



Russian War Against Ukraine: Energy Dimension

DiXi Group alert

(status as of 12:00, May 21)

Stop russian nuclear terrorism!

Stop the atrocities!

Introduce full embargo on russian oil and gas imports now!

#StopRussianAggression

#StandWithUkraine

Summary

- **App. 635,800 consumers all over Ukraine did not have electricity supply, and over 161,000 consumers remained without gas supply.**
- The Acting Head of the State Nuclear Regulatory Inspectorate of Ukraine Oleh Korikov and the Chairman of the U.S. Nuclear Regulatory Commission Christopher Hanson agreed about sharing **experience of licensing advanced nuclear technologies (projects of AP1000 units and small modular reactors)**. The parties also discussed refusal from Russian nuclear fuel for the VVER-440 type reactors in Ukraine.
- According to the current estimates, **5-10 years are needed to demine Ukraine's territory**. As of May 21, the State Emergency Service crews managed to neutralize 115,268 explosive items.
- According to the President Volodymyr Zelenskyi, **Ukraine offered to sign a multilateral agreement with partner countries to create a mechanism for confiscating Russian assets** which would be transferred to a special fund for paying compensations to Ukrainians who suffered from war.
- **Naftogaz will receive a 300 mln EUR loan from the EBRD to purchase gas.**

- The CEO of Naftogaz **Yurii Vitrenko stated the possibility of a new arbitration with Gazprom**, as the Russian party still has not paid the fee for organization of gas transit for the next month.
- **The Presidential Office held a meeting with business representatives who criticized the governmental economic policy.** The parties agreed to establish a working group to develop recommendations. Business representatives stressed on their demand of economic liberalization, and offered to reformat the National Council for the Recovery of Ukraine from the War in a way to include entrepreneurs, international donors and experts.

Attacks:

[According to](#) the State Emergency Service of Ukraine, from February 24 to May 21, 115,268 explosive items were neutralized in Ukraine, including 1,977 aviation bombs and 593 kg of explosives; the area of 22,397 hectares was surveyed. [According to](#) the Ministry of Environmental Protection and Natural Resources, the Russian troops used remote mining systems, installed uncontrolled minefields in settlements and left behind a large number of dangerous explosive devices, which were a deadly threat to civilians, and the environmental consequences of such actions would last for years. The Head of the State Emergency Service's Department for Pyrotechnic Works and Humanitarian Demining Oleh Bondar [reported](#) earlier that demining of Ukraine's territory could take 5 to 10 years.

Donetsk region In the last 24 hours, 14 settlements of the Donetsk region, including Bakhmut, Lyman, Avdiivka, and Krasnohorivka, were shelled from aircraft, tanks and heavy artillery, killing 3 civilians and injuring 7, as the National Police [reported](#). The shelling damaged at least 53 residential facilities, including residential buildings, educational and religious facilities, a bus station, farms; the Avdiivka Coke Plant [was hit](#) again. As a result of mortar shelling of Krasnohorivka, most of the city was disconnected from electricity supply, and power supply to the village of Novoluhanske was damaged, yet restored during the day. [In the city of Mariupol](#), the enemy took measures to restore the functioning of the port, in particular, carried out demining of port infrastructure.

Luhansk region In the Luhansk region, more than 11,000 houses had been destroyed by the Russian army, incl. almost 3,200 multi-apartment buildings, and economic losses were estimated at hundreds of billions of UAH, [reported](#) the Luhansk Regional Military Administration Head Serhii Haidai. During the day, the shelling [destroyed](#) about 50 residential houses, including 23 in Lysychansk, 16 in Pryvillia, and 5 in Severodonetsk. In addition, in the city of [Severodonetsk](#), the occupiers once again opened fire on the Azot chemical industry facility; the cooling tower caught fire, which was extinguished and prevented from spreading on production facilities. In the city of Lysychansk, after shelling, a coal bunker at a mine caught fire. It was impossible to count the damage in the settlements of Hirske and Popasna communities, which regularly suffered from attacks by Russian aircraft.

Kharkiv region In the afternoon of May 20, the Russian occupiers fired three missiles at the house of culture in the city of Lozova; two were destroyed by the Ukrainian air defense forces, but one hit and destroyed the facility, injuring 8 civilians, [reported](#) the Kharkiv Regional Military Administration Head Oleh Syniehubov. In the evening of the same day, the occupiers opened fire on the territory of the Kyivskiy district in Kharkiv, with trade pavilions on the area of 1,000

square meters burning due to shelling; the fire was extinguished only in 4 hours. [According to](#) the State Emergency Service of Ukraine, during the day, fires caused by enemy's shelling occurred in Chuhuiv (4), Kharkiv (3), Lozova (1) and Bohodukhiv (1) districts of the region, burning private houses, outbuildings, garages, infrastructure and natural ecosystems.

[According to](#) the General Staff of the Armed Forces of Ukraine, the enemy continued to block the work of Ukrainian mobile operators in the temporarily occupied territories of the region, distributed propaganda materials, and tried to broadcast Russian TV and radio channels.

Poltava region On May 20, the Russian troops attacked an infrastructure facility of the Lubny community, but no one was injured, [reported](#) the Poltava Regional Military Administration Head Dmytro Lunin.

Sumy region [According to](#) the Operational Command "North", the enemy continued to fire on the areas close to the border with Russia. E.g., on May 20, 4 mortar shellings were recorded in the area of Seredyna-Buda, no casualties were recorded among personnel and equipment. On the morning of May 21, the Russian military [fired](#) artillery on the Esman community; in addition, border guards [recorded](#) 6 "arrivals" from Russia close to the village of Kucherivka.

Chernihiv region On May 20, the border areas of the Chernihiv region were once again shelled from Russian territory, as the Operational Command "North" [reported](#). In particular, in the area of the village of Hremyach, 4 attacks were recorded, probably from a 120 mm mortar; but no losses reported.

Zhytomyr region In the Zhytomyr region, as a result of a missile strike on the city of Malyn, an infrastructure facility, almost 100 residential houses were damaged and 3 civilians were injured, [reported](#) the mayor Oleksandr Sytailo. Due to the shelling in the neighborhood, power supply was disconnected, which was planned to be restored within a day.

Odesa region [According to](#) the Operational Command "South", on May 20, the Russian military carried out 2 missile attacks on the Odesa region using aircraft. One of the missiles hit a beach in the south of the region; the second one hit an industrial facility with fertilizers, which exploded and caught fire. The fire was promptly eliminated by the State Emergency Service of Ukraine, no victims and threat to the environment were recorded.

Mykolaiv region In the evening of May 20, the Russian military carried out another shelling by multiple rocket launch systems on the suburbs of Mykolaiv, with an infrastructure facility damaged, but no one injured, as the Operational Command "South" [reported](#). In the territory of the Mykolaiv region, [2 fires](#) were reported due to enemy attacks: at a garage cooperative in the settlement of Pervomaiske and at a natural ecosystem on the area of 1.1 hectares in the village of Halytsynove.

[According to](#) the Mykolaiv Regional Military Administration, as of May 21, since the beginning of the Russian invasion, 3,587 residential facilities were partially or completely damaged in the region, in particular 2,551 facilities of housing stock (+22 houses), 284 electricity (+1), 145 gas, 53 heat and 16 water supply facility.

Kherson region The Russian invaders in the temporarily occupied Kherson region continued to use terror against civilians, including preventing entry into Ukrainian-controlled territory and opening any humanitarian corridors to import food, medicines and evacuate vulnerable groups of people, as the General Staff of the Armed Forces of Ukraine reported. Those who wanted to leave the region were sent to [Crimea](#) as the only possible direction; patrols were intensified in the regional center, and the number of checkpoints has increased. On the outskirts of the [town of Chornobaivka](#), the enemy deployed about 130 units of military equipment.

Zaporizhzhia region [According to](#) the Zaporizhzhia Regional Military Administration, as of May 21, 1,117 households in the region were completely destroyed or partially damaged. During the day, as a result of hostilities, damage was caused to Bilmak networks, leaving residents of 500 homes in the village of Husarka without electricity supply. In the village of Abrykosivka (Vasylivka district), an underground medium-pressure gas pipeline was damaged due to the digging of trenches by the occupying forces.

The occupation authorities continued [attempts](#) to create quasi-republics in the southern regions of Ukraine and the introduction of the Russian ruble turnover. E.g., in Melitopol banners "On the 220th anniversary of the Tavriya Province" appeared, and 10,000 rubles are provided to pensioners in exchange for their personal data. Personal data was also exchanged for money in the settlements of Mykhailivka and Vasylivka. Residents of the city of Kamyanka-Dniprovska reported the theft and removal of 300 tons of grain from the community; in the village of Mala Bilozerka, invaders stole grain from farmers and shareholders.

Rivne region On May 21, the Russian troops launched a missile strike on a military infrastructure facility; the number of victims and the extent of the destruction were being clarified, [reported](#) the Rivne Regional Military Administration Head Vitalii Koval.

Nuclear and Radiation Safety:

As of 08:00 on May 21, all operating NPPs of Ukraine were operating normally; radiation, fire and environmental conditions at station sites and adjacent areas were within current standards.

The Acting Chairman of the State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) Oleh Korikov [met](#) with Chairman of the U.S. Nuclear Regulatory Commission Christopher Hanson to discuss the refusal from Russian nuclear fuel for the VVER-440 type reactors in Ukraine and the regulation of nuclear and radiation safety during the war. The parties agreed to cooperate in sharing experience of licensing advanced nuclear technologies (projects of AP1000 units and small modular reactors). Technical assistance was also planned to strengthen the capacity of the SNRIU Information and Crisis Center and to put into operation the State Registry of Individual Irradiation Doses for Personnel and Citizens (within the IAEA's Response and Assistance Network (RANET)).

Chornobyl NPP Exclusion Zone

No significant changes in the situation were reported. To remind, the State Agency for Exclusion Zone Management (SAEZM) [reported](#) a significant increase in the level of fire danger. At the same time, [according](#) to the SNRIU, SAEZM and the IAEA, seasonal forest fires

would not have a significant impact on the radiation background and would not pose a threat to life and public health.

Zaporizhzhia NPP

For 79 days in a row, the Zaporizhzhia NPP and the satellite city of Energodar have been under the control of Russian terrorists, who are putting constant physical, psychological and informational pressure on the station's employees and residents. ZNPP power units are serviced by Ukrainian personnel with proper rotation, but the plant's nuclear and radiation safety are under constant threat.

As of 08:00 on May 21, the radiation background on the territory of the ZNPP industrial site and the sanitary protection zone of the station remained [within the standards](#); gamma background in the Zaporizhzhia region was also [stable](#) (7-13 µR/h) and did not pose a threat to life and public health.

To remind, the occupiers were digging trenches and building fortifications around the ZNPP site and the city of Energodar, which testifies their preparation for the defense of the captured facilities and territories. The occupiers also continued to terrorize residents of Energodar, as they abducted the municipal fire department chief and acting commander, having used [force](#) against Ukrainian firefighters (who went on protest) and damaged fire and rescue equipment.

The presence of Russian terrorists at nuclear facilities poses extremely high threats to nuclear and radiation safety on a global scale! Ukraine demands to recognize the actions of Russia and Rosatom as nuclear terrorism, which aims to intentionally violate the security of nuclear power plants, international law and basic human rights with the aim of genocide, ecocide and encroachment on the country's sovereignty.

We call on international partners to increase pressure on the IAEA, whose actions may prevent acts of nuclear terrorism by Russia. At the same time, it is critical to minimize Russia's influence on IAEA policies and activities, in particular by removing all Russians from key positions in the Agency's Secretariat and restricting their access to information about Ukraine's nuclear power plants.

We also emphasize the need to impose tough sanctions on the management, staff, products, international projects of Rosatom and, in general, the nuclear industry of the aggressor country!

Electricity Sector:

Power system operation

For over 2 months, Ukraine's power system has been stably operating in trial synchronous mode with the Continental Europe network (ENTSO-E). Commercial exports of electricity to Poland via the Dobrotvirska TPP - Zamosc transmission line [remained](#) at the stable schedule with a maximum level of 210 MW during the day. Exports to Moldova [fluctuated](#) during the day and were performed at the maximum level of 150 MW. In addition, there are technical [cross-border](#) flows between the energy systems of Ukraine and Eastern European countries (Romania, Hungary, Slovakia and Moldova).

The current cross-border capacity between the power system of Ukraine and ENTSO-E is about 2 GW, and potentially can be increased to 4-5 GW. However, the trial mode of synchronous operation does not provide for full-fledged commercial exports/imports of electricity. To remind, Ukraine has

initiated respective [official negotiations](#) with the ENTSO-E leadership, and the U.S. representatives have [assured](#) of political support for the development of electricity exports to the EU and readiness to facilitate this process. Full-scale exports of electricity from Ukraine would help reduce the EU's energy dependency on Russia, as well as faster achievement of decarbonization targets. In addition, [Ukrainian Energy Exchange](#) (UEEX) plans to start a separate direction of holding auctions to sell electricity for exports. UEEX has already developed a mechanism and proposed to open a special trading section. At the same time, it is expected that the consolidation of supply and demand on an exchange platform will ensure high market liquidity and equal access to resources.

Ukrenergo [continued](#) to restore the damaged energy infrastructure. In particular, the priority emergency and recovery works in the central region were concentrated on 330 kV and 750 kV lines, and in the eastern region - on two 330 kV lines. Installation of new supports, repair of cable breaks and inspection of sites, together with sappers, continued. At one of the substations in the northern region, the dismantling of damaged equipment and surviving hardware was completed for further repairs.

Electricity market performance

Day-ahead market (DAM): In the last three days, the DAM weighted average settlement price is slightly [decreasing](#) and, as for May 21, amounted to 2,222.14 UAH/MWh (-3.8% vs the previous trading day). At the same time, the rapid synchronous decline of exchange prices in the Eastern European markets led to significant reduction of price gaps to Ukraine. The prices in Hungary and Romania were 1.9-2.1 times [higher](#) than the DAM Base price index of Ukraine, while the spread to Slovakia and Poland was narrower at app. 1.6 and 1.4 times, respectively.

The total volume of trading on DAM continued to [decrease](#) to 8,328.7 MWh (-45.4% vs the previous day), which is one of the lowest levels in May and for the entire DAM performance period. At the same time, the moderate decrease in supply to 78,413.1 MWh (-6.2%) did not restrain the increase in the DAM surplus - the gap with the volume of purchase bids, which remained relatively stable at 5.2-5.5 times for 4 previous days, increased to 9.4 times. [The structure of electricity](#) purchase on DAM has changed slightly: 69.4% belonged to suppliers, 30.4% to system operators, 0.2% to producers and traders.

Intraday market (IDM): On May 20, the weighted average price of electricity on IDM [increased](#) slightly and amounted to 2,610.56 UAH/MWh (+4.4% vs the previous day). At the same time, the total volume of trading decreased more than two times to 173.6 MWh (-52.2% vs the previous day). At the same time, the volume of supply increased slowly to 35,850.2 MWh (+9.5%), which led to an increase in the market surplus. The gap with the volume of purchase bids increased from 91 to 211 times. In the [purchasing structure](#), significant change did occur: the dominant part (57.6%) was occupied by producers, 38% by suppliers, 4.4% by system operators.

Disruption and resumption of supply

[According](#) to the Ministry of Energy, as of May 20, 677 settlements were disconnected from electricity, a total of app. 635,800 consumers. During the day, electricity supply was resumed to app. 18,700 consumers.

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

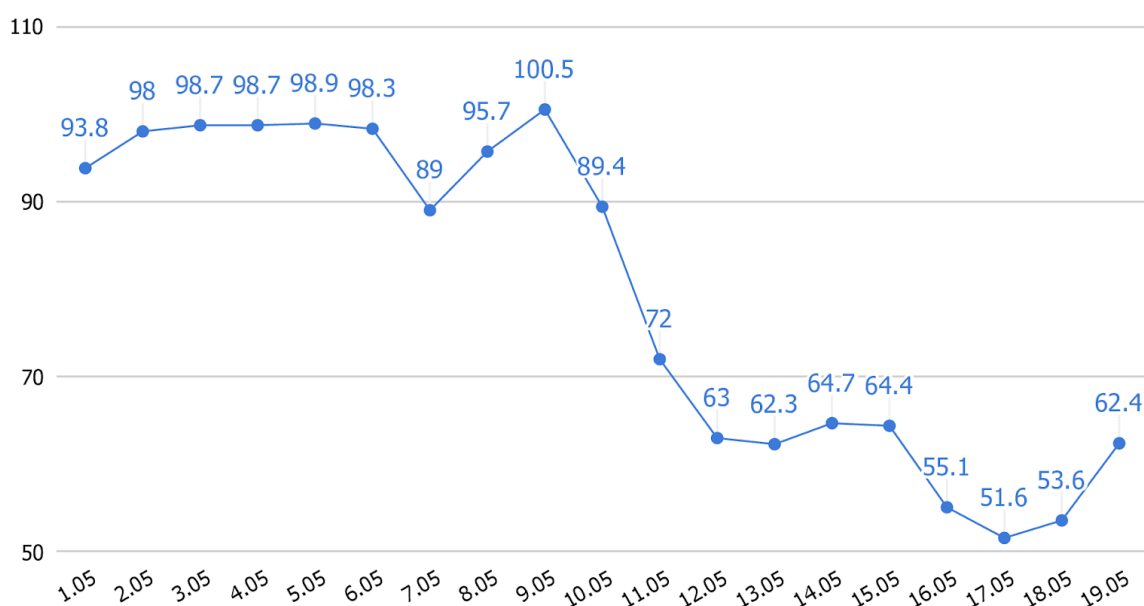
- in the **Donetsk region**, [according](#) to DTEK, supply to 11,500 consumers in 21 settlements was resumed during the day; 276 settlements ([according](#) to the Cabinet of Ministers, 331,200 consumers in total) were left without electricity supply;
- in the **Luhansk region**, [according](#) to the Cabinet of Ministers, 128,300 consumers were left without electricity supply;
- in the **Kharkiv region**, [according](#) to the Cabinet of Ministers, 90,000 consumers were still with no electricity supply; supply to 4,000 consumers was resumed during the day;
- in the **Kyiv region**, [according](#) to the Cabinet of Ministers, supply to 13,300 consumers was resumed during the day;

- in the **Zaporizhzhia region**, as of 07:00 on May 21, 21,626 consumers in 74 settlements were left without [electricity supply](#); supply to 1,337 consumers was resumed during the day;
- in the **Sumy region**, [according](#) to the Cabinet of Ministers, supply to 800 consumers was resumed during the day;
- there was no up-to-date consolidated information on power supply in the **Mykolaiv, Chernihiv, Dnipropetrovsk, Odesa and Kherson regions** at the time of the review preparation.

Gas Sector:

As of May 19, the transit of Russian gas through the territory of Ukraine increased by 8.8 mcm compared to the previous day and amounted to 62.4 mcm. These volumes were 43% less than the capacity contracted by Gazprom (109 mcm per day). There were no transit flows via the Sokhranivka interconnection point. Physical imports of gas from the EU were reported from the Hermanowice interconnection point (virtual interconnection point "Ukraine-Poland") at 0.46 mcm.

Gas transit through Ukraine (at Sokhranivka and Sudzha interconnection points), mcm



Source: [GTSOU](#)

Gas Transmission System Operator of Ukraine LLC (GTSOU) [received](#) 101 portable generators and 9,000 m of cable from the Italian TSO Snam, which will be used for the restoration works at facilities damaged in the combat activities, as well as to service the system's equipment.

The CEO of Naftogaz Yurii Vitrenko [stated](#) the possibility of a new arbitration with Gazprom on transit. According to him, the Russian party still has not paid the fee for organization of gas transit for the next month. Vitrenko stressed the Russian party is to blame for the reduction in gas transit volumes. After GTSOU refused to accept gas at the Sokhranivka interconnection point (located in the territory temporarily occupied by Russia), it was proposed to transfer volumes to the Sudzha interconnection point (in the territory controlled by Ukraine), which Gazprom refused. Vitrenko believes that Russia was not interested in increasing gas transit to Europe and was trying to blame Ukraine.

Naftogaz will receive a 300 mln EUR loan from the European Bank for Reconstruction and Development (EBRD) to purchase gas, [reported](#) Irina Kravchenko, the EBRD Deputy Director in Ukraine. In addition, the EBRD will support the program for Ukraine's recovery.

Disruption and resumption of supply

The **Donetsk, Luhansk, Zaporizhia, Chernihiv, Kharkiv and Mykolaiv regions** had the most challenging situation in gas supply. [According](#) to the Cabinet of Ministers, as of May 20, over 161,000 consumers were left with no gas supply. Gas supply to more than 23,300 consumers was restored during the day.

In the **Donetsk region**, on May 20, the local DSO [performed](#) many repair works on gas infrastructure facilities, in particular, more than 200 breaches were welded, the next planned stage was to restart gas flow.

In the **Luhansk region**, as of 12:00 on May 20, the repair of a main gas pipeline near Severodonetsk was [completed](#), its tightness was checked and the valve was opened, which allowed to resume gas supply to some areas of the city.

In the **Kharkiv region** specialists of the local DSO [repaired](#) the damaged networks and started gas supply to the settlement of Elitne of the liberated Vilkhivka community, with the first 10 households receiving gas. In addition, works were performed to restore gas supply to more than 50 houses in Derhachi and Pokotyivka.

In the **Zaporizhzhia region**, as of 11.30 on May 20, 69,983 supplies in 89 settlements were [without gas supply](#). The day before, as a result of trenches' digging by the occupiers, an underground medium-pressure gas pipeline in the village of Abrykosivka (Vasylivka district) was damaged. At the same time, previously damaged low-pressure gas pipelines were restored in the city of Huliaipole.

In the **Kherson region**, as of 12:00 on May 20, 1 community (Vysokopillia) has completely remained [without gas supply](#) and 3 communities (Velyka Oleksandrivka, Novovorontsovka, Stanislav) partially. LPG reserves were running out in the Hornostaivka, Velyka Lepetykha and Rubanivka communities; in Novoraysk, Novotroitske and Dolmativka communities, LPG supply has run out.

In the **Mykolaiv region**, as of May 21, 145 gas infrastructure facilities were [damaged](#) due to Russian aggression, and 3,485 consumers were left without gas supply, in particular 231 were disconnected during the day.

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

Countermeasures of Ukrainian Companies and Public Authorities

The President of Ukraine Volodymyr Zelenskyi in his evening video address [stated](#) that Ukraine to sign a multilateral agreement with partner countries to create a mechanism for confiscating Russian assets which would be transferred to a special fund for paying compensations to Ukrainians who suffered from war.

The Cabinet of Ministers of Ukraine [approved](#) the composition of a commission, which starts negotiations with the EU on concluding the agreement on road freight transport, which aims to liberalize logistics and facilitate Ukraine's access to European ports.

The Presidential Office [held a](#) meeting with representatives of Ukrainian business critical of the government's economic policy. At the meeting, the parties agreed to establish a working group to develop policy recommendations. Business representatives emphasized their main demand was the liberalization of the economy, and also proposed to reformat the National Council for the Recovery of Ukraine from the War in a way to include entrepreneurs, international donors and experts.

Sources:

The alerts are developed based on collected, verified, and analyzed information reports of over 100 official sources: ministries, state agencies, network operators, and energy companies. Information was collected only from official websites and official social media accounts.

For subscriptions, comments and other questions, please email to: author@dixigroup.org

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