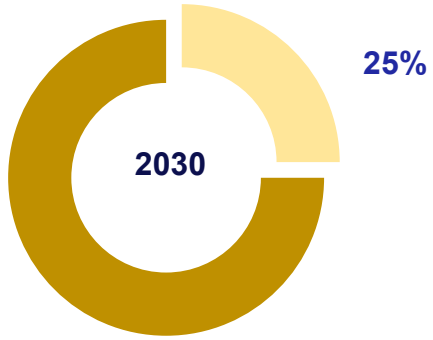
Smart Metering: precondition for flexibility measures

- The government's Concept for **Smart Grid Implementation until 2035**, approved in Oct 2022, explicitly targets nationwide smart metering.

Share of smart metering



Next goal – 25% till 2030*



- **As of mid-2025**, the level of smart meters penetration is **20 %** on average.
- To accelerate this progress, NEURC is working with DSOs to increase smart meter deployment by implementing investment programs.

**according to the Sustainable Development Goals of Ukraine until 2030*

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Current Network Development Plans

Massive investment needs to repair and modernize grids to unlock the potential of flexibility and ensure safe integration of RES

TSO

EUR 1.8 bln — Transmission System Development Plan for 2025–2034

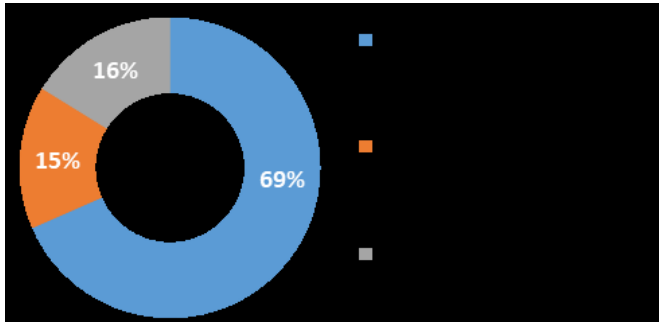
EUR 99.3 mln — “Ukrenergo” investment programme for 2024

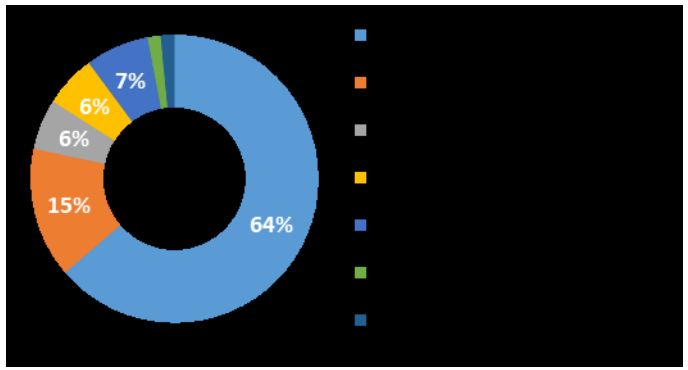
DSOs

EUR 1.8 bln — FYNDPs until 2029 (21 DSOs)

EUR 254.6 mln — Investment Programmes for 2024

Focus Areas of the 2024 Investment Program, %





Grid operators are allowed to redirect investment funds towards immediate restorationn and keeping system operational

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