



# Russian War Against Ukraine: Energy Dimension

DiXi Group alert

(status as of 12:00, September 6)

#StopRussianAggression

#StandWithUkraine

## Summary

- Due to damages caused by hostilities, about 612,800 consumers do not have electricity supply in Ukraine. About 235,700 subscribers remain without gas supply.
- During the last three days, the Russian occupying forces had continued intensive shelling of the territory around the **ZNPP**. As a result, all power transmission lines connecting ZNPP to the energy system of Ukraine were damaged and disconnected, and power unit No. 6, which supplied the ZNPP's needs, was unloaded and disconnected from the network.
- As of September 5, the occupiers turned off the Kakhovskaya HPP, which caused the blackout of part of the Kherson and Zaporizhzhia regions. Before that, the plant worked with three hydro units out of 6 - at 30-40% capacity and did not participate in balancing the power system.
- Ukrenergo paid UAH 1.25 billion of debts on the balancing market at the expense of the funds allocated from the income from the sale of the interstate crossing. It is expected that with these funds, producers will be able to additionally finance planned repairs of power units, purchase of equipment, and thermal generation - to purchase additional volumes of coal and gas for the heating season.
- Draft law No. 7732 was registered in the Verkhovna Rada. During martial law, it cancels the obligation to pay rent for the subsoil use for the natural gas extraction for those volumes of gas that were extracted from April 1, 2022, were not sold by extractive companies but were pumped into storages.
- Prime Minister Denys Shmyhal stated, following the results of the 8th meeting of the Association Council between the EU and Ukraine that, the Ministry of Community and Territorial Development, jointly with the World Bank, verified the damage caused by Russia

in the amount of USD 326 billion, including USD 105 billion is the verified amount needed to restore various objects.

## Attacks

Energoatom [reported](#) that during the last three days, the Russian occupying forces had continued intensive shelling of the territory around the **ZNPP**. As a result, the power transmission lines "ZNPP-Dniprovsk" (750 kV), "Zaporizhzhia TPP-Kakhovska" (330 kV) and "Zaporizhzhia TPP-Melitopol" (330 kV) were damaged and disconnected. The 750/330 kV ZNPP transformer was also damaged, and other lines of the ZNPP/Zaporizhzhia TPP unit were damaged earlier. On September 5, a fire broke out due to shelling. It led to the disconnection of the last line connecting the ZNPP/Zaporizhzhia TPP unit with the Ukrainian power system (the Zaporizhzhia TPP-Ferosplavna transmission line, 330 kV). As a result, power unit No. 6, which supplied the ZNPP's needs, was unloaded and disconnected from the network.

The Kryvyi Rih Military Administration Head Oleksandr Vilkul [reported](#) that on September 5, the Russian military made two strikes with cruise missiles at the **oil depot** in the Kryvyi Rih district, destroying a large fuel reserve.

[According](#) to Prime Minister Denys Shmyhal, USD 326 billion have already been verified as **direct damage** to Ukraine from Russia's aggression. USD 105 billion is the verified amount needed to restore various facilities.

## Nuclear Safety

### *Zaporizhzhia NPP*

On September 6, the IAEA report on the results of the Agency's mission short-term preliminary inspection of the ZNPP is expected to be [published](#). Ukraine calls on the international community to urgently take effective measures for the fastest possible demilitarization of the ZNPP and the territory around it, the withdrawal of all Russian military personnel from the plant and the city of Energodar, and the return the complete control on ZNPP to Ukraine to prevent a nuclear disaster of a global scale.

## Electricity Sector

### *Power system operation*

[According](#) to the General Staff of the Ukrainian Armed Forces as of September 5, the occupiers turned off the Kakhovskaya HPP, which caused the blackout of part of the Kherson and Zaporizhzhia regions. Before that, the plant worked with three hydro units out of 6 - at 30-40% capacity and did not participate in balancing the power system.

### **Daily capacity allocation auctions ([for September 6](#)):**

*Ukraine->Poland:* access to capacity was not allocated; According to Ukrenergo, exports to Poland has been temporarily discontinued.

*Ukraine->Moldova:* out of 600 MW of available capacity, 300 MW was booked by Energoatom (200 MW) and Ukrhydroenergo (100 MW) on a flat schedule; marginal price - "zero".

*Ukraine->Slovakia:* 125 MW of available capacity for (for 00:00-07:00, 22:00-24:00) and 150 MW (07:00-22:00) for each hour of day was distributed among 7 companies out of 8 that competed at the auction. The largest total shares were booked by ECU (52.5%) and DTEK Zakhidenergo (36.8%); the remaining 10.7% were distributed among 5 companies. The distribution concentration level decreased significantly - the Herfindahl-Hirschman Index (HHI) amounted to 4,137. The marginal price for various hours of the day increased slowly and ranged from 9,215.59 UAH/MWh (for 3:00-

4:00) to 15,726.47 UAH/MWh (for 20:00-21:00). This allowed Ukrenergo to receive over 42.9 million UAH in revenues from the auction (+2.6% to the previous day).

*Ukraine->Romania:* 125 MW of available capacity (for 00:00-07:00, 22:00-24:00) and 150 MW (for 07:00-22:00) was distributed among 6 companies competing at the auction. The largest total shares were booked by DTEK Zakhidenergo (48.8%) and ECU (43.8%); the remaining 7.4% were distributed among 4 companies. The distribution concentration level did not change (HHI amounted to 4,313). The marginal price for various hours of the day decreased significantly and ranged from 1,091.65 UAH/MWh (06:00 - 07:00) to 13,054 UAH/MWh (22:00 - 23:00), which allowed Ukrenergo to increase revenues from the auction to over 13.7 million UAH (-67.8% to the previous day).

## **Electricity market performance**

**Day-ahead market (DAM):** The Base, Peak and Offpeak indices [amounted](#) as of September 6 to 3,120.61 UAH/MWh (+1% vs the previous day), 3,628.06 UAH/MWh (+1.8%) and 2,613.16 UAH/MWh (-0.1%) respectively. As a result, the weighted average electricity purchase price slowly [increased](#) to 3,319.59 UAH/MWh (+2.5%). The highest prices were reported in the evening peaks (17:00-23:00), and ranged from 3,780 to 3,980 UAH/MWh. Exchange prices in the Eastern European markets have diverse dynamics. The Base DAM indices of Romania, Slovakia and Hungary were 6.2 times [higher](#) than the Base DAM index of Ukraine; while the price spread to Poland was 2.1 times.

The total volume of trading [decreased](#) moderately to the level of 21,455.1 MWh (-7% vs the previous day); the reported volume of supply did not change 44,331.4 MWh (-0.8%). Together, these factors drove the slow increase of the DAM surplus level: the gap between the volumes of purchase and sale bids was 2 times. At the same time, during 05:00-07:00, and 23:00-24:00, a shortage of electricity was observed at the DAM. In the [structure of purchase](#), 88.1% was occupied by suppliers, 11.8% belonged to network operators, 0.1% to producers.

**Intraday market (IDM):** The weighted average price of electricity [increased](#) slowly and amounted on September 5 to 3,345.19 UAH/MWh (+2.2% vs the previous day). At the same time, the highest prices were observed during the evening peaks (18:00-23:00), reaching the upper price cap 4,000 UAH/MWh.

The total volume of trading significantly increased to 942.5 MWh (+64.2% vs the previous day); supply decreased significantly to 12,879.2 MWh (-61.9%). All together, these factors caused a significant decrease in the surplus of the IDM: the gap between the total volume of purchase and sale bids decreased from 58.9 to 13.6 times. At the same time, a slight shortage of electricity was observed during 18:00-19:00. In the [structure of purchase](#), the dominant part (91.5%) was occupied by suppliers, 7.1% belonged to producers, and 1.4% belonged to network operators.

**Other:** [Ukrenergo paid](#) UAH 1.25 billion of debts on the balancing market at the expense of the funds allocated from the income from the sale of the interstate crossing (after making appropriate amendments to the legislation). It is expected that with these funds, producers will be able to additionally finance planned repairs of power units, purchase of equipment, and thermal generation - to purchase additional volumes of coal and gas for the heating season. According to the Law of Ukraine "On the Electricity Market", until the end of 2022 Ukrenergo will direct 50% of the revenue from auctions for interstate power lines access to producers who provided services on the balancing market. Also, the company systematically attracts international financing, which, in particular, is used to pay for the producers services in the auxiliary services market.

## **Disruption and resumption of supply**

[According](#) to the Ministry of Energy, as of September 5, a total of app. 612,800 consumers in 850 settlements were disconnected from electricity supply due to damage caused by hostilities, while supply to app. 13,700 consumers were restored during the day.

Large-scale power supply disruptions and, consequently, active recovery works were taking place:

- in the **Donetsk region**, [according](#) to the local DSO, specialists restored electricity supply to 2,000 consumers in 9 settlements. [According](#) to the Ministry of Energy, in general, about 373,000 consumers remained without electricity;
- in the **Luhansk region**, [according](#) to the Ministry of Energy, more than 128,200 consumers remained without electricity supply;
- in the **Kharkiv region**, [according](#) to the Ministry of Energy, about 29,500 consumers remained without electricity supply and electricity supply to 3,000 households was restored. In particular, local DSO specialists [restored electricity supply](#) to 26 private sector houses in the Novobavarskiy district of Kharkiv, which were cut off due to the rocket attack on the city;
- in the **Zaporizhzhia region**, [according](#) to the local DSO, as of 07:00 on September 6, 17,600 consumers in 73 settlements remained offline (data not including 11 district offices, where the occupation "authorities" restricted access). During the day, specialists repaired equipment and restored supplies to 16,542 consumers (28 settlements) of Orihiv, 1,902 in Zaporizhzhia, 1,208 (12 settlements) in Vilnia and 144 consumers in Stepnogorsk electricity grids;
- in the **Mykolaiv region**, [according](#) to the Regional Military Administration, as of September 6, 604 electricity supply facilities were partly or completely damaged (+5 during the day). 96 settlements in the Bashtan and Mykolaiv districts were sully without power supply and another 2 did not have electricity supply partially ([according](#) to the Ministry of Energy, a total of 30,000 consumers were left without electricity supply). In addition, electricity supply service to 5,000 households was restored during the day;
- in the **Dnipropetrovsk region**, [according](#) to the Regional Military Administration, on the night of September 6, the enemy once again opened fire on the Nikopol district, as a result of which power lines were damaged, more than 2,000 households left without electricity supply. [According](#) to the Ministry of Energy, specialists restored electricity to 1,200 consumers during the day;
- in the **Kherson region**, [according](#) to the General Staff of the Ukrainian Armed Forces, due to the disconnection of the Kakhovskaya HPP, part of the settlements in the Kherson region were left without electricity ;
- in the **Sumy region**, [according](#) to the Regional Military Administration, as of September 5, as a result of artillery shelling, some households in the Myropylyya village are without electricity;
- there was no up-to-date consolidated information on power supply in the **Odesa and Chernihiv regions** at the time of the review preparation.

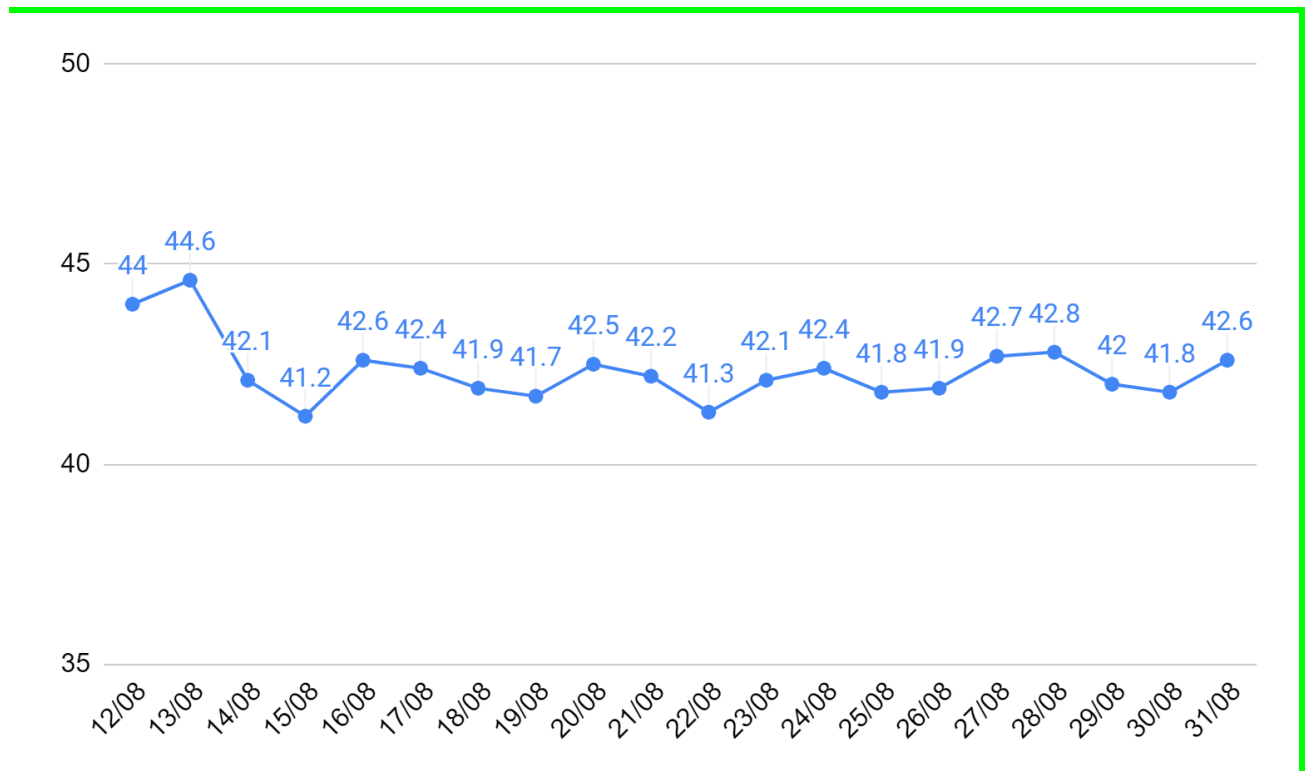
## Oil & Gas Sector

### *Gas system performance*

On September 4, the gas transit through the territory of Ukraine amounted to 42.7 mcm. These volumes were only 39% of the capacity contracted by Gazprom (109 mcm per day). There were no transit flows via the Sokhranivka interconnection point.

The total physical imports of gas from the EU for the reported period sharply decreased and amounted to 0.4 mcm: gas was reported only via the Hermanowice interconnection point (virtual interconnection point Ukraine-Poland). On September 4, there was no gas shipped on Ukraine's gas system exit via the Berehove interconnection point.

## Transit of Russian gas through the territory of Ukraine, mcm



Source: [GTSOU](#)

### Functioning of natural gas market

[Draft law No. 7732](#) was registered in the Verkhovna Rada. During martial law, it cancels the obligation to pay rent for the subsoil use for the natural gas extraction for those volumes of gas that were extracted from April 1, 2022, were not sold by extractive companies but were pumped into storages. Also, from August 1, 2022, and during the ban on the self-produced natural gas export, the draft law stipulates that the actual price of natural gas (at which rent charges are determined) is equal to the largest of the specified indicators:

- the weighted average price of natural gas, which was transferred/supplied by natural gas producers of NJSC Naftogaz of Ukraine in the framework of sales contracts on organized commodity markets in the reporting month;
- the sale price of natural gas, which is transferred/supplied by natural gas producers, based on the results of the trades that took place in the month preceding the reporting month. It's about trade transactions, the participants of which are not the Naftogaz group of companies (including companies in which Naftogaz owns a controlling interest);
- the natural gas price, defined as the arithmetic mean of domestic quotations on the Ukrainian market from the ICIS and Argus price agencies.

According to the 2021 Naftogaz annual report, in January-June 2022, JSC Ukrgezvydobuvannya (the largest producer of natural gas in Ukraine) [reduced](#) the supply of commercial gas by 1.5% compared to the same period in 2021 - to 6.31 bcm

### Disruption and resumption of supply

The **Donetsk, Luhansk, Zaporizhzhia, Kherson, Mykolaiv, and Kharkiv regions** had the most challenging situation. [According](#) to the Ministry of Energy, as of September 5, app. 235,700 consumers remained without gas supply. There was no information regarding the number of consumers to whom gas distribution was restored during the reporting day.

In the **Donetsk region**, the situation didn't change: almost the whole region remained without gas supply due to the main gas pipeline damage.

In the **Luhansk region**, there were no changes in gas supply: it was completely suspended due to hostilities which were deeply destroying the region's critical infrastructure.

In the **Kharkiv region**, the local DSO specialists [eliminated](#) 25 damages to the gas infrastructure in the Chuhuiv community over the past week, which occurred due to occupants' shelling of residential buildings. At the same time, almost 800 consumers were left without gas due to enemy bombing and damage to gas pipelines.

In the **Mykolaiv region**, as of the morning of September 6, 861 gas infrastructure facilities (+3 as compared to September 5) were [damaged](#) for the whole period of war. As a result, 6,344 consumers (+1) were left without gas supply.

In the **Zaporizhzhia region**, as of the morning of September 6, 226,681 consumers in 268 settlements [remained](#) without gas supply.

Operational information on gas supply in **Chernihiv and Kherson regions** was not available at the time of the review preparation.

## Countermeasures of Ukrainian Companies and Public Authorities

At a meeting with the Vice President of the European Commission for Interinstitutional Relations and Forecasting, Marosh Shefchovych, the Prime Minister of Ukraine Denys Shmyhal [called](#) for the introduction of a full energy embargo against the Russian Federation, following the road map, proposed by the Yermak - McFaul expert group. In addition, among the issues discussed at the meeting were the increasing export of Ukrainian electricity to the EU and the possible use of Ukrainian gas storage facilities by the EU countries.

Also, Denys Shmyhal [stated](#), following the results of the 8th meeting of the Association Council between the EU and Ukraine that, the Ministry of Community and Territorial Development, jointly with the World Bank, verified the damage caused by Russia in the amount of USD 326 billion, including USD 105 billion is the verified amount needed to restore various objects.

For subscriptions, comments and other questions, please email to: [author@dixigroup.org](mailto:author@dixigroup.org)

## **SUPPORT UKRAINIAN ENERGY SECTOR**

*Ukraine urgently needs emergency energy equipment to restore energy supply in the regions affected by war. More than 10.000 items are on the list of requested emergency energy equipment. If your company, association or country is ready to help, please [contact the Energy Community Secretariat's Ukraine Support Task Force](#)*  
[More information](#)

## **SUPPORT UKRAINIAN ARMY**

*To financially support Heroic Ukrainian Army, please follow the [link](#) (The National Bank of Ukraine)*