Distribution system operators in Ukraine: gatekeepers of a decentralised energy system

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Patchwork of Ownership of Ukrainian DSOs

32 DSOs

Network:
818 782 km

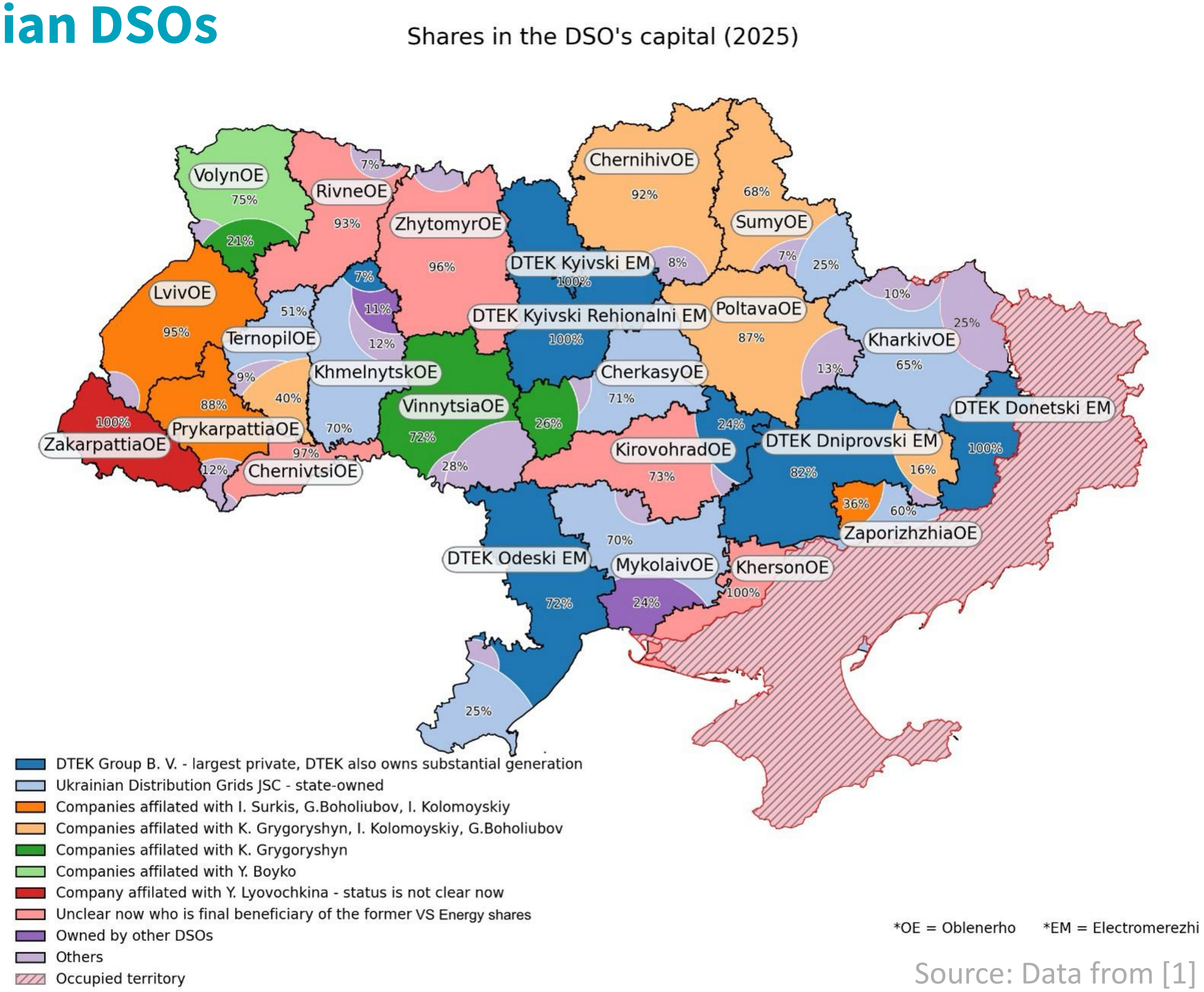
Distributed electricity:
83 TWh in 2024 (115 TWh in 2021)

Ownership:
mixed (mostly private, incl. foreign + state)

Approved investment programs for 2025:
300 mln euro

Approved FYNDP 2025–2029 in 2024:
for 21 DSO €2.0 billion

Voltage level:
0.4 – 110 kV (some even have 150 kV lines)



Source: Data from [1]

* plus LLC "Luhanske Energetichne Obednanya» and 7 smaller DSOs including PRJSC "PEEM TSEK", JSC "Ukrzaliznytsia", PRJSC "DTEK PEM-Enerhovuhillia", LLC "Naftogaz Teplo", SE "Rehionalni Elektrychni Merezhi", LTD "DTEK Vysokovoltni Merezhi", SE PRJSC "Atomservis"

[1] - Energy Map (DiXi Group). (2025, June 19). *The ownership structure of the electricity Distribution System Operators (DSOs)* [Dataset]. (Coverage: 2007-01-01 to 2025-03-31; underlying source: SMIDA). Retrieved October 9, 2025, from https://map.ua-energy.org/en/datasets/ed84c4fa-1419-4c9b-b628-f4330c44ec69

RAB introduction incentivised improvements in DSO operation and investment

- The volume of the DSO investment programme increased by 59%[2] in 2021 as RAB tariff regulation was introduced. In 2021, DSOs implemented almost 95% of the investment program.
- The quality of power supply improved. For example, SAIDI on the company's fault fell from 818 minutes/year in 2020 to 626 minutes/year in 2021. The downward trend continued even during wartime. This excludes interruptions due to third party fault - such as war-related damages.
- Technical losses decreased from 11.2% in 2022 to 10.6% in 2024.

Despite improvements in DSO performance following the introduction of RAB, wartime constraints, coupled with specific regulations (e.g., tariff freeze for households), **weakened incentives**.

=> **The upcoming 2nd regulatory period presents a crucial opportunity to stimulate further investment.**

[2] - Eurelectric, & Association DSO(E)–Ukraine. (2021, September 7). *Joint letter to the European Commission (DG Energy) on modernisation and synchronisation of the Ukrainian power sector*. https://www.eurelectric.org/wp-content/uploads/2024/06/ukrainian_dso_eurelectric_letter-2021-030-0428-01-e.pdf

Electricity Distribution Tariffs differ widely among Ukrainian DSOs

Tariffs for Electricity Distribution Services as of 01.01.2025 (Voltage class 1)

Note: Voltage class 1 are consumers connected to lines of more than 27.5 kW, or a consumption of more than 150,000 MWh per month.

Source: National Energy and Utilities Regulatory Comission of Ukraine (NEURC)

Regional distribution tariffs for Voltage class 1* consumers vary significantly — the highest is more than double the lowest, reflecting structural differences in distribution networks—such as network density, customer base size, and operational complexity

* Voltage Class I (≥ 27.5 kV): mainly large industrial & infrastructure consumers (e.g., rail).

Households on regulated PSO; competition only for business

Universal Service Supply (regulated)

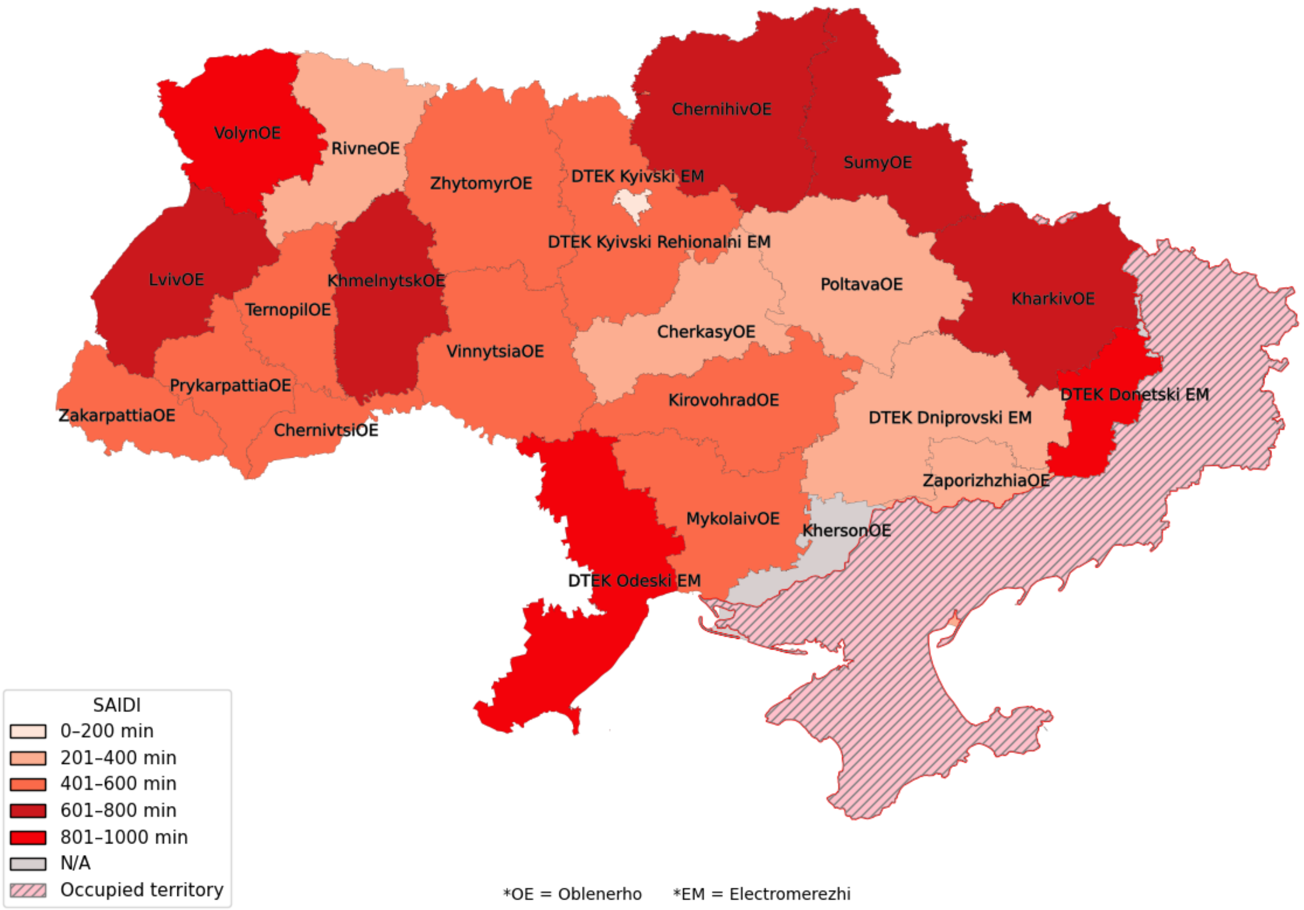
- Since 2018, 25 universal service suppliers deliver electricity to households at regulated PSO prices, significantly lower than the market price.
- Each of these suppliers has an exclusive regional territory (oblast). DSO-affiliated retail suppliers are thus the dominant suppliers to households.
- Obligation: serve any household that requests a supply.
- Result: households have no economic incentive to look for an alternative supplier.

Competitive Supply (unregulated)

- All businesses may purchase from any licensed supplier at free (unregulated) prices.
- In practice, large consumers contract directly with commercial suppliers.
- Small businesses can choose: competitive supply or USS (regulated).
- Commercial suppliers do not target households, as demand for non-USS contracts is absent.

Ukraine showed the lowest reliability of electricity supply in Europe … only few DSOs managed to approach reliability level of weak EU members

Average interruption duration in electricity supply (SAIDI) due to DSO's fault (2024)



Source: Data from [4]

CEER benchmarking (2018 data, published 2022[3]):

- **Ukraine overall:** >690 min
- **Western Europe:** <55 min
- **CEE/SEE EU members:** <105 min

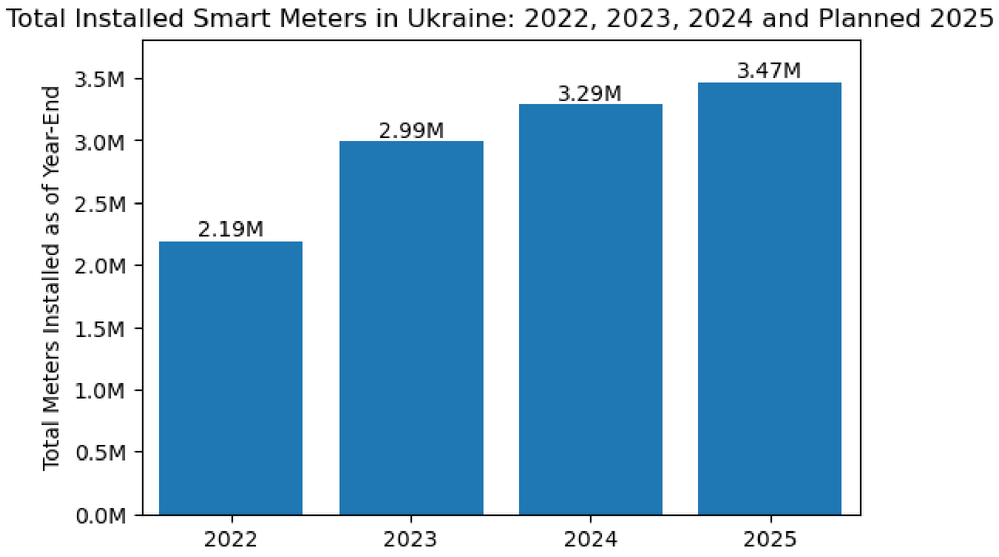
In Ukraine, only **DTEK Kyivski EM** stayed below 200 min

[3] - Council of European Energy Regulators, & Energy Community Regulatory Board. (2022, December 22). *7th Benchmarking Report on the Quality of Electricity and Gas Supply, p.238,* https://www.ceer.eu/publication/7th-ceer-ecrb-benchmarking-report-on-the-quality-of-electricity-and-gas-supply;

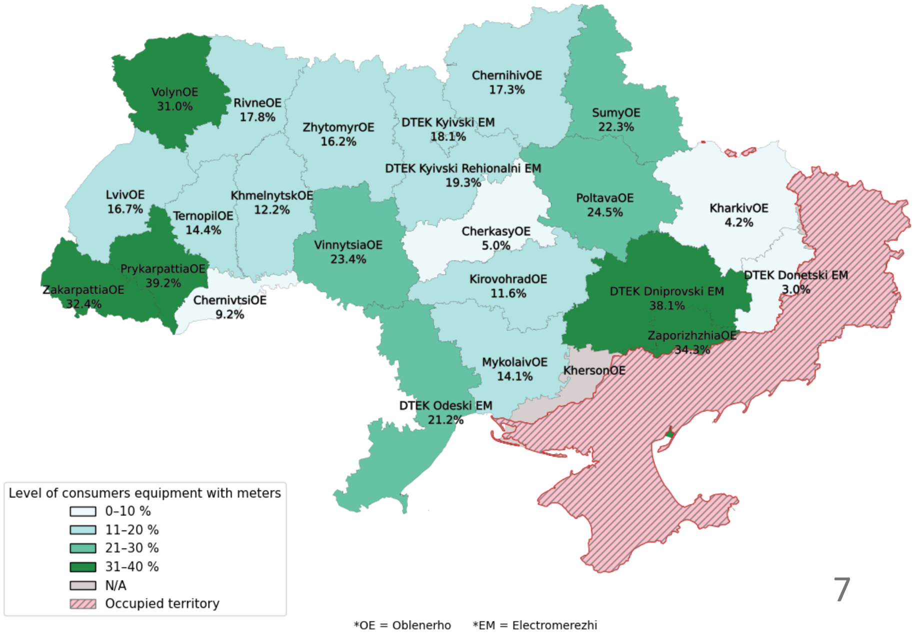
[4] - National Energy and Utilities Regulatory Commission (NEURC). (2024). *Report on the quality of services provided by licensees in electricity supply and centralized water supply & wastewater* [in Ukrainian].https://www.nerc.gov.ua/storage/app/sites/1/Docs/Monitoryng/Zvit_yakist_posluh/Zvit_yakist_posluh_2024.pdf

Smart Metering: Growing, but Unevenly

- As of mid-2025, the level of penetration of SMART meters on average is 20%.
- The government's **Concept for Smart Grid Implementation until 2035**, approved in Oct 2022, explicitly targets nationwide smart metering.
- At the current pace, **100% smart metering** could be achieved **by 2040.**[5]
- To accelerate this progress, NEURC proposes to DSOs to increase smart meter deployment **by 15% starting from 2025.**[5]



Level of consumer smart-meter penetration by DSO (2024)



[5] - National Energy and Utilities Regulatory Commission of Ukraine. (2025, March 12–13). *Customer protection and empowerment in Ukraine: Status quo and perspectives* [PowerPoint slides]. Presented at the European Commission, Brussels, Belgium.

Getting connection to DSO networks: all good on paper

- **Standard Connection (**up to 50 kW, and less than 300 m distance to existing network)
  - According to the regulation, it should not take more than 60 days
  - And indeed avg. standard connection time is reported 58 days
- **Non-Standard Connection** (all other cases).
  - According to regulation, should not take more than 120 (up to 160 kW) to 350 (up to 5 MW) days
  - and indeed avg. standard connection time is reported 95 days

- DSO issues the technical specifications to the customer within 10 working days from the date of receiving the request.

- Connection fees are set annually by the Regulator, based on location (region, urban/rural), voltage level, and reliability category.

- Connection of energy storage facilities and EV charging stations – lower connection charge by January 2025 – to incentivise their penetration.

DSOs work under substantial financial constraints

Regulatory and Market Challenges, incl:

- Supplier of Last Resort fails to compensate DSOs
- Sanctioned DSOs

DSOs (excluding frontline DSOs) own a lot of money to other market participants*:

- €83 m for transmission services
- €100 m for dispatching services
- €376 m for imbalances

DSOs are owned a lot of money*
(as of 20.07.2025)

- Non-household consumers: €56 m
- Electricity suppliers: €105 m (incl. USS €88 m)
- **Arrears from previous years:** €78.4 m (48.8% of total)

Tariffs:

- Tariff revisions are still ahead – future changes may influence consumer payment levels and DSOs' financial stability.
- No mandatory audits were conducted in the first year of the war. Audits resumed last year, leading to estimated tariff cuts of €180 million (excluding DSOs near the frontline).

Access to capital market: Due to regulatory, commercial and legal risks, Ukrainian DSOs seem to have no access to capital markets (and limited access to bank loans).

** State of play June-July 2025, info from NEURC*

What’s Holding Ukrainian DSOs Back: Challenges in Focus

- **War-related challenges:**
  - **Damages** to the distribution sector amount to approximately €620 million[6]
  - **Shifting demand** due to population/business relocation to Western regions → need to integrate new producers and loads
  - **Managing outages**
  - **Lack of unified data publication** practices across DSOs
  - **Limited tariff recovery** close to the frontline
- **Decreasing net demand**
- **Deteriorating reliability** of an ageing grid
- **Financial constraints**: Debts, DSOs face limited access to capital due to wartime conditions and a lack of mechanisms for reimbursing external investments

[6] - Government of Ukraine, World Bank Group, European Commission, & United Nations. (2025, February 25). *Ukraine — Fourth Rapid Damage and Needs Assessment (RDNA4), February 2022–December 2024.* https://www.undp.org/ukraine/publications/ukraine-fourth-rapid-damage-and-needs-assessment-rdna4-february-2022-december-2024-english

Transition-related Challenges

- **Decentralisation pressures**: rapid growth of RES, storage, EVs, heat pumps → DSOs must handle variable, less predictable flows.
- **Connection queues**.
- **Flexibility gaps**: assessment of flexibility (e.g. demand response, storage) and network reinforcement remains limited. Smart metering can help unlock demand-side potential.
- **Permitting, supply chain, and workforce shortages** delay projects.
- **Digitalisation lag**: insufficient data, forecasting, and observability of low-voltage networks; requires capital and skilled staff, even harder under wartime conditions.

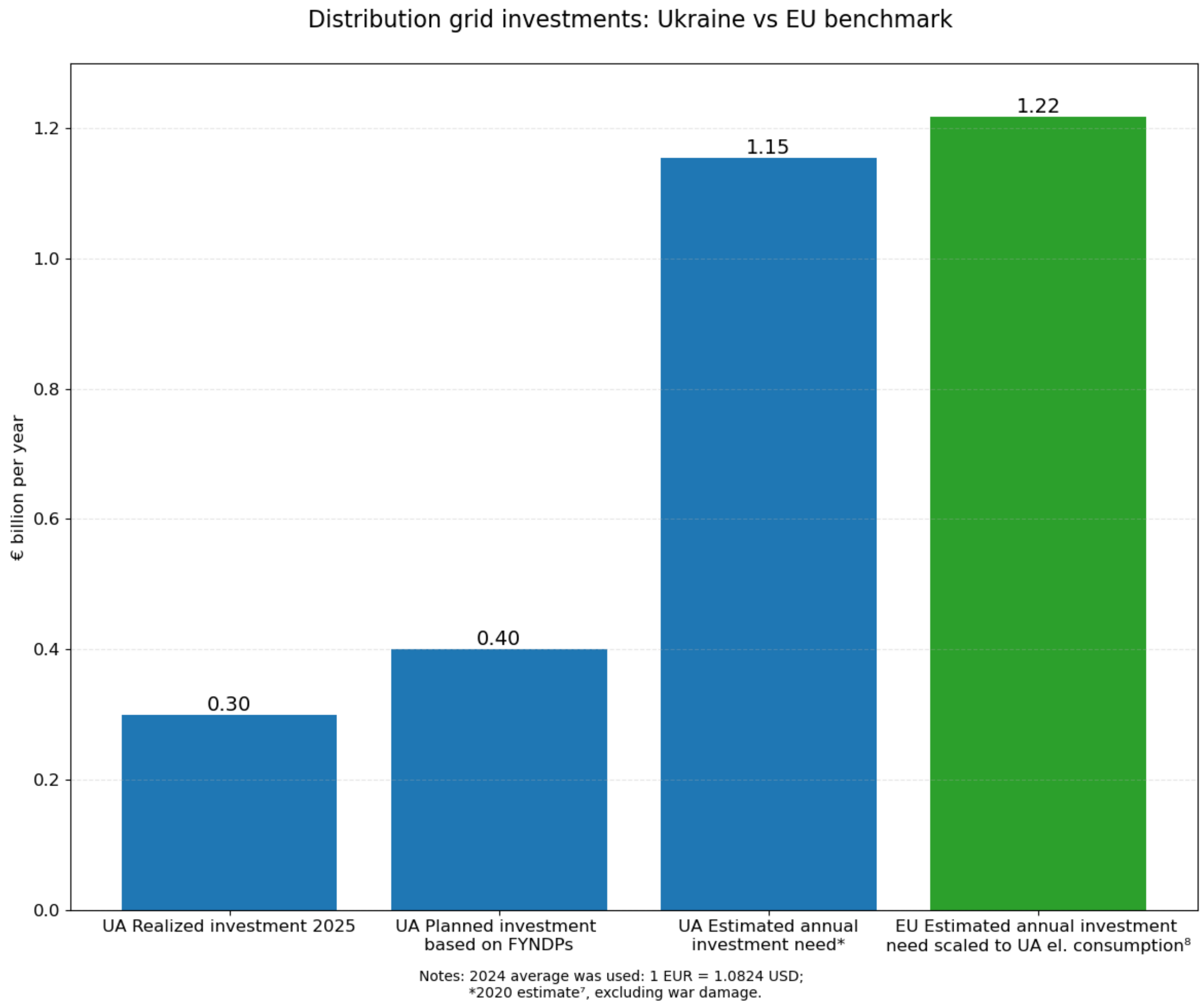
As BTM generation and microgrids spread (especially for industry), DSOs risk massive revenue decrease unless tariffs evolve and new business models emerge. Current BTM capacities are around 1.5 GW (solar).

EU accession-related Challenges

Where Ukraine, for example, is not yet aligned:

- **Partial implementation** of the binding Energy Community acquis.
- Need to strengthen **NEURC's governance and independence**.
- **Network development plans are incomplete**, they lack
  - detail on capex, flexibility
  - transparency and proper stakeholder consultation
  - alignment with national plans (NECP, RES targets, and TSO planning).

Investability and Tariff Adequacy



- Realised 2025 and planned 2024-2029 **investments fall short of the estimated need** (which aligns with investment needs assessed for EU peers)
- **Regulatory incentives still unclear** - ongoing review for the second regulatory period starting in 2027.
- **Financing predictability:** Unstable tariff regulation undermines investment attractiveness and EU/IFI funding access.
- **Loan serving** not properly accounted for in tariffs.

[7] - State Enterprise “Ukrpromzovnishekspertyza” (Ukrainian Industry Expertise). (2020). Implementing the RAB model in Ukraine’s electricity distribution system [Presentation, in Ukrainian]. https://www.expert.kiev.ua/wp-content/uploads/2020/06/pr11062020_final_min.pdf
[8] - Eurelectric, & E.DSO. (2021, January 14). Connecting the dots: Distribution grid investment to power the energy transition. https://www.eurelectric.org/publications/connecting-the-dots/

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