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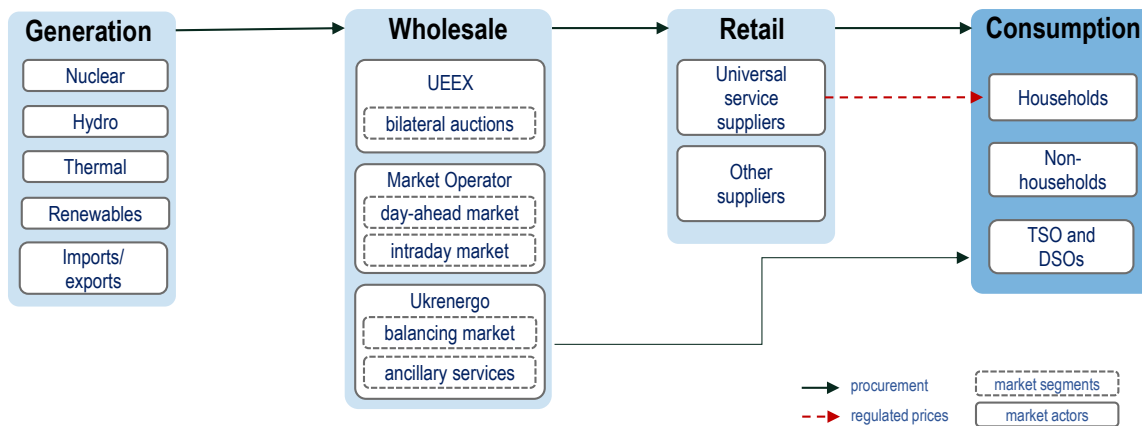
Market functioning and regulatory framework

This chapter describes Ukraine's wholesale electricity market, identifies different wholesale submarkets, and describes their functioning. It then describes the Ukrainian retail electricity market, which can be demarcated into several segments. It presents two important public service obligations, one protecting households from high electricity prices and the other supporting generation from renewable energy sources. These public service obligations have a profound impact on Ukraine's electricity market.

Liberalised electricity markets, in the simplest description, allow producers to sell electricity wholesale to suppliers that agree supply contracts with consumers in the retail market. In practice, they involve multiple parties and varying degrees of complexity. Imports and exports complement domestic production, traders buy and sell electricity, and large consumers may buy directly on the wholesale market. Wholesale markets consist of several submarkets and retail markets are often segmented.

Ukraine's overall electricity market design is shown in Figure 3.1.

Figure 3.1. Electricity market design in Ukraine



Several variations of overall electricity market design are possible. Ukraine's market design closely resembles those of EU countries. This is significant, given Ukraine's and the EU's ambitions to increase the integration of their electricity markets. The main platform driving these efforts is the Energy Community. With Ukraine's status as a candidate for EU membership, close alignment with EU rules has become even more vital.¹

3.1. Wholesale market

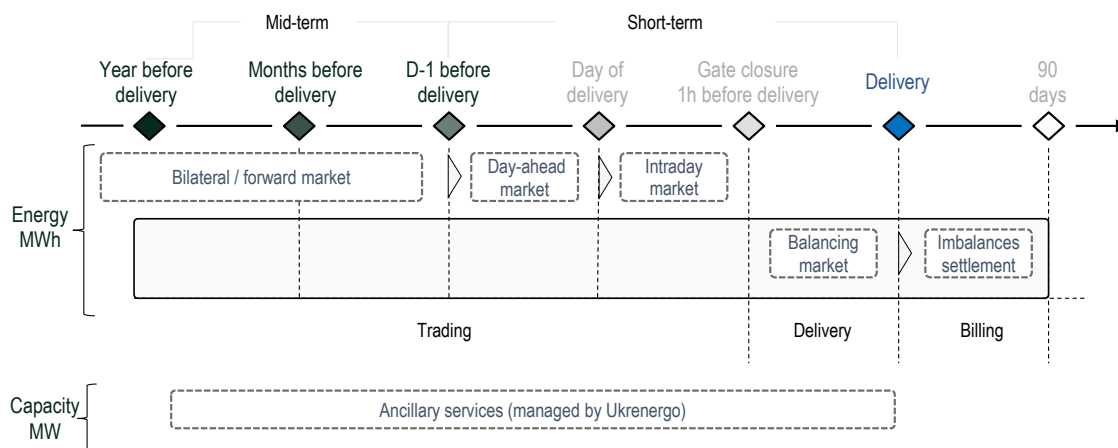
Wholesale markets are where large volumes of electricity are traded before being delivered to consumers such as households, businesses and public institutions via the transmission and distribution network. Wholesale electricity markets play a central role in the operation of any competitive power system, serving as the basis for retail prices.

In general, wholesale electricity markets comprise different market segments that fulfil distinct but related roles. The main differentiating characteristic is the timing of market exchanges in relation to the delivery and consumption of electricity. Key short-term markets are the day-ahead market (DAM), the intraday market (IDM) and the balancing market (BM). On these markets, trading takes place between one day to near real-time to delivery. Longer-term markets, called forward markets, are for electricity delivery further in advance. In Ukraine, the bilateral agreement market (BAM) offers forward trading.

In addition to timing, there is also a distinction between energy markets and capacity markets. An energy market matches demand and supply for electricity at a given time (for the next day, in the case of the DAM). A capacity market, conversely, does not cover the actual delivery of electricity but matches demand and supply for the readiness, or capacity, to produce electricity if needed. In essence, capacity markets procure a promise to produce. Capacity markets are often described as ancillary services.

Figure 3.2 presents the sequence of Ukraine's wholesale electricity market and the different market segments.

Figure 3.2. The sequence of Ukraine's wholesale electricity market



3.1.1. Bilateral agreement market

Electricity can be traded through bilateral agreements between two parties. Sellers are typically producers and buyers are typically suppliers, but other types of market participants are also common, such as traders and large industrial electricity consumers. Bilateral contracts may specify any delivery time and duration in the future. They can be concluded on a purely bilateral basis or facilitated by brokers. Due to the fact that they are fulfilled in the future, they are forward contracts.

In many countries, forward contracts are the dominant mode of electricity trading. In France, for example, around seven times more electricity is sold on the forward market than on the DAM (CRE, 2021^[1]). The main reason is that forward contracts allow sellers and buyers to reduce their exposure to short-term price fluctuations. This is crucial for financial planning by both producers and suppliers. Bilateral contracts also offer privacy to the parties if they wish not to disclose the conditions of their agreements.

In Ukraine, the Electricity Market Law (EML) stipulates that market participants have the right to conclude bilateral agreements at freely negotiated terms, but with certain exceptions.² There is an indirect limit on bilateral sales as producers and importers must sell certain volumes on the DAM. State-owned producers may sell bilateral contracts only in electronic auctions. Further, there is a maximum limit of 50% bilateral sales between vertically integrated entities.³

Most bilateral agreements are concluded on the platform operated by the Ukrainian Energy Exchange (UEEX). Bilateral agreements outside the UEEX play a minor role. The bilateral market on the UEEX is Ukraine's largest wholesale electricity market by volume, accounting for 78% of total sales in 2021, up from 75% in 2020.⁴

The requirements for organising and conducting electronic auctions via the UEEX are set out in the "Procedure for conducting electronic auctions for the sale of electric energy under bilateral contracts" (Auction Procedure) and its subsequent amendments.⁵ Detailed trading rules govern interactions between the UEEX and market participants.

The UEEX offers two types of auctions: one-way auctions and two-way continuous auctions. In one-way auctions, there is single initiator (seller or buyer) and an unlimited number of counterparties can participate, provided they comply with auction regulations. In two-way continuous auctions, there is no single initiator and an unlimited number of sellers and buyers can participate simultaneously, also subject to auction regulations. The two-way continuous auction platform was set up by the UEEX in August 2022, but at the time of writing had not been used.

One-way auctions are further divided into special, commercial and export sections that have their own rules and purposes. The special section is reserved for sales under specific public service obligations (PSOs). The commercial section is open to all market participants. Participation in it was previously voluntary, but EML amendments in July 2021 made it mandatory for all producers. The export section was created in July 2022 and is meant to be temporary. There have been no auctions yet in the export section.

The EML empowers the National Energy and Utilities Regulatory Commission (NEURC) to limit the maximum duration of bilateral contracts to a period of six months. NEURC has not set a general term limit for contracts, but Cabinet of Ministers of Ukraine (CMU) Resolution No. 499 limits the duration of bilateral contracts in the special section to 12 months,⁶ and to 36 months for contracts of a certain size.⁷ The commercial section has no duration limit.

Table 3.1 provides a breakdown of sales on the UEEX in the fourth quarter of 2021. Most auctions took place in the special section, accounting for 83% of total volume. In terms of sellers, the special section consists of a small number of companies.

Table 3.1. Bilateral auctions by section, Q4 2021

Description	Special section	Commercial section	Total
Number of auctions	274	107	381
Number of initiators/sellers	19	52	71
Sales volume (GWh)	26 658	5 570	32 228

Source: UEEX (2022_[2]) UEEX report Q4 2021, https://www.ueex.com.ua/files/ueex_electricity_q4_2021.pdf.

The shares of market participants across the sections varies substantially. For instance, the commercial section is dominated by thermal producers (including combined heat and power [CHP]), with DTEK holding a significant share as a seller, while in the special section, Energoatom is the biggest seller.

Special section

The special section serves market participants with special duties to ensure the public interest in the functioning of the electricity market, as defined in the Auction Procedure. The sellers are exclusively electricity producers entrusted with special responsibilities and the Guaranteed Buyer (GB).⁸

The trading rules for the special sections are set out in the “Regulations on organisation and holding of an electronic auction on the sale of electricity on the commodity exchange”.⁹ This governs interactions between the UEEX and market participants.

Under the latest version of the PSO for households, Energoatom must sell part of its output to universal service suppliers (USSs) through electronic auctions on the UEEX. (Until 1 October 2021, Ukrhydroenergo also had to do so.) In these auctions, the maximum price may not exceed the price determined in accordance with the PSO Act.

The GB must sell part of the electricity it acquires under the feed-in tariff (FiT) support scheme (see Section 3.3.2) in the special section of the UEEX.¹⁰ Any market participants may participate as buyers in sales initiated by the GB on a voluntary basis. To initiate an auction, the GB must indicate the starting price and amount of electricity offered, as well as the period of supply. For a short time in 2020, the starting price could not exceed the price determined by a specific formula.¹¹ The formula was based mainly on the GB’s sale prices on the DAM and the IDM. In October 2020, the minimum price requirement was removed.¹² Since then, the GB has been free to set the starting price, but the maximum duration of supply contracts remains limited to 12 months.¹³

Commercial section

In the commercial section, electricity market participants can conclude bilateral contracts under freely negotiated conditions. Prices, volumes, delivery times and other conditions (such as settlement) are agreed between producers and buyers. Any market participant not excluded by legislation can participate. The TSO, DSOs and the GB are excluded from selling in the commercial section.

Participation was previously voluntary, but in July 2021, Law No. 1 639-IX introduced a temporary requirement for all producers (except RES producers on the FIT) to conclude bilateral sales exclusively via the UEEX.¹⁴ The stated aim of this amendment was to ensure transparent and equal terms for all producers regardless of their ownership structure (state-controlled producers already had such an obligation). With the latest amendment of Article 66 of the EML, this requirement was made permanent.¹⁵

The trading rules for the commercial section are set out in the “Regulations for the organisation and conduct of electronic auctions for the purchase and sale of electricity under bilateral contracts in commercial sections on the commodity exchange”.¹⁶

Products sold in the commercial section are not standardised, although the initiator of each auction sets several key parameters for transactions. These include the starting price, the lot size (MWh to be delivered), the number of lots, a guarantee fee and the period of supply.

The UEEX publishes monthly and quarterly price indices for baseload supply. This information contributes to price transparency on the wholesale market and is the only source of regular price reporting outside the short-term market (DAM or IDM). Table 3.2 shows the quarterly price index for the fourth quarter of 2021 and the first quarter of 2022.

Table 3.2. UEEX quarterly baseload price index (IPS trade zone), 2021-22

Delivery period	Price (UAH/MWh)	Volume (MWh)	Value (million UAH)
Q4 2021	2 038.8	3 359 889	6 850
Q1 2022	2 330.2	811 784	1 892
Q4 2022	2 705.6	1 435 850	3 885
Q1 2023	2 993.8	485 775	1 454

Source: UEEX (2022_[3]) Quarterly BCM Indices, <https://www.ueex.com.ua/eng/exchange-quotations/electric-power/indexes/>.

The monthly and quarterly price indices indicate the weighted average price for baseload energy in the IPS trade zone. It is calculated by dividing the total value of sales within the month/quarter (excluding VAT) by the total amount of baseload electricity. Only contracts in the commercial section are included in the calculation. It should be noted that commercial contracts with a weighted average price of more than 10% above the weighted average price are excluded from the calculation (UEEX, 2023_[4]).

Two-way continuous auctions

The trading platform for two-way continuous auctions has existed since 10 August 2022. The UEEX developed it following a proposal by the Ministry of Energy and market participants.

It offers trading of standardised products. As such, the sales schedules (base, peak, off-peak), the delivery period (month) and other conditions (payment terms, warranty contribution) are all pre-defined.

Market participants reportedly had an overall positive view of this new trading model but trading never took place due to a lack of applications from producers. The UEEX attributed this to:

- inconsistent and unpredictable policy by the regulator in setting maximum price limits (market participants expect a revision of the maximum prices, which does not motivate to conclude contracts for longer periods)
- a large share of regulated volume (not available to the competitive segment)
- the availability of alternative segments (specialised and commercial sections) for the sale of electricity by producers
- a lack of support for product standardisation by the regulator.¹⁷

NEURC disagrees with UEEX's assessment and stresses that it has proposed improvements for the rules and functionalities of the new auction platform.

Auction rules

Auction participants are required to transfer a guarantee fee to the UEEX. This provides a degree of financial security for the effective conclusion of bilateral agreements. The fee is established by the auction initiator but cannot exceed 25% of the value of the electricity offered, calculated using the starting price. Bidders can submit their offers and counter-offers only within the limits of the guarantee.

Within the auction, a position can be initiated by a seller or a buyer. If the initiator is a seller, interested buyers submit offers to buy a lot (or package of lots) on the seller's terms. If the initiator is a buyer, interested sellers submit offers to sell a lot. Depending on the type of initiator (seller or buyer), the bidding is for price increases or decreases.

During the auction, initiators are allowed to adjust certain parameters of their positions, as long as they are not traded at the time of the adjustment. In particular, they can adjust prices, combine lots¹⁸ into packages, adjust the number of lots in packages,¹⁹ and withdraw all or part of the lots. Initiators can also exclude any counterparty from bidding for their positions.²⁰ This must be done before the auction and must be notified to the auction administrator.

During the bidding period, auction participants can submit proposals for the offered lot (or package of lots). If a proposal is not accepted, an improved bid can be made (the minimum increase/decrease is 1 UAH/MWh). Software automatically ranks the counter-offers according to their prices.²¹ The initiator can either accept or reject the best counter-offer selected by the software. If a counter-offer is accepted, other buyers have a window of opportunity during which they can increase their price offer.

At the end of the auction, the UEEX draws up auction certificates for each transaction that stipulate the agreed conditions. This concludes the bilateral contract between the seller and the buyer and makes the conditions final.

There are certain rules and restrictions that aim at ensuring fair competition in accordance with the Law of Ukraine on the protection of economic competition.²² In particular, the number of lots that can be combined into a single package is limited, as is the amount of electricity in each auction item.

In June 2019 the Ministry of Energy established an auction committee to monitor compliance with the auction rules.²³ The committee has the power to set requirements for organising and conducting auctions, and to change the auction rules. It approves the auction regulations and their amendment. It monitors auction regulation compliance by both auction participants and the auction organiser, develops and provides auction organisers with recommendations on measures aimed at supporting fair competition, establishes procedural requirements for the organisation and conduct of bilateral continuous auctions and to orders of settlement (if necessary), approves exemplary forms of bilateral contracts for the purchase and sale of electricity, and oversees the annual schedule of auctions. The committee is comprised mainly of public authority representatives, including a representative from the Antimonopoly Committee of Ukraine who has only an advisory vote. Each seller has one representative with an advisory vote on the committee.

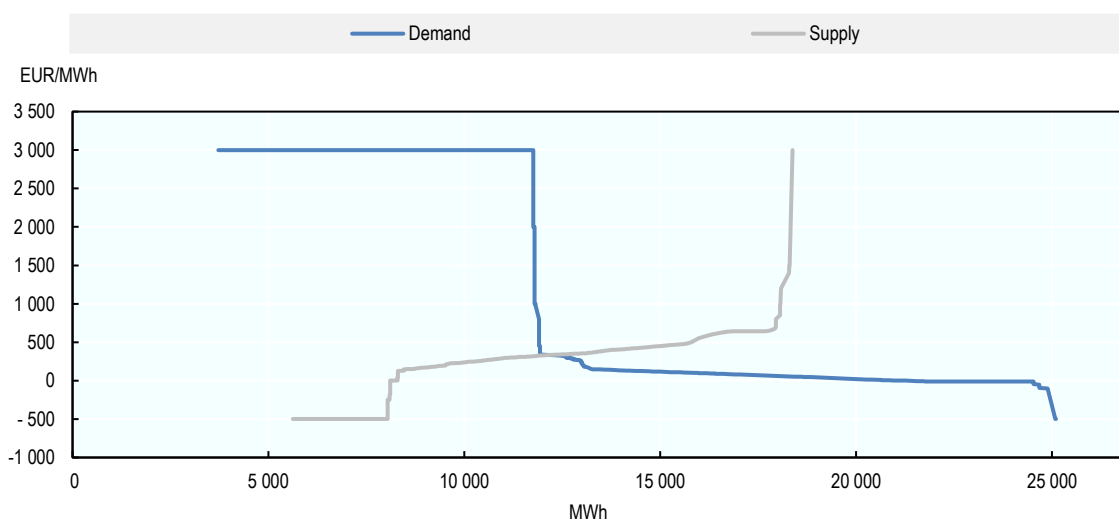
3.1.2. Day-ahead and intraday markets

Electricity spot markets are used to buy and sell electricity in a short timeframe ahead of delivery. Spot markets consist of the DAM and the IDM, both of which are indispensable parts of the wholesale electricity market.

On the DAM, electricity is traded for delivery on the next day through an online blind auction. Once a day, market participants submit their orders, indicating their willingness to buy and/or sell electricity for the following day. Each purchase/sale order specifies a volume, price and delivery hour(s).

Based on the orders received, the operator of the DAM establishes a demand and a supply curve for each hour of the following day. The intersection of the two curves determines the price and volume. The equilibrium price is referred to as the clearing price. Figure 3.3 shows a real-world example of matching supply and demand for a single hour (6-7 p.m.) on the French day-ahead market.

Figure 3.3. Example of supply and demand on the day-ahead market, 3 March 2022



Source: OECD based on data provided by EPEX.

All sell orders equal to or below the clearing price, and all buy orders equal to or above it, are accepted. All accepted orders receive/pay the same clearing price. This pricing formation method is referred to as marginal pricing, uniform pricing or pay-as-cleared. The hourly clearing prices constitute a reference point for the bilateral market, making the DAM an essential segment for the functioning of the entire wholesale electricity market.

The DAM allows electricity to be traded close to delivery and offers some protection against real-time price volatility. DAM prices can signal the need for flexibility during specific time periods, incentivising long-term investments (Schittekatte, Reif and Meeus, 2019^[5]).

The IDM allows producers and consumers to adjust their positions after closure of the DAM. IDMs are normally organised as continuous markets, meaning that electricity is traded around the clock. In some countries, continuous trading is complemented or sometimes replaced by individual auctions.

Although the design of DAMs is similar across OECD countries and largely harmonised in the EU, the same cannot be said about IDMs. In some countries, such as Belgium, France and the Netherlands, shortly after a DAM auction, continuous trading with hourly products is possible. In other countries, such as Spain,

multiple intraday auctions are held. In Germany, a combination of continuous trading and auctions is used (Schittekatte, Reif and Meeus, 2019^[5]).

In continuous trading, market participants can submit buy and sell orders for electricity for delivery on the same day. Trades are completed when a buy order and a sell order are matched. To facilitate matching, the delivery period, also called settlement period, is standardised, typically in one hour, half-hour or 15-minute units. Prices are determined separately for each settlement period and each trade. This price setting mechanism is referred to as pay-as-bid.

The IDM offers market participants a high level of flexibility, as they can adjust their positions at very short notice and in close to real time. It enables the optimisation of electricity production and supply, and reduces costly imbalances in the system.

The DAM and the IDM in Ukraine were created as part of the new wholesale market model in July 2019, following the liberalisation of the electricity sector.

The main legal provisions for the DAM and the IDM are set out in Article 67 of the EML, which ²⁴ specifies that DAM and IDM prices are formed according to market principles. The pricing principle for the DAM is marginal pricing based on the balance of total demand and supply. For the IDM, the pricing principle is pay-as-bid.

The EML designated the state-owned company Market Operator (MO) to operate the DAM and IDM.

Based on the EML, NEURC issued detailed rules on the functioning of the DAM and the IDM in 2018. ²⁵ In 2020, amid the COVID-19 pandemic, NEURC created new versions of certain provisions through a special COVID-19 resolution. ²⁶ Due to the exceptional circumstances, this happened without market consultation or a public hearing. The changes were limited to the quarantine period plus one month after.

As a guiding principle, the EML establishes that the rules covering the DAM and the IDM “should create conditions for providing objective price signals for producers and consumers of electricity” to maintain a balance between electricity demand and supply. ²⁷

In the event of a substantial price fluctuation, NEURC is empowered to set price caps (temporary minimum and/or maximum price limits) on the DAM, the IDM and the BM. ²⁸ Prior to setting price caps, NEURC must consult the Antimonopoly Committee of Ukraine. When setting price caps, NEURC should ensure that they do not unduly influence price formation, and should review them at least every six months.

Further, to ensure a sufficient level of liquidity on the DAM, the EML empowers NEURC to impose an obligation on producers (except RES producers under the FIT) and importers to make up to 30% of their monthly sales on the DAM. NEURC may also require the TSO, DSOs and pumped-storage hydro power plants to purchase electricity on the DAM to cover their technical losses and needs. ²⁹

Trading sequence

On the DAM, participants can submit orders seven days before the day of delivery and change or cancel them until noon the day preceding the delivery day (the DAM gate closure time). Half an hour before the gate closure time, the MO checks compliance of bidders with financial requirements, such as sufficient deposits in escrow accounts.

At noon, the main trading session opens, during which the DAM algorithm determines the clearing price for each hour (billing period), based on the balance of aggregate demand and supply. If there is at least one billing period for which the clearing price cannot be determined, the MO immediately announces an additional trading session. Otherwise, the MO informs participants of the detailed results by 1 p.m. Participants may submit a reasoned objection within 30 minutes of receiving the results. A full trade report including prices, volumes and participants is published within the following three hours. In addition, the MO reports relevant information on the DAM results to the TSO and NEURC.

The IDM opens for bids at 3 p.m. on the day before the delivery day and the IDM gate closure time is 60 minutes before the start of the settlement period.³⁰ Upon the receipt of bids on the IDM, the MO verifies them and, if they fulfil all necessary conditions, registers them as valid bids. As long a bid is not accepted by another market participant, it can be changed or cancelled. At the IDM gate closure time, all unaccepted bids are automatically cancelled. Market participants can not only accept registered bids but can also submit counter-offers, for instance by offering lower volumes.

The MO notifies the TSO of the volumes and prices of IDM trades 30 minutes before start of the settlement period. Further, it provides a full trade report to market participants until 1 p.m. on the day following delivery. As on the DAM, participants can object in writing within 30 minutes. Finally, the MO reports detailed IDM trading data to NEURC by 3 p.m. on the day following delivery.

Price and volume limits

Upon the market opening on 1 July 2019, NEURC set temporary price limits for the DAM and the IDM until March 2020.³¹ The initial price limits were calculated based on the average wholesale prices prior to the market opening (March-May 2019). Bids outside the specified range are dismissed by the MO. There have been different price limits for the two trade zones and for periods of minimum load (off-peak hours) and maximum load (peak hours). Minimum load is defined as the hours from midnight to 7 a.m. and from 11 p.m. to midnight. The other hours are maximum load periods.

In February 2020, the application of the price limits was extended for an undetermined period.³² Since then, NEURC has changed the price limits several times, as shown in Table 3.3.

Table 3.3. Price limits on the DAM per trade zone (UAH/MWh, excl. VAT), 2019-22

Trade zone	Load	Type of limit	1 July 2019	29 July 2020	16 June 2021	5 July 2021	13 July 2021	1 August 2021	7 October 2021	2 January 2022
IPS	maximum	maximum	2 048.23	2 048.23	2 655.99	2 048.23	2 048.23	4 000.00	2 048.23	2 048.23
		minimum	10.00	10.00	10.00	734.85	10.00	10.00	10.00	10.00
	minimum	maximum	959.12	1 228.94	1 243.70	1 243.70	1 243.70	2 000.00	1 243.70	1 243.70
		minimum	10.00	10.00	10.00	734.85	10.00	10.00	10.00	10.00
BEI	maximum	maximum	2 048.23	2 048.23	2 048.23	2 048.23	2 048.23	2 048.23	2 500.00	3 000.00
		minimum	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	minimum	maximum	959.12	959.12	959.12	959.12	959.12	959.12	1 500.00	1 650.00
		minimum	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Note: For the IDM, the minimum limit is set as a percentage of displayed values.

Source: OECD based on data provided by NEURC.

Following the merger of the two trade zones, NEURC set minimum price limits for the DAM from 28 February 2022 as follows:

- 2 646.25 UAH/MWh during hours of maximum load
- 1 378.97 UAH/MWh during hours of minimum load.³³

In 2022, the minimum limit for the IDM was set in a new way, namely with reference to the DAM price. From 6 February 2022, the minimum limit for the IDM was set at 105% of the DAM price.³⁴ Within a short period, it was increased to 115% and then to 150%³⁵ before being cut to 110%, and then to 102% from 1 June 2022.³⁶

In addition to the general price limits, NEURC imposed a specific limit for sales of renewable electricity by the GB. Notably, on 4 April 2020, it introduced Resolution No. 791 requiring the GB to sell RES electricity on the DAM at a price not higher than the weighted average nuclear power price during April-May 2019.³⁷ Soon after, on 30 April 2020, NEURC changed this cap, setting it at 75% of the maximum price limit on the DAM during hours of maximum load.³⁸ This resolution was cancelled in April 2022 and the GB-specific price limit was abolished.³⁹

An amendment of the EML in July 2020 set minimum mandatory monthly sales on the DAM of 10% for producers (except RES producers) and importers.⁴⁰ On a temporary basis, another amendment to the EML placed a maximum limit on sales on the DAM. From July to November 2021, monthly sales by suppliers and traders were limited to a maximum of 10% of the electricity purchased from producers, the GB and importers under bilateral agreements.⁴¹

Main market participants

By volume, the DAM is Ukraine's second-largest market segment. In 2021, the share of electricity traded was 12% (35.8 TWh) on the DAM and 2% (5 TWh) on the IDM (Market Operator, 2022_[6]).

Table 3.4. Average monthly sales on the DAM (IPS trade zone), 2020-22

Seller	2020		2021		2022	
	MWh	%	MWh	%	MWh	%
Producers	2 007 762	72	1 819 057	70	1 196 282	84
Suppliers	743 189	27	658 976	25	206 863	14
Traders	37 191	1	133 093	5	22 753	2
Network operators	0	0	2 352	0	2 641	0
Total	2 788 142	100	2 613 478	100	1 428 539	100

Note: Sales by the GB are included in sales by producers.

Source: Market Operator (2023_[7]), DAM/IDM Analysis, https://www.oree.com.ua/index.php/web_monitoring_dtorg_year/index_year_dam.

Table 3.5. Average monthly sales on the IDM (IPS trade zone), 2020-22

Seller	2020		2021		2022	
	MWh	%	MWh	%	MWh	%
Producers	416 772	85	360 274	86	204 002	91
Suppliers	62 794	13	42 541	10	17 655	8
Traders	10 933	2	14 927	4	1 651	1
Network operators	24	0	117	0	742	0
Total	490 523	100	417 859	100	224 050	100

Note: Sales by the GB are included in sales by producers.

Source: Market Operator (2023_[7]), DAM/IDM Analysis, https://www.oree.com.ua/index.php/web_monitoring_dtorg_year/index_year_dam.

Participants on the DAM and IDM need to register with the MO. In 2021, registered participants consisted of 36 producers, 455 suppliers, 27 traders, five business customers, the TSO, 32 DSOs, and the GB (Market Operator, 2022_[8]).

On both the DAM and IDM, producers are the biggest group of sellers by a wide margin, followed by suppliers. Sales by traders amounted to no more than 5% on the DAM and 4% on the IDM in 2020-22.

Table 3.6 shows the main (state-owned and private) participants in the DAM and their respective shares of sales and purchases.

Table 3.6. Market participants on the DAM, 2020-21

Trade zone	Market participant	Share in 2020	Market participant	Share in 2021
Sellers				
IPS	Guaranteed Buyer	27%	Energoatom	20.9%
	Energoatom	22%	Guaranteed Buyer	18.3%
	Energyx	9%	Ukrhydroenergo	9.2%
	Centrenergo	5%	Energyx	4%
	Ukrhydroenergo	4%	Centrenergo	3.4%
	<i>Other</i>	33%	<i>Other</i>	44.2%
BEI	DTEK Zahidenergo	32%	DTEK Zahidenergo	72.1%
	Guaranteed Buyer	12%	Guaranteed Buyer	12.1%
	Gen-I Kiev	10%	D.Trading	5.9%
	Kalush CHP- Nova	9%	Kalush CHP- Nova	5.1%
	D.Trading	8%	<i>Other</i>	4.8%
	ERU Trading	8%		
	<i>Other</i>	21%		
Buyers				
IPS	D.Trading	24%	D.Trading	36.5%
	United Energy	10%	United Energy	24.6%
	Ukrenergo	7%	Ukrenergo	5.1%
	Kharkivenergozbut	3%	<i>Other</i>	33.8%
	New Energy Company	3%		
	<i>Other</i>	53%		
BEI	Guaranteed Buyer	36%	Guaranteed Buyer	28.5%
	D.Trading	16%	Zakarpatyaenergozbut	11.5%
	Zakarpatyaoblenergo	9%	Lvivenergozbut	9.4%
	Lvivenergozbut	6%	D.Trading	9%
	New Energy Company	5%	<i>Other</i>	41.6%
	<i>Other</i>	28%		

Sources: OECD based on data received from AMCU and NEURC; NEURC (2020^[9]), Report on the results of the National Commission, which carries out state regulation in the spheres of energy and public services.

In the IPS trade zone, the two biggest sellers on the DAM were the GB and Energoatom, with a combined share was 49% in 2020 and 39.2% in 2021. Producers Ukrhydroenergo and Centrenergo, with trader Energyx, collectively accounted for 16.6% of sales in 2021 and a similar share the previous year. The cumulative share of smaller sellers (those whose shares were individually less than 3%) was 33% in 2020 and 44.2% in 2021.

In the BEI trade zone, the three main sellers on the DAM in 2021 were DTEK Zahidenergo, the GB and D.Trading. DTEK Zahidenergo and D.Trading, which belong to DTEK Group, had a combined share of 78%. It is noteworthy that the shares changed significantly from 2020 and 2021. The share of the two DTEK companies almost doubled, while the shares of ERU Trading and smaller sellers declined steeply.

In the IPS trade zone, the two main DAM buyers were D.Trading and the United Energy, with a combined share of 61.1% in 2021, a large increase from 34% the previous year. The third-largest buyer in both years was TSO Ukrenergo. There were also significant shifts among buyers in the BEI trade zone. The GB's share fell from 36% to 28.5%, while the combined share of smaller buyers increased from 28% to almost 42%.

Table 3.7 shows the main participants on the IDM and their respective shares of sales and purchases.

Table 3.7. Market participants on the IDM, 2020-21

Type	Trade zone	Market participant	Share in 2020	Market participant2	Share in 2021	
Sellers	IPS	Ukrhydroenergo	25%	Ukrhydroenergo	43%	
		Centrenergo	25%	Energoatom	21%	
		Energoatom	19%	Guaranteed Buyer	5%	
		Guaranteed Buyer	5%	Kharkiv CHPP-5	4%	
		Kharkiv CHPP-5	4%	DTEK Zahidenergo	4%	
		Other	22%	Other	24%	
		BEI	DTEK Zahidenergo	50%	DTEK Zahidenergo	85%
		D.Trading	9%	Guaranteed Buyer	8%	
		De Trading	8%	D.Trading	3%	
		New Energy Company	5%	Zakarpattyaenergozbut	2%	
		Gen-I Kiev	4%	Other	3%	
		Other	24%			
	Buyers	IPS	New Energy Company	16%	D.Trading	9%
			United Energy	9%	United Energy	8%
Energozahid			6%	New Energy Company	7%	
Energo Zbut Trans			4%	De Trading	6%	
TEC			4%	Pivden Energo Zbut	5%	
Other			61%	Other	65%	
BEI			Guaranteed Buyer	29%	Zakarpattyaenergozbut	21%
		D.Trading	14%	Lvivenergozbut	16%	
		Zakarpattyaoblenergo	11%	Guaranteed Buyer	14%	
		New Energy Company	10%	United Energy	8%	
		Lvivenergozbut	7%	Zakarpattyaoblenergo	8%	
		Other	29%	Other	33%	

Sources : OECD based on data received from AMCU and NEURC; NEURC (2020^[9]), Report on the results of the National Commission, which carries out state regulation in the spheres of energy and public services.

In the IPS trade zone, Energoatom and Ukrhydroenergo were collectively responsible for around 63% of all sales on the IDM in 2021. The main change from the previous year concerned Centrenergo, whose share dropped from almost 25% to only around 2%. The situation was quite different in the BEI trade zone, where the biggest supplier was DTEK Zahidenergo, whose market share increased from 50% to 84.5% between 2020 and 2021. The next biggest seller in 2021 was the GB, with 7.6%, followed by D.Trading with 2.7%.

The largest IDM buyer in the IPS trade zone in 2020 was the New Energy Company, with a 16% share. Its share fell to 7% in 2021 as it was overtaken by D.Trading which had an 8.9% share. Smaller buyers had a very significant combined share of more than 60% in both years.

In the BEI trade zone, the largest IDM buyer in 2020 was the GB, with a share of 29%. Its share fell to 13.8% the following year. In 2021, the largest buyers were USSs Zakarpattyaenergozbut with 20.9% and Lvivenergozbut with 16.3%.

3.1.3. *Balancing market and ancillary services*

The BM is the last stage for electricity trading. It allows market participants to correct differences between their predicted and actual levels of supply and demand close to delivery.

The BM is operated by the TSO responsible for balancing the power system. The TSO acts as the single buyer on the BM. On the supply side, balancing service providers (BSPs) offer balancing services to the TSO. Balance-responsible parties (BRPs) are market participants with a financial responsibility for their individual imbalances. Imbalances are deviations between generation, consumption and commercial transactions by a BRP within a given imbalance settlement period.

Based on the need for balancing, the TSO procures balancing capacity from BSPs. Depending on the system imbalances, it activates capacity and receives balancing energy (Schittekatte, Reif and Meeus, 2019^[5]). In cases of negative imbalances (power shortages), the TSO asks BSPs to increase production. In cases of positive imbalances (power surpluses), the TSO asks BSPs to reduce output. Large industrial consumers and smaller consumers, through aggregators, can offer the equivalent service through demand response, i.e. by adjusting consumption.

The final phase of trading on the BM is the balance settlement. BSPs are remunerated for the balancing services they provide, while the BRPs bear the costs of their imbalances (see also (Veen and Hakvoort, 2016^[10])). The BM can have a single-price or dual-price imbalance system for settlements. In the single-price system, deviations are settled at a single price, regardless of the nature of their imbalances (i.e. excessive or insufficient production). As a general rule, the balancing price is higher than the day-ahead price if the system is in deficit and lower if it is in surplus. This price settlement opens up arbitrage opportunities for producers as they can be rewarded for deviations (Mazzi and Pinson, 2017^[11]). There are no such arbitrage opportunities under a dual-price system, in which positive and negative deviations involve different prices.

Balancing market

The Ukrainian BM began operating on 1 July 2019, at the same time as the DAM and the IDM. It is organised by Ukrenergo and functions as a daily auction in which market participants offer balancing energy to the TSO based on their marginal costs.

In principle, the actual power generation and consumption of market participants should equal their planned generation and consumption, or schedule. In cases of deviations, market participants are financially responsible for their imbalances towards Ukrenergo. To this end, each market participant must either become a BRP or join a balancing group. In the latter case, the financial responsibility for the group's aggregated imbalance resides with the group BRP.⁴² For RES producers under the FiT, the GB forms a balancing group and assumes responsibility for balancing the entire portfolio.

Generators must offer balancing energy up to the level of their remaining available capacity. For consumers, participation is voluntary.⁴³

BSPs are required to offer positive and negative energy to Ukrenergo for each settlement period of the trading day, which starts at midnight Kyiv time. The settlement period, the basic time unit of the balancing market, consists of a block of 15 minutes. Offers for each settlement period can be submitted up to 45 minutes before its start (BM gate closure).

For each settlement period, Ukrenergo determines the overall positive or negative balance of the system and establishes the market price based on the offers received from BSPs. In cases of deficits in the system, the highest accepted offer (for upward balancing energy) determines the market price. In cases of surpluses, the lowest accepted offer (for downward balancing energy) determines the market price. Prices for balancing energy are set in UAH/MWh and must be greater than zero.

After determining the price for balancing energy, Ukrenergo calculates the payment due by each BRP for their imbalances. Both the price for balancing energy and the imbalance price are limited by regulation.

Initially, the price limits for balancing energy were set as a range calculated from the DAM price cap (minimum 85% and maximum 115%). A few months later, this fixed price range was replaced by a dynamic range linked to the DAM price instead of the DAM caps. On 1 March 2020, the maximum balancing energy price was again linked to the DAM cap, but the minimum price remained linked to the DAM price. At the same time, the single imbalance price was replaced by a dual imbalance price with the maximum price set at 115% of the DAM price in cases of positive imbalances and a minimum price of 70% of the DAM price in cases of negative imbalances. Table 3.8 provides an overview of the changes in the price limits for balancing energy.

Table 3.8. Price limits for the balancing energy, 2019-21

Date	Peak (max. load)		Off-peak (min. load)	
	Maximum	Minimum	Maximum	Minimum
1 July 2019	115% of DAM cap (2 355.47 UAH/MWh)	85% of DAM cap (1 741 UAH/MWh)	115% of DAM cap (1 102.99 UAH/MWh)	85% of DAM cap (815.25 MWh)
30 November 2019	115% of DAM price	70% of DAM price	115% of DAM price	70% of DAM price
1 March 2020	115% of DAM cap (2 355.47 UAH/MWh)	55% of DAM price	115% of DAM cap (1 102.99 UAH/MWh)	55% of DAM price
8 April 2020	105% of DAM cap (2 150.64 UAH/MWh)	55% of DAM price	105% of DAM cap (1 007.08 UAH/MWh)	55% of DAM price
27 May 2020	105% of DAM cap (2 150.64 UAH/MWh)	65% of DAM price	105% of DAM cap (1 007.08 UAH/MWh)	65% of DAM price
10 June 2020	105% of DAM cap (2 150.64 UAH/MWh)	80% of DAM price	105% of DAM cap (1 007.08 UAH/MWh)	80% of DAM price
29 July 2020	105% of DAM cap (2 150.64 UAH/MWh)	80% of DAM price	105% of DAM cap (1 290.39 UAH/MWh)	80% of DAM price
1 March 2021	115% of DAM cap (2 355.47 UAH/MWh)		115% of DAM cap (1 413.3 UAH/MWh)	
16 June 2021	115% of DAM cap (3 054.39 UAH/MWh)		115% of DAM cap (1 430.26 UAH/MWh)	
1 August 2021	115% of DAM cap (4 600 UAH/MWh)		115% of DAM cap (2 300 UAH/MWh)	
10 August 2021	100% of DAM cap (4 000 UAH/MWh)		100% of DAM cap (2 000 UAH/MWh)	

Source: OECD based on data received from NEURC.

The number of changes is symptomatic of problems with the functioning of the BM. There have been accusations of market manipulation linked to the interplay of the DAM and the BM (DTEK, 2020_[12]).

An important provider of balancing energy also commented that linking imbalance prices to DAM prices does not encourage market participants to reduce their imbalances. Further, it claimed that the system allows market participants to manipulate different market segments.

Ancillary services

In addition to buying balancing energy, Ukrenergo also procures ancillary services for regulating the network. This is a more technical part of power system operation, which ensures the frequency remains at 50 Hertz and that the system can be restarted in cases of partial outages (brownout) or complete shutdowns (blackouts). The most important ancillary services are the operating reserves. Ukrenergo procures the following types of operating reserves:

- frequency containment reserves (FCRs): used for immediate stabilisation of system frequency
- frequency restoration reserves (FRRs): active power reserves activated to restore system frequency to the nominal frequency
- replacement reserves (RRs): used to restore/support the required level of FRR to be prepared for additional system imbalances.

Each type of reserve must fulfil specific technical requirements. For that reason, only units certified by the TSO can provide these ancillary services. Only a few companies fulfil the technical requirements and are certified by Ukrenergo. As shown in Table 3.9, only four providers of ancillary services operate in the IPS trade zone.

Table 3.9. Certified reserves (IPS trade zone, MW), 2021

Name	FCR	Automatic FRR	Manual FRR	RR
Ukrhydroenergo		1 219	3 193	3 340
DTEK Group	±224	465	868	420
Kharkiv CHP-5	±27	90	90	180
Energoatom	±140			
Total	±391	1 774	4 151	3 940

Source: OECD based on data received from Ukrenergo.

For each type of reserve, there are only three providers. The share of the largest provider by reserve type ranges from 57% (FCR) to 85% (RR). There is clearly very high concentration in the supply of ancillary services due to the special technical characteristics of the services. The demand side is represented solely by Ukrenergo.

3.2. Retail market

Following the sale of large volumes of electricity on the wholesale market, electricity is sold to end consumers on the retail market. The retail market serves households, businesses and public entities such as hospitals and schools. In the retail market, consumers are connected mainly to the distribution network. Only a small number of large industrial consumers are directly connected to the high-voltage networks of the TSO.

To conclude an electricity supply contract, customers must first enter into a contract with a DSO. The contract with the DSO determines certain technical conditions of electricity supply, such as metering, termination procedures, reliability and continuity. A supply contract determines the commercial terms, in particular the price (or pricing method) and payment conditions. As of 31 December 2020, there were 17 602 832⁴⁴ electricity connection contracts with DSOs, most concluded by household consumers (97.1%) (NEURC, 2020^[9]). In terms of consumption, households' share was much lower, at 31%.

The retail market is regulated by the EML, the Retail Market Rules,⁴⁵ the Transmission Network Code, the Distribution Network Code and the Commercial Metering Code. The EML provides the general legal framework, while the Retail Market Rules and the codes provide detailed rules on the rights of participants and their interactions with one another. The market rules and codes are developed and administered by the TSO and approved by NEURC.

The EML stipulates that from 1 January 2019, the supply of electricity to consumers is carried out at freely negotiated prices, except for in cases established by the law. Thus, in principle, Ukraine's retail electricity

market is fully liberalised and all consumers have the right to choose suppliers at unregulated prices. In practice, the retail market is split into different segments. Although some differences exist in the supply of different types of consumers in terms of volume and supply flexibility, the main reason for the segmentation is retail price regulation. Price regulation has two layers: universal service supply prices and fixed, regulated prices under a PSO.

3.2.1. Regulated price segment

According to the EML, household consumers and small non-household consumers (with capacities of up to 50 kW) have the right to be supplied by a USS “at economically reasonable, transparent and non-discriminatory prices, calculated according to the methodology approved by the regulator“. On a transitional basis, for the years 2019 and 2020, budgetary institutions and non-household consumers with contracted capacities of up to 150 kW were also eligible to receive universal services.

The EML allows NEURC to introduce regulated prices for universal services, but it must justify doing so and they must reflect costs. When NEURC sets regulated prices, it should review them annually and provide a timetable for phasing them out.

In 2018, NEURC developed a pricing methodology for supplies under the universal service obligation, which is based on the (baseload) DAM price.

For households, the government introduced an additional price regulation in the PSO Act. It stipulates that households (individual and collective) should be eligible for supply at fixed prices by a USS. The fixed prices set by PSO Act (see Section 3.3.1) have been significantly lower than prices based on the USS methodology by NEURC and below market prices. Households therefore have no incentive to seek supply at either USS prices or unregulated prices. In fact, commercial suppliers do not offer supply contracts to household consumers because there is no demand for them. Household consumption accounts for 35% to 40% of total electricity supply in Ukraine.⁴⁶

The only other supplier operating in the regulated retail segment is the supplier of last resort (SoLR), which has a special and very limited role.⁴⁷ It provides electricity for up to 90 days to consumers without suppliers, for instance in circumstances in which a previous supplier has ceased to operate.

It is important to note that USS or SoLR status does not preclude the possibility of supplying electricity at freely negotiated prices in the unregulated segment. USSs’ supply volumes depend mainly on the number of households within their licensed territory. Since Ukraine’s population is concentrated near industrial centres in the country’s eastern and central regions, USSs operating in these areas have the biggest share.

Six of the 25 USSs are state-controlled and collectively supply 21% of households (3.5 million out of 16.5 million) (Vinnichuk, 2021^[13]) The other USSs are privately owned. Private energy group DTEK controls three USSs, which supply close to 24% of all household consumers, and the Enera Group (foreign entity) controls four USSs, supplying a further 13% of household consumers (Vinnichuk, 2021^[13]).

Table 3.10. Shares of electricity supply in the regulated segment (10 largest USSs by volume), 2021

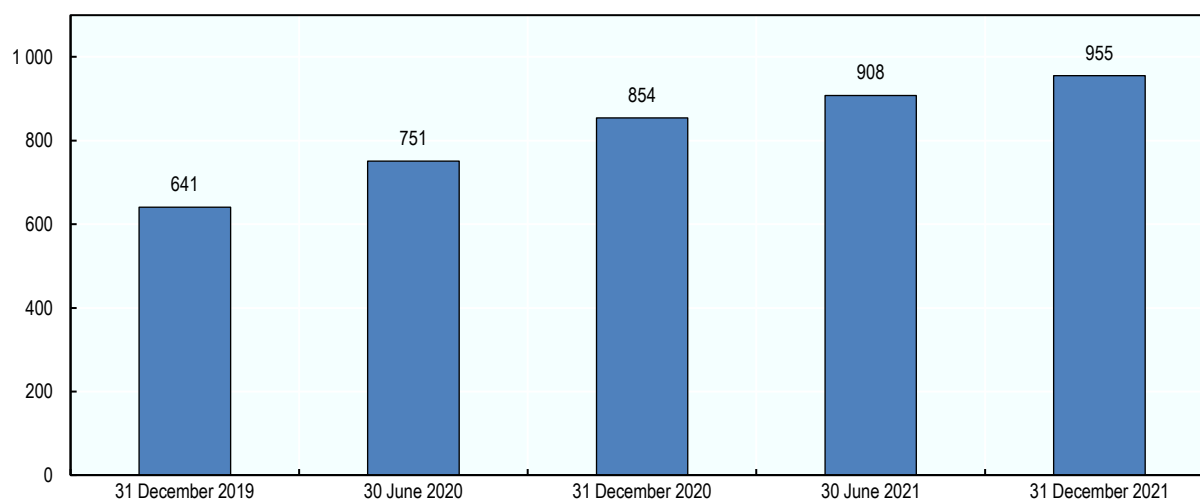
Company	Share
Dnipro Energy Services (DTEK Group)	9.9%
Kyiv Energy Services (DTEK Group)	9.5%
Kyiv Regional Energy Supply Company	8.5%
Odessa Regional Energy Supply Company	8.2%
Kharkivenergozbut	6.7%
Lvivenergozbut	5.6%
Zhaporizhyaelectropostachannya	4.6%
Donetsk Energy Services (DTEK Group)	4.2%
Enera Vinnitsa	3.3%
Zakarpattiaenergozbut	3.2%
Total	63.7%

Source: OECD based on data provided by NEURC.

3.2.2. Unregulated price segment

Non-household consumers with capacities above 50 kW are not entitled to universal service supply and must purchase electricity at freely negotiated prices in the competitive segment. According to the latest available data from NEURC, supplies in this segment made up 69% of total supply in 2021 (NEURC, 2022^[14]).

The supply of electricity at freely negotiated prices is arranged through contracts drawn up by suppliers based on a model contract set out in the Retail Market Rules. Several aspects of such contracts can be freely agreed between suppliers and customers, notably prices, payment methods and termination procedures.

Figure 3.4. Number of licensed electricity suppliers, December 2019-December 2021

Source: NEURC (2021^[15]), Monitoring the functioning of the retail electricity market in the 3rd quarter of 2021, <https://gas.ua/Content/Entities/LegalBasis/239/document>.

Electricity suppliers need a licence that allows trading and supply to consumers. According to market participants, obtaining a licence does not represent a significant administrative burden. The large number of suppliers and its continued increase also indicate that the licensing does not constitute an entry barrier.

The majority of companies with supply licences are not active in the retail market and many active ones have few customers. In 2020, 81.2% of the 38 291 supply contracts at unregulated prices were concluded with one of the USSs and the ten largest suppliers supplied close to 60% of all electricity in this segment (NEURC, 2020^[16]).

Table 3.11. Shares of supply in the competitive segment (10 largest suppliers by volume), 2020

Company	Share
D.Trading (DTEK Group)	26.7%
Energo Zbut Trans	6.4%
Kyiv Energy Services (DTEK Group)	5.2%
Dnipro Energy Services (DTEK Group)	4.0%
Kyiv Regional Energy Supply Company	3.1%
Odessa Regional Energy Supply Company	3.0%
Trading Electric Company	2.8%
Lvivenergozbut	2.6%
Kharkivenergozbut	2.5%
Poltavaenergozbut	2.1%
Total	58.4%

Source: OECD based on data provided by NEURC.

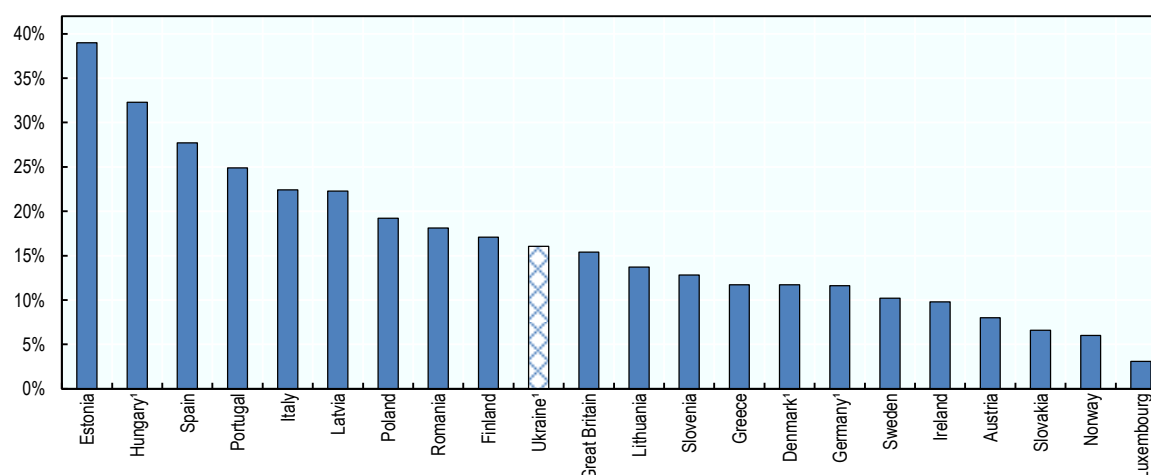
Based on Table 3.11, DTEK Group had a 36% share of the competitive segment in 2020. The top five suppliers in the segment have remained the same since the liberalisation of the retail electricity market in 2019.

One indicator of the intensity of competition in the retail market is customers' switching rate. This is a measure of the percentage of consumers who have changed electricity suppliers within a certain period (typically in a year). Changing electricity suppliers is the most direct way for consumers to benefit from competition in energy markets. By switching, consumers seek to obtain lower prices and/or better service. If many consumers switch or are ready to switch, suppliers must offer competitive prices and quality services to prevent losing them. In theory, readiness to switch is sufficient to subject suppliers to competitive pressure, but one can assume a significant correlation between actual switching rates and consumers' readiness to switch. Low switching rates may indicate limited choice for consumers, high switching costs or a lack of consumer engagement. The latter is relevant mostly for smaller consumers, especially households, rather than businesses with larger consumption. Finally, it should be noted that switching may also be a sign of consumers' dissatisfaction with suppliers.

In 2020, 9.27% of Ukraine's non-household consumers (by metering point) changed suppliers, representing 16.05% of electricity volume supplied to this customer group in the retail market (ECRB, 2021^[17]). The difference between the two values reveals that consumers with above average consumption switch more frequently than consumers with below average consumption. This indicates that the main driver for switching is probably lower price rather than better quality; potential savings increase with consumption volume, whereas quality improvement does not depend on consumption levels.

Compared to switching rates in other European countries, Ukraine is within the middle range.

Figure 3.5. Non-household consumer switching rates (by volume), 2021



Note: Latest available data is for 2020.

Source: ACER/CEER (2021^[18]), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2020 – Energy Retail Markets and Consumer Protection Volume, <https://documents.acer.europa.eu/en/Electricity/Market%20monitoring/Documents/MMR%202020%20Summary%20-%20Final.pdf>; ECRB (2021^[17]), ECRB Market Monitoring Report Gas and Electricity Retail Markets in the Energy Community, https://www.energy-community.org/dam/jcr:5bd1fa33-679b-4bfa-8cfe-566d22413cf8/ECRB_MM_retail_2020.pdf.

3.3. Public service obligations

PSOs are regulatory measures or requirements to guarantee minimum levels of quality, service standards and consumer rights to achieve sector-specific objectives in the name of general economic interest. In the energy sector, PSOs are justified by the fact that electricity and gas are essential goods, the supply of which must be continuous and non-discriminatory.

In Ukraine, the EML lists the following general public interest considerations that may be invoked for PSOs to be adopted in the electricity market:

- national security and security of supply
- stability, quality and availability of energy, including for vulnerable consumers
- protection of the environment, including energy efficiency, increases of the share of energy from alternative sources and reductions of greenhouse gas emissions
- protection of life, health and the property of the general public.

According to Article 62 of the EML, in pursuit of these broad public interests, the regulator should set up implementation mechanisms for the following special obligations for market participants:

- purchases of electricity at FiT
- provision of universal services
- performance of functions of the supplier of last resort
- provision of services to ensure the development of generating capacity
- increases in the efficiency of the combined production of electricity and thermal energy.

Further, the EML empowers the CMU to impose additional special obligations on market participants (except consumers) to pursue public interest objectives. Proposals for additional special obligations are prepared by NEURC and consulted on with the Energy Community Secretariat before being submitted to the CMU.

On 5 June 2019, CMU Resolution No. 483 (the PSO Act) laid down detailed rules for PSOs.⁴⁸ Originally, PSOs were conceived as a temporary measure valid until 31 December 2020. Since then, the PSO Act has been amended 16 times and its validity has been extended. The latest version of the act was adopted on 23 April 2023 and is valid until 31 May 2023.⁴⁹

It is worth noting that PSOs are not particular to Ukraine but are widely used to ensure public economic interests. In the EU, Directive 2019/944⁵⁰ explicitly recognises that member states may impose PSOs on undertakings operating in the electricity sector in the general economic interest but requires that “such obligations shall be clearly defined, transparent, non-discriminatory and verifiable”.⁵¹ Similarly, the EML requires PSOs imposed by the CMU to be transparent, temporary and non-discriminatory. However, as will be outlined further, these requirements have not been followed in practice.

This section examines two PSOs that have had significant impacts on the functioning of Ukraine’s electricity markets. The first is the PSO designed to ensure the supply of electricity at affordable prices to household consumers.⁵² The second aims to support generation from renewable energy sources.

3.3.1. PSO for households

In order to protect household consumers from high electricity prices in the newly liberalised market, the government introduced an obligation for USSs to supply electricity to household consumers at regulated prices. It is important to note that all households have been entitled to electricity at regulated prices, not only vulnerable consumers, as is often the case in other jurisdictions.

Regulated prices vary according to household consumption, with an initial amount priced at low rates and additional volumes at higher rates.

Table 3.12. Regulated electricity prices for households, 1 July 2019

Consumption bracket	Price (UAH/kWh, incl. VAT)
Up to 100 kWh per month	0.366
From 100 kWh to 600 kWh per month	0.63
Over 600 kWh per month	1.407

Source: OECD based on data provided by NEURC.

Upon the introduction of the new market model in 2019, regulated prices applied only to electricity consumption by private households. In 2021, collective households, an additional category of consumers, became entitled to receive electricity at regulated prices. Collective households include the following categories of consumers:

- apartment buildings (e.g. electricity for elevators, lighting of common areas)
- dormitories
- religious organisations
- co-owner associations such as *dacha*-building co-operatives and gardeners’ partnerships.

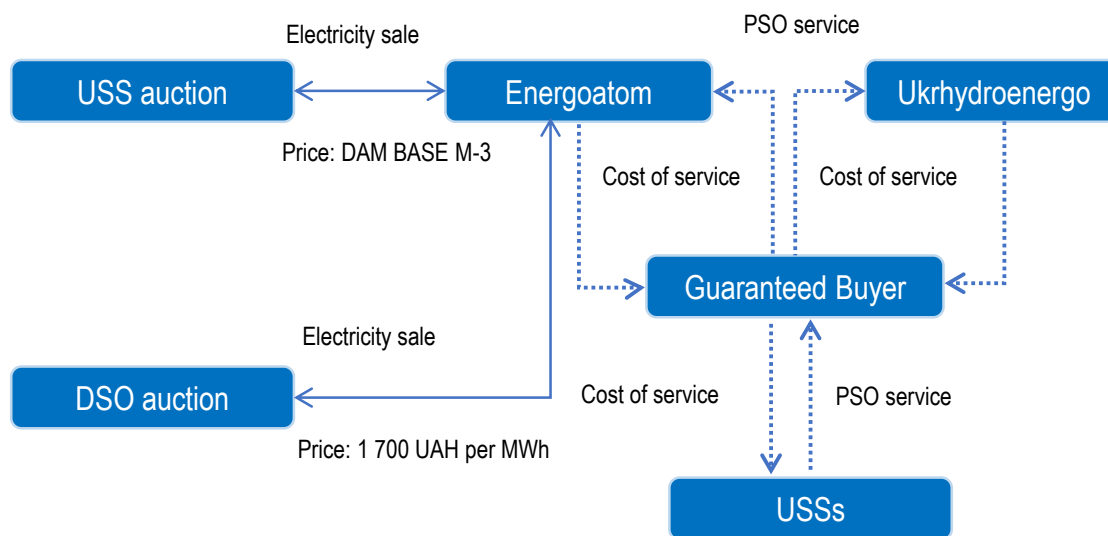
Since regulated prices for households had been significantly below wholesale market prices, the PSO for households offered a mechanism to provide lower-cost electricity to USSs to supply households at regulated prices. To this end, the PSO Act obliged Energoatom and Ukrhydroenergo to sell up to 60% and 20% of their output, respectively, to the GB.⁵³ The GB resold this electricity to USSs in electronic bilateral auctions at the weighted average price of electricity sold by the respective generator during the last three calendar months before the date the new electricity market became operational (April-May 2019).⁵⁴ On

20 August 2020, the weighted average price method was replaced with a fixed price of 10 UAH/MWh.⁵⁵ In December 2020, the price for Energoatom was increased to 150 UAH/MWh, but the price for Ukrhydroenergo remained unchanged.

Prices set by the PSO Act for Energoatom and Ukrhydroenergo appear not to have fully covered their costs, leading to significant financial difficulties.⁵⁶ As of September 2021, the accumulated debt for households under the PSO amounted to EUR 153 million (NEURC, 2021^[19]). In response, on 1 October 2021, a new PSO model for households became operational, aiming to replace transfers of electricity with a financial compensation mechanism.⁵⁷ In principle, a financial PSO model is a more market-friendly approach than a physical PSO, as it allows producers to sell and USSs to buy electricity on the free market rather than on a special, regulated market. This shifts supply and demand to the free market, which makes markets more liquid and prices more meaningful.

The new PSO model was not a fully financial PSO but a hybrid model with both physical and financial elements. Under the new arrangements, Energoatom remains obliged to sell electricity to USSs through electronic auctions in the special section of the UEEX. The volume corresponds to the minimum hourly electricity consumption by households in the same month of the previous year. In addition, Energoatom and Ukrhydroenergo must pay a financial contribution to the GB, which in turn compensates USSs for the difference between the DAM baseload price and the regulated price for households. Somewhat simplified, Energoatom pays 95% of its revenues above a certain threshold derived from the average price of electricity in the first half of 2019 and Ukrhydroenergo pays 60%.

Figure 3.6. Financial PSO as of 1 October 2021



With the introduction of the new PSO model, regulated prices for households were also changed. The new prices, shown in Table 3.13, were set for the period 1 October 2021 to 31 October 2022 and later extended until 31 March 2023.⁵⁸

For comparison, the higher price of 1.68 UAH/kWh (approximately EUR 0.054⁵⁹) was less than one-quarter of the average household electricity price in the EU (EUR 0.237) and roughly half the lowest price in the EU, that of Hungary, in the second half of 2021 (Eurostat, 2022^[20]).

The introduction of the new PSO model did not remedy the financial problems associated with the previous physical PSO model. In fact, the cost of the new model turned out to be much higher than estimated. The initial pre-VAT forecast for the fourth quarter of 2021 was UAH 621 million, but the actual cost turned out

to be UAH 3.04 billion. Ukrhydroenergo estimates that its share of the financial compensation mechanism amounts to 30% of its revenues.⁶⁰

Table 3.13. Regulated electricity prices for households, 1 October 2021

Type of consumer	Price (UAH/kWh, incl. VAT)
Individual households	
Up to 250 kWh per month	1.44
Over 250 kWh per month (all consumption)	1.68
Collective households	1.68

Source: OECD based on data provided by NEURC.

3.3.2. PSO for renewables

The PSO for renewables was designed to increase generation from RES to reduce greenhouse gas emissions. Under the PSO for renewables, most RES producers – with the notable exception of large hydropower plants – benefit from “green” or feed-in FiT. They sell their output to the GB at the applicable FiT and the GB resells it on the wholesale market (through electronic auction on the DAM or the IDM). Since wholesale market prices are on average lower than those under the FiT, this results in a loss for the GB. To cover this loss, Ukrenergo is obliged to compensate the GB from its transmission tariff revenues.

When the market was liberalised, NEURC increased the transmission tariff more than eightfold, from 42.24 UAH/MWh to 347.43 UAH/MWh.⁶¹ After several complaints and a series of lawsuits, NEURC was forced to reduce the tariff sharply, producing insufficient revenues for Ukrenergo to compensate the GB fully for its losses. To remedy this problem, NEURC increased the transmission tariff slightly for 2020 (to 155.40 UAH/MWh),⁶² but this proved insufficient and it made a much larger tariff increase effective from 1 August 2020 (to 240.23 UAH/MWh),⁶³ and another from 1 December 2020 (to 312.76 UAH/MWh).⁶⁴

As a reaction to the problem of RES financing, an amendment to the Law of Ukraine on alternative energy sources⁶⁵ on 21 July 2020 stipulated that the state budget should pay the GB for at least 20% of RES producers’ forecast output.⁶⁶ In anticipation of this direct state support and a corresponding easing of Ukrenergo’s financial contribution to the GB, NEURC reduced the transmission tariff to 293.93 UAH/MWh from the beginning of 2021. However, the 2021 state budget did not allocate any funds to supporting the GB, leaving Ukrenergo with the full financial cost of the renewable PSO but without adequate tariff revenues.

Overall, the design of the PSO for renewables caused significant fluctuations in the transmission tariff and undermined the financial stability of Ukrenergo, which accumulated a debt of around UAH 12 billion to the GB during 2020. By October 2021, the debt had increased to around UAH 21 billion (Litvinchuk, 2022^[21]). To repay this, Ukrenergo issued five-year, state-guaranteed corporate bonds to raise USD 825 million in November 2021. The funds enabled Ukrenergo to pay most of its debt to the GB, leaving it owing UAH 8 billion as of February 2022. By 16 May 2022, however, Ukrenergo’s debt to the GB had risen to around UAH 10 billion (Guaranteed Buyer, 2022^[22]) suggesting that the financing of the PSO for renewables remains unsustainable.

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Notes

¹ Ukraine applied for EU membership on 28 February 2022 and received candidate status on 23 June 2022.

² Article 67 of the EML.

³ Article 66 of the EML.

⁴ Based on responses provided by UEEEX to the OECD questionnaire in 2022.

⁵ CMU Resolution No. 983 “On Amendments to the Procedure for conducting electronic auctions for the sale of electricity under bilateral agreements”, 22 September 2021, <https://zakon.rada.gov.ua/laws/show/983-2021-%D0%BF#n2>.

⁶ CMU Resolution No. 499 “On the approval of the Procedure for conducting electronic auctions for the sale of electricity under bilateral agreements and Procedure for selecting organisers of auctions for the sale of electricity under bilateral agreements”, 5 June 2019, <https://zakon.rada.gov.ua/laws/show/499-2019-n#Text>.

⁷ CMU Resolution No. 791 “On amendments to the Procedure for conducting electronic auctions for the sale of electricity under bilateral agreements”, 28 July 2021, <https://zakon.rada.gov.ua/laws/show/791-2021-%D0%BF#n10>.

⁸ Article 66 of the EML.

⁹ UEEEX, Regulations on organisation and holding of an electronic auction on the sale of electricity on the commodity exchange, June 2019, https://www.ueex.com.ua/files/ueex_regulations_of_electronic_specialised_auctions_electricity-eng.pdf?1674329696.

¹⁰ More precisely, the GB must sell electricity on the short-term markets and/or on the BAM. The part of electricity it does not sell on the short-term markets must be auctioned in the special section of the UEEEX.

¹¹ See para 42 of CMU Resolution No. 887 “On amendments the Procedure for holding electronic auctions for the sale of electric energy under bilateral contracts”, 28 September 2020, <https://zakon.rada.gov.ua/laws/show/887-2020-%D0%BF#n8>.

¹² CMU Resolution No.1002 “On amendments to the Procedure for holding electronic auctions for the sale of electric energy under bilateral contracts”, 28 October 2020, <https://zakon.rada.gov.ua/laws/show/1002-2020-%D0%BF#n8>.

¹³ This limit is set in the “Procedure for holding a special session on the sale of electricity produced from alternative sources”.

¹⁴ Law of Ukraine No. 1 639-IX “On measures aimed at overcoming the crisis and ensuring financial stability in the natural gas market”, 14 July 2021, <https://zakon.rada.gov.ua/laws/show/1639-20#n267>.

¹⁵ Law of Ukraine No. 2 371-IX “On amendments to the Law of Ukraine on the electric energy market regarding the regulation of relations on the sale of electric energy by energy producers under bilateral contracts”, 8 July 2022, <https://zakon.rada.gov.ua/laws/show/2371-20#n5>

¹⁶ UEEEX, Regulations organisation and conduct of electronic auctions for the purchase and sale of electricity under bilateral contracts in commercial sections on the commodity exchange – LLC Ukrainian Energy Exchange, 20 November 2019, https://www.ueex.com.ua/files/regulations_electronic_commercial_auctions-140622-eng.pdf?1674340874.

¹⁷ Based on responses provided by UEEEX to the OECD questionnaire in 2022.

¹⁸ A lot is an indivisible volume of electricity, it equals capacity of 1 MW during the specified sale period. If the period is five hours for 10 days, then the lot equals 50 MWh.

¹⁹ According to the regulation, the number of lots sold in a package may not exceed 20% of the total number of lots offered by the seller, and it cannot be more than 50 lots.

²⁰ Point 10.10 of the rules for the commercial section.

²¹ The software ranks counter-offers made at the same price according to the time they are received.

²² Law of Ukraine No. 2 210-III “On the protection of economic competition”, 11 January 2001, <https://zakon.rada.gov.ua/laws/show/2210-14#Text>.

²³ Order of the Ministry of Energy No. 272 “On the establishment of the auction committee for the sale of electricity under bilateral agreements”, 21 June 2019, <http://mpe.kmu.gov.ua/minugol/doccatalog/document?id=245398571>

²⁴ Law of Ukraine No. 2019-VIII “On the electricity market”, 13 April 2017, <https://zakon.rada.gov.ua/laws/show/2019-19#Text>.

²⁵ NEURC Decision No. 308 “On approval of the Rules of the day-ahead market and the intraday market”, 14 March 2018, <https://zakon.rada.gov.ua/laws/show/v0308874-18#Text>.

²⁶ NEURC Decision No. 766 “On the actions of electricity market participants during the quarantine period and restrictive measures related to the spread of coronavirus disease (COVID-19)”, 8 April 2020, <https://zakon.rada.gov.ua/rada/show/v0766874-20#Text>.

²⁷ Art. 19 of the EML.

²⁸ Law of Ukraine No. 1 639-IX “About measures aimed at overcoming crisis events and ensuring financial stability in the natural gas market”, 14 July 2021, <https://zakon.rada.gov.ua/laws/show/1639-20#Text>

²⁹ Article 67 of the EML.

³⁰ In certain cases, the MO may postpone the start time for bidding until 5 p.m. See para 3.1.10. NEURC Decree No. 308 “On the approval of the Rules of the day-ahead market and the intraday market”, 14 March 2018, <https://zakon.rada.gov.ua/laws/show/v0308874-18#Text>.

³¹ NEURC Decision No. 308 “On approval of the Rules of the day-ahead market and the intraday market” (with amendments), 14 March 2018, paragraph 5.1, <https://zakon.rada.gov.ua/laws/show/v0308874-18#Text>.

³² NEURC Decision No. 517 “On amendments to the Rules of the day-ahead market and the intraday market”, No. 517, 28 February 2020, <https://zakon.rada.gov.ua/rada/show/v0517874-20#n2>.

³³ NEURC Decision No. 332 “On ensuring the stable functioning of the electricity market, including the financial condition of market participants, during the period of martial law in Ukraine”, 25 February 2022, <https://zakon.rada.gov.ua/rada/show/v0332874-22#Text>.

³⁴ NEURC Decision No. 2 969 “On NEURC amendments decision No. 766 of 8 April 2020”, 24 December 2021, <https://zakon.rada.gov.ua/rada/show/v2969874-21#Text>.

³⁵ NEURC Decision No. 238 “On NEURC amendments decision No. 766 of 8 April 2020”, 7 February 2022, <https://zakon.rada.gov.ua/rada/show/v0238874-22#Text> and NEURC Decision No. 239 “On NEURC amendments decision No. 766 of 8 April 2020”, 10 February 2022, <https://zakon.rada.gov.ua/rada/show/v0239874-22#Text>

³⁶ NEURC Decision No. 299 “On NEURC amendments decision No. 766 of 8 April 2020”, 14 February 2022, <https://zakon.rada.gov.ua/rada/show/v0299874-22#Text> and NEURC Decision No. 332 “On ensuring the stable functioning of the electricity market, including the financial condition of market participants, during the period of martial law in Ukraine (with amendments)”, 25 February 2022, <https://zakon.rada.gov.ua/rada/show/v0332874-22#Text>

³⁷ NEURC Decision No. 791 “On NEURC amendments decision No. 766 of 8 April 2020”, 14 February 2022 (expired), <https://zakon.rada.gov.ua/rada/show/v0791874-20#Text>

³⁸ NEURC Decision No. 905 “On NEURC amendments decision No. 766 of 8 April 2020”, 30 April 2020 (expired), <https://zakon.rada.gov.ua/rada/show/v0905874-20#Text>

³⁹ NEURC Decision No. 413 “On NEURC amendments decision No. 332 of 25 February 2022 and No 766 of 8 April 2020”, 26 April 2022, <https://zakon.rada.gov.ua/rada/show/v0413874-22#Text>.

⁴⁰ The mandatory sales target is also reflected in Clause 9 of chapter X of the Market Rules.

⁴¹ section XVII “Final and Transitional Provisions” of Law of Ukraine No. 1 639-IX “On Measures to Overcome the Crisis and Ensure Financial Stability in the Natural Gas Market”, 14 July 2021, <https://zakon.rada.gov.ua/laws/show/1639-20#n339>.

⁴² Participants in a balancing group are not responsible for their individual imbalances towards the TSO, but they remain financially responsible towards the BRP of their group.

⁴³ Unless the dispatched load is selected to provide reserves. In such cases, the provider of balancing services is obliged to submit offers corresponding to the volumes of the selected reserve to the balancing market.

⁴⁴ The number does not include Crimea, Donetsk and Luhansk regional data.

⁴⁵ NEURC Decision No. 312 “On approval of the Retail Market Rules”, 14 March 2018, <https://zakon.rada.gov.ua/laws/show/v0312874-18#Text>.

⁴⁶ In the third quarter of 2021, the share was 32%, according to NEURC’s Retail Monitoring Report (NEURC, 2021^[24]).

⁴⁷ As of 1 July 2021, only 65 consumers were supplied under a SoLR agreement.

⁴⁸ CMU Resolution No. 483 “On approval of the provision on the assignment of special duties for electricity market participants to ensure public interest in the process of electricity market functioning” (PSO Act), 5 June 2019, <https://zakon.rada.gov.ua/laws/show/483-2019-%D0%BF#Text>.

⁴⁹ CMU Resolution No. 384 “On amendments to the resolution of the Cabinet of Ministers of Ukraine No. 483 of 5 June 2019”, 25 April 2023, <https://zakon.rada.gov.ua/laws/show/384-2023-%D0%BF#n2>.

⁵⁰ Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0944>.

⁵¹ Article 9 of Directive (EU) 2019/944.

⁵² See points 11 to 14 of paragraph 13 of section XVII “Final and Transitional Provisions” of the EML.

⁵³ It should be noted that Energoatom had an additional obligation to sell 15% of its output to the TSO and DSO to cover their network losses.

⁵⁴ CMU Resolution No. 483 “On approval of the provision on the assignment of special duties for electricity market participants to ensure public interest in the process of electricity market functioning” (PSO Act), 5 June 2019, <https://zakon.rada.gov.ua/laws/show/483-2019-%D0%BF/ed20190605#n9>.

⁵⁵ CMU Resolution No. 694 “On amendments to the regulation on imposition of special duties on electricity market participants to ensure public interests in the process of operation of the electricity market”, 5 August 2020, <https://zakon.rada.gov.ua/laws/show/694-2020-%D0%BF#n2>.

⁵⁶ See (Economic Truth, 2020^[23]) on Energoatom’s financial problems.

⁵⁷ CMU Resolution No. 859 “On amendments to resolution of the CMU No. 483 of 5 June 2019 and recognising some resolutions of the Cabinet of Ministers of Ukraine as having lost their validity”, 11 August 2021, <https://zakon.rada.gov.ua/laws/show/859-2021-%D0%BF#n2>.

⁵⁸ CMU Resolution No. 1 206 “On amendments to the resolution of the CMU No. 483 of 5 June 2019”, 28 October 2022, <https://zakon.rada.gov.ua/laws/show/1206-2022-%D0%BF#Text>.

⁵⁹ Based on the EUR/UAH exchange rate of 30.9226 on 31 December 2021. <https://bank.gov.ua/en/markets/exchangerate-chart?cn%5B%5D=EUR&startDate=2021-12-31&endDate=2022-01-31>.

⁶⁰ Based on responses provided by Ukrhydroenergo to the OECD questionnaire in 2022.

⁶¹ NEURC Decision No. 954 “On setting the tariff for electricity transmission services of NEC Ukrenergo for the second half of 2019”, 7 June 2019, <https://zakon.rada.gov.ua/laws/show/v0954874-19#Text>.

⁶² NEURC Decision No. 1998 “On NEURC amendments decision No. 2 668 of 10 December 2019”, 11 November 2020, <https://zakon.rada.gov.ua/rada/show/v1998874-20#n2>.

⁶³ NEURC Decision No. 1 329 “On NEURC amendments decision No. 2 668 of 10 December 2019”, 11 July 2020, <https://zakon.rada.gov.ua/laws/show/v1329874-20#n2>.

⁶⁴ NEURC Decision No. 2 668 “On setting the tariff for electricity transmission services of NEC Ukrenergo for 2020”, 10 December 2019, <https://zakon.rada.gov.ua/laws/show/v2668874-19#Text>.

⁶⁵ Law of Ukraine No. 555-IV “On alternative energy sources”, 20 February 2003 (as amended), <https://zakon.rada.gov.ua/laws/show/555-15#Text>.

⁶⁶ Law of Ukraine No. 810-IX “On amendments to some laws of Ukraine regarding the improvement of the conditions for supporting the production of electricity from alternative energy sources”, 21 July 2020, <https://zakon.rada.gov.ua/laws/show/810-20#n13>



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