



USAID
FROM THE AMERICAN PEOPLE



building
local
promise.



Razumkov
centre

UKRAINE'S ENERGY SECTOR IN SEPTEMBER 2024

October 2024



This publication was conducted by Razumkov Centre as part of its project implemented under the USAID/ENGAGE activity, which is funded by the United States Agency for International Development (USAID) and implemented by Pact. The contents of this publication are the sole responsibility of Pact and its implementing partners and do not necessary reflect the views of USAID or the United States Government.

UKRAINE'S ENERGY SECTOR IN SEPTEMBER 2024

Gennadii RIABTSEV,
Visiting Research Fellow for Energy Studies

Volodymyr OMELCHENKO,
Director of Energy Programmes of the Razumkov Centre (general editing)

The September bulletin of the UN Human Rights Monitoring Mission in Ukraine states that between 22 March and 31 August 2024, russians launched nine waves of long-range and large-scale coordinated attacks on Ukraine's electric power system, «damaging or destroying numerous power generation, transmission, and distribution facilities. The strikes had reverberating effects causing harm to the civilian population and the country's electricity supply, water distribution, sewage and sanitation systems, heating and hot water, public health, education, and the economy». Considering the number of regions affected, the coordinated nature of the attacks, the high precision of the weapons involved, and the sheer scale of harm inflicted on civilians and interconnected civilian systems supplying the population with services essential to their health and survival, the UN Monitoring Mission in Ukraine has reasonable grounds to believe that «multiple aspects of the military campaign... have violated foundational principles of international humanitarian law». This law relies on three main principles for the protection of civilians and civilian objects: distinction, proportionality, and precaution. «The Russian armed forces' attack on electricity infrastructure in Ukraine likely violated all three principles».

The damage inflicted by the russian strikes would have been much greater if measures had not been taken to shield the fuel and energy sector, including those undergoing repair work, and if the transmission and distribution facilities had first- and second-level protection not installed as part of the pilot project to protect critical energy infrastructure.

It took 11 days to restore the power system after the August attacks. Subsequently, efforts were made to arrange the physical protection of facilities taking into account the enemy's use of air-launched cruise missiles with cluster warheads, to accumulate dispersed stocks of the most vulnerable equipment at transmission and distribution facilities, and to continue repairs at the plants, which should result in the launch of nine NPP units and the restoration of 60-70% of thermal generation capacity.

PREPARATION FOR HEATING SEASON

Preparations for the 2024-2025 heating season are underway in [three key areas](#) defined by the government in August:

1. Large-scale generation and distribution: «Restoration and repairs are [underway 24/7](#)». The Ukraine Energy Support Fund has accumulated €560 million. «Partners [have financed](#) the purchase of 170 MW of power equipment». Since August, after the Cabinet of Ministers [defined](#) the list of energy goods exempted from customs duties, more than 1,800 units of generator and 120,000 units of battery equipment have been [imported](#).

«[Negotiations](#) with ENTSO-E to increase electricity import limits from the EU to 2.2 GW are at the final stage».

2. Decentralised generation for business. Since the beginning of the year, entrepreneurs have received UAH 60.2 billion under the government's «Affordable Loans 5-7-9%» [programme](#) alone. 83 out of 169 cogeneration units delivered to heat companies have been put into operation. «More than 290 additional units and 100 modular boiler houses to be [provided](#) by partners».

3. Decentralised generation for individuals – «programmes that provide government

support to households and condominiums to provide electricity». «More than 80% of schools and 100% of hospitals **have generators**, with a total of 16,500 powerful generators installed».

Participants of the meeting of the Headquarters for the preparation of housing and communal services and the fuel and energy sector for the autumn-winter period have formulated the following **main tasks** for central and local authorities for October 2024:

- ✓ preparing TPPs and CHPPs for stable operation in winter;
- ✓ ensuring physical protection of critical infrastructure facilities;
- ✓ developing algorithms for action in case of force majeure;
- ✓ installing cogeneration units and modular boiler houses in the affected regions;
- ✓ ensuring stable water supply in at-risk areas;
- ✓ promoting the use of individual heating stations.

As part of these efforts, the State Agency on Energy Efficiency and Energy Saving **reported** the elimination of 77% and 92% of more than 5.5 and 3.4 thousand remarks on the operation of 1,775 and 1,576 socially important electricity and heat supply facilities inspected by the inspectors, respectively.

In turn, the Ministry for Reconstruction **announced** that it had begun developing, together with USAID, a feasibility study for projects to provide uninterrupted electricity, heat and water supply to more than 800,000 residents of Vinnytsia, Khmelnytskyi and Ternopil. However, it has not been reported whether these projects will be implemented and when this might happen.

Quite worrisome is the fact that the winners of auctions held by Ukrenergo in August pursuant to the **NEURC resolution** did not fully guarantee the construction of new capacity. Only 33 of 48 companies deposited financial collateral into escrow accounts. In other words, in a year's time, the power system will have only 99 MW of frequency support reserves (which meets the **demand**), 68 MW of **reserves** for

loading services and 210 MW for loading and unloading services in each hour (12% and 50% of **the demand**). It is possible that the incomplete guarantee was caused by the controversial **change** of Ukrenergo management. For the same reason, the third special auction scheduled for October is likely to be cancelled.

Due to the serious damage caused to power generation by nine massive attacks, the energy sector could not use the fuel that had been reserved for the off-season. As a result, coal reserves at TPPs and CHPPs are at their maximum level (3.1 Mt), and **gas reserves** in underground storage facilities have increased to 7.6 bcm (+0.7 bcm; excluding 4.7 bcm of long-term storage and 0.6 bcm of gas owned by non-residents). At the same time, Naftogaz Ukraine **noted** that «gas remains almost the only reliable source of energy in times of war», so «the heating season will start on time».

ENERGY BALANCE

Ukraine managed to balance its power system after 11 days of removing the consequences of the enemy attack of 26 August. This made it possible to cancel the hourly blackout schedules that were in place on 1-6 September for one to three consumer groups at a time. Emergency assistance from European operators was used only five times during the month, and the use of cross-border crossings never exceeded half of their capacity (20 GWh on 25 September).

The relative balance was achieved thanks to lower daytime temperatures and the restoration of generation and distribution facilities. Plans are to **launch** nine nuclear power units in October and **return** 60 to 70% of the thermal generation capacity destroyed by Russian attacks. In the meantime, deteriorating weather conditions significantly reduced the efficiency of SPPs, and their electricity generation almost halved over the month.

In September, the baseload capacity of Ukraine's integrated power system (IPS) was provided by 8 NPP units generating about 5.4 GW of power. One unit remained under maintenance. Sources of manoeuvrable power included 4-6 power units of TPPs and CHPPs, as well as HPPs and PSPs, which together generated about 2.7 GW of electricity.

Due to the lack of rain and high temperatures, generation at Ukrhydroenergo facilities

remained low in September, not exceeding 0.5 GW. The levels in the Dnipro and Dniester reservoirs were in line with the decision of the Interagency Commission with the State Agency of Water Resources of Ukraine establishing their operating modes.

During the reporting period, Ukraine generated 8.8–9.5 GW of electricity every hour (for comparison, generation in 2021 was 18 GW). NPPs accounted for most generation (60%), followed by TPPs (14%), renewables (13%), CHPPs (8%), and HPPs (5%).

Electricity shortages were predicted 7 times a month, on 1–6 September and 12 September. Emergency assistance from ENTSO-E operators, primarily the Polish one, was called in to balance the system five times. The Polish operator received similar assistance from Ukrenergo once, on 6 September.

Due to hostilities and technical problems, an average of 560 Ukrainian settlements were without electricity (+50 compared to the previous month), and up to 86 more due to weather conditions (16 September). The fact that the number of settlements left without power for various reasons has been growing for the fifth month in a row (400 in April) causes serious concern. Moreover, about 300 settlements were without power for two or more days in September.

There were no commercial exports of electricity in September. At night and in the morning, electricity was [transited](#) through the Ukrainian grid from Hungary to Romania. Imports of 0.6–1.5 GW came from Poland, Slovakia, Romania, Hungary and Moldova.

There was no shortage of natural gas. Its consumption in September was 10% higher year-on-year thanks to an increase in the number of generating units, but 35% down compared to September 2021. Monthly production exceeded last year's level by 2%. Naftogaz Ukraine [plans](#) to increase the annual output to 15 bcm and [claims](#) that in eight months, its companies produced 9.8 bcm of commercial gas – 7% more than in the same period in 2023.

As an average of 25 mcm of gas was pumped daily to underground storage facilities in September out of 40 mcm produced, the level of reserves was 20% lower than in 2015–2018, including gas owned by non-residents.

However, according to Naftogaz Group's management, «the rate of gas accumulation allows us to be optimistic about [our plan](#) to achieve 13.2 bcm by 1 November».

Daily commercial exports of gas stored by non-residents in Ukrainian underground storage facilities in the customs warehouse regime did not exceed 7–8 mcm (Drozdovychi UGSF). In the short-hold mode, 9.5 mcm of gas were transported to the outlet of the Ukrainian GTS per day.

The gas transmission system has been operating properly. Nominations of storage customers and capacity reservations have been fulfilled in full.

The domestic market has enough petroleum products to meet demand, which remains at the highest monthly level due to the farmers' activity and a large number of road transport. A significant stock of diesel fuel has been built up. There is also no shortage of liquefied petroleum gas, despite a significant increase in its prices.

SECTOR'S FINANCIAL SITUATION

Thanks to May decisions by the Cabinet of Ministers and the NEURC (including a [re-solution](#)) and a reduction in energy consumption due to lengthy stabilisation shutdowns, the debt to energy producers decreased slightly in the summer to UAH 12 billion. At the same time, debts to universal service providers continue to grow (> UAH 13 billion), and debts to district heating companies for gas consumption, although decreasing, still amount to about UAH 65 billion.

Once again, Ukrenergo's debt to renewable energy generation has increased to UAH 26 billion, although the previous management planned to [pay it off](#) in full by the end of the year. At the same time, electricity market participants owe the operator approximately the same amount for transmission and dispatching services.

Debts on the balancing electricity market are growing by UAH 0.7–0.8 billion every month. The problem can be solved by ensuring the solvency of all energy market participants, from producers and suppliers to end consumers. However, the matter has not progressed beyond the NSDC's [regular instructions](#) to the Cabinet of Ministers. For reasons

unknown, the government is effectively boycotting the [reduction](#) of the list of protected consumers, where critical infrastructure companies make no more than one-third.

Meanwhile, the Commercial Court of Kyiv [opened proceedings](#) in case No. 910/11241/24 under the claim of the SOE Guaranteed Buyer against Energoatom to recover UAH 14.4 billion of debt. According to the plaintiff, Energoatom breached its obligations under the contract for the provision of services to ensure the availability of electricity to household consumers in terms of full and timely payment of the cost of services for February 2023 - June 2024.

TRANSIT

In the reporting period, Gas Transmission System Operator of Ukraine LLC ensured the daily transit of 5-6 mcm of gas from Hungary to Moldova and Slovakia and transited on average 41-42 mcm of russian gas (39% of volume under the contract with Gazprom). About 89% was sent to Slovakia, and 11% – to Cuciurgan (Moldavian) power station in Transnistria. Transportation was carried out through the Sudzha gas metering station.

In the meantime, the Prime Minister has [confirmed](#) that «there are no official negotiations on the continuation of the russian gas transit. Neither the Ukrainian government, nor I, as Prime Minister, are involved in the transit of russian oil or gas», and that Ukraine is not ready to cooperate with russia, is not planning to do so and will not extend the agreement with it.

Ukrtransnafta transited up to 30 thousand tonnes of russian oil per day to refineries in Slovakia and Hungary (owned by the Hungarian MOL). Transportation was carried out via the southern branch of the Druzhba pipeline to the Fenyeslitke and Budkovce refineries.

Starting from 9 September 2024, MOL Plc. [will buy](#) all the oil it transports at the Belarusian-Ukrainian border.

PRICE SITUATION

In September 2024, the [price index](#) for base-load electricity (BASE) on the day-ahead market (DAM) was UAH 5,433/MWh, and at the peak (PEAK) it was UAH 5,157/MWh (-1.2 and +8.8% compared to August). These

changes reflect a reduction in energy supply in the evening due to the seasonal decrease in solar activity after 4 pm. Off-peak (OFFPEAK) load slightly dropped to UAH 5,711/MWh (-8.7%). In September, the indices remained highly volatile (up to 80%).

The [weighted average price](#) on the intraday market (IDM) amounted to UAH 6,185/MWh, and on the Ukraine IPS DAM – UAH 5,672/MWh (+3.6 and -1.2 compared to August, respectively).

The [weighted average price](#) of October natural gas in Ukraine based on electronic trading on the UEEX in September increased again to UAH 14,364/tcm (+4.3% compared to August). The start of the heating season obviously contributes to such an upward trend.

The [cost](#) of natural gas at the TTF delivered to the national border decreased to UAH 24,650/tcm (-4% compared to August; including VAT). It is noteworthy that a month ago, when quotes at the hub added 14%, prices at the border rose by 19%. In September, the average decline in TTF quotations was 7%, while those at the Ukrainian border were down only 4%.

Naftogaz Ukraine [gas tariffs](#) for non-household consumers are set to increase again from 1 October 2024, reaching UAH 18,200 (including VAT) in September. [Prices](#) for [households and district heating](#) companies are fixed at UAH 7,960/tcm until 30 April 2025.

Despite record [gas reserves](#) in European storage facilities (+9% of the last 5-year average), at least nine EU member states continue to replenish them. As a result, they have already accumulated 101.4 bcm of fuel (+2.2% for the month). Further accumulation was not even hindered by the largest planned repairs of the Norwegian gas infrastructure since the beginning of the year and relatively high spot prices at the TTF hub. Although down by 6-8% compared to August (to \$390-440/tcm), they still compete with Asian prices.

In September, Coal (API2) CIF ARA (ARGUS-McCloskey) steam coal [futures](#) quotes reduced by 7% and ranged from \$112 to 116/t. One year ago, quotes were \$123/t. Despite the decline in prices, coal stocks at ARA (Amsterdam-Rotterdam-Antwerp) terminals fell to 3.8 Mt (-19% compared to August, and -39% compared to the annual average).

Brent crude oil [futures](#) quotes continued to fall in September, driven by bidders' [disappointment](#) with both the announced and actual production growth by OPEC+ member states in the second half of 2024. As a result, on 10 September 2024, the three-year low was updated at \$69/bbl (\$68 on 1 January 2021), and the average price for September fell to \$73/bbl (-7% compared to August).

Given [lower-than-expected](#) oil consumption and Saudi Arabia's [willingness](#) to increase production, it is unlikely that prices will rise in October. This assumption is [confirmed](#) by Goldman Sachs and Morgan Stanley. If current trends continue, oil supply in 2024 will reach 103.2 million barrels per day, while demand will increase to 103.0 million barrels. As a result, prices for futures with near-term delivery dates are again lower than those for longer-dated positions.

The cost of motor petrol and diesel fuel in Ukraine remained unchanged, as the [increase](#) in excise tax rates on both fuels (by 14% and 27%, respectively) and another [depreciation](#) of the hryvnia on the interbank market (-1% against the euro) were almost entirely offset by decreasing wholesale prices at the border. As a result, as of 30 September 2024, the [indicative prices](#) for Euro5 A-95 petrol and Euro5 diesel fuel were UAH 60.27 and 52.77 per litre, respectively.

Meanwhile, the [indicative price](#) of LPG, for which the excise tax rate was raised by 185%, increased to UAH 32.97 per litre (+15% compared to the previous month). Moreover, unlike other petroleum products, the supply of propane-butane is expected to reduce significantly with the start of the heating season in Poland and the Baltic States, which, given the higher excise tax and the likely adoption of [Draft Law](#) No. 11416-d, could raise retail prices to UAH 37-39 per litre. This will reduce effective demand from businesses that use LPG as a fuel for small commercial vehicles and make it unfeasible to install LPG equipment on vehicles.

CHANGES IN THE REGULATORY FRAMEWORK

The President of Ukraine has signed:

- ✓ The [law](#) of 22 August 2024 No.3931-IX on clarifying the powers of state bodies responsible for critical infrastructure protection, which addressed the legal

conflict between the [Law of Ukraine](#) «On Critical Infrastructure» and the [Civil Protection Code](#) of Ukraine in terms of defining the powers of the entities of national civil protection systems and critical infrastructure protection. However, the existing contradictions have been resolved only partially, as evidenced by the [opinion](#) of the Verkhovna Rada's Main Scientific and Expert Department;

- ✓ The [law](#) of 21 August 2024 No. 3915-IX on regulating certain issues of the use of terminology in the field of smart grids, sustainability criteria, demand response and management. In addition, this document allowed Gas Transmission System Operator of Ukraine LLC to apply special modes of operation of gas pipelines, including simplified temporary mothballing, to optimise their excess capacity, and also allowed Ukrenergo to use the funds received from the distribution of cross-border capacity in 2024 to repay debts on the balancing market (50%) and to the SOE Guaranteed Buyer (50%).

The Cabinet of Ministers:

- ✓ prematurely terminated the powers of the chairman of the board of Ukrenergo «without evidence of improper management», thus [calling into question](#) the «political and business independence of the system operator». Such actions of the company's sole shareholder [led](#) to the resignation of the chairman and one of the two independent members of the Supervisory Board and may negatively affect its further cooperation with ENTSO-E operators;
- ✓ [approved](#) the procedure for providing a guarantee of origin of electricity produced by a high-efficiency cogeneration unit, the procedure and forms for maintaining an electronic register of guarantees of origin of electricity produced by such units;
- ✓ [defined](#) measures to arrange the installation of gas piston and gas turbine units on technical fleet (specialised vessels) to be used to ensure stable energy supply during martial law. The document also simplified the procedures for leasing and connecting such vessels to distribution networks;

- ✓ **approved** the procedure for the use of state budget funds for the rapid recovery of Ukraine, which will be directed to restoration of critical infrastructure, including energy and water pipelines, damaged by the destruction of the Kakhovka HPP;
- ✓ **defined** the list of expenses of gas distribution system operators on the repair of infrastructure damaged by hostilities and on measures to prevent humanitarian crises. Such expenses cover technical (equipment repair) and production and technological costs (including gas losses due to hostilities), as well as those related to connection to the gas distribution system at the request of military administrations. The amount of compensation for them will be calculated based on the methodology approved by the Ministry of Energy and will be reduced by the amount of international assistance received and the costs that are part of the distribution tariff;
- ✓ **ensured** that the biomethane **register** complies with the requirements of the **law** on the restoration and «green» transformation of Ukraine's energy system in terms of user registration, the procedure for issuing, transferring, distributing and cancelling guarantees of biomethane origin.

In turn, the Ministry of Finance **approved** the procedure for customs clearance of pipeline biomethane, including the rules for submitting documents for customs clearance and export, as well as requirements for confirming that biomethane meets sustainability criteria.

There is still no **confirmation** or denial in open sources of the adoption of **draft resolution** published by the Ministry of Energy back on 18 January restoring the ban on the circulation of petroleum products that do not meet Euro 5 environmental standards, **allowed** from 17 March 2022 «to supply the Armed Forces and other military formations».

The NEURC:

- ✓ **reduced** the number of reporting indicators for district heating companies by 37%;

- ✓ **retained** the coefficient of 1 applied to the gas transmission **tariffs** of GTS Operator of Ukraine LLC for entry and exit points of the GTS at interstate connections when ordering capacity for the quarterly period of 2024/25 gas year;
- ✓ **included** the risks from price fluctuations in the balancing and day-ahead markets in the **procedure** for setting the price at which electricity is supplied to consumers by the supplier of last resort;
- ✓ **clarified** the **methodology** for determining and calculating tariffs for natural gas transportation services for entry and exit points based on long-term incentive regulation, in particular to take into account changes in the economic environment and to avoid cross-subsidisation;
- ✓ **provided** for payment of the cost of daily negative imbalances for the previous and current gas months in cash and/or transfer of funds to an escrow account and specification of the methodology for calculating the balancing neutrality fee in the natural gas market from 1 December 2024;
- ✓ **allowed for** scheduled and unscheduled inspections of business entities operating in the energy and utilities sectors and located in the regions of Ukraine with ongoing active hostilities and in temporarily occupied territories, at the premises of the NEURC and/or its territorial body and/or the entity whose activities are inspected, provided that a sufficient level of security is maintained for the NEURC employees and the entity whose activities are inspected;
- ✓ **postponed** the deadline for registration of generating plants and metering points in the **register** of guarantees of origin of renewable electricity until 31 October 2024;
- ✓ **created** accounts in the register of guarantees of origin of renewable electricity for business entities that have submitted the relevant applications.

JSC Market Operator [presented](#) the [software](#) and made market participants familiar with the [rules](#) for trading guarantees of origin of renewable electricity. Such guarantees of origin will be generated automatically on a free-of-charge basis for the actual amount of electricity supplied to the grid or produced/used for own consumption (based on commercial metering data).

Following the Antimonopoly Committee [recommendations](#), GTS Operator of Ukraine LLC has [updated](#) the instructions for registering applications for concluding contracts, requirements for documents, information on means of communication and contact details of responsible persons.

PROJECTS AND INTENTIONS

The Verkhovna Rada of Ukraine is preparing for the second reading:

- ✓ a [draft law No. 11301-d](#) of 18 July 2024, aimed at improving payment discipline in the electricity market by opening current accounts with a special regime of use, introducing an algorithm for the distribution of funds from such accounts and strengthening liability for unauthorised electricity withdrawal.
- ✓ a [draft law No. 11416-d](#) of 30 August 2024, adopted as a basis with provisions amended in line with Part 1 of Article 116 of the Rules of Procedure of the Verkhovna Rada of Ukraine, which, inter alia, provides for monthly advance payments of income tax for petrol stations in the amount of UAH 30-80 thousand depending on the range of goods offered at them;
- ✓ a [draft law No. 11310](#) of 31 May 2024, adopted as a basis and [recommended](#) by the relevant parliamentary committee, which lays down the legal framework for low-carbon development, climate neutrality, adaptation to climate change and Ukraine's fulfilment of its international obligations in this sphere.

The NEURC has published the drafts:

- ✓ a [law](#) that clarifies the definition of a wholesale energy product and gives NEURC officials the right to draw up a

protocol on administrative offences in relevant cases, as well as to determine liability for market abuse;

- ✓ a [resolution](#) obliging to enter consumers using alternative sources into the register of electricity facilities and electrical installations, information on the capacity of aggregated generating units of private households that have entered into an agreement with a universal service provider on the purchase and sale of electricity at a «green» (feed-in) tariff;
- ✓ a [resolution](#) changing the time for calculating sales volumes on the DAM and the rules for rounding these volumes, the time limits set for bidding, gate closure and settlements on the DAM/IDM, and provides for the possibility of assigning the right to claim funds under contracts by agreement of the parties.

INTERNATIONAL COOPERATION

The Verkhovna Rada of Ukraine [called on](#) the G7 parliaments and governments to «consolidate efforts to provide financial and economic assistance to Ukraine, in particular in the restoration of its energy infrastructure».

At its 68th session of the IAEA General Conference, following the discussion of the IAEA [Director General's report](#), a [resolution](#) was adopted that once again confirms that Ukrainian nuclear power plants, including Zaporizhzhya NPP (ZNPP), must operate under full sovereign control of Ukraine. The document calls for urgent withdrawal of Russian military and other personnel from the territory of ZNPP and the provision of unrestricted access to all plant facilities and information to the IAEA.

A [cooperation agreement](#) was signed between the Zaporizhzhia oblast military administration and the Commonwealth of Pennsylvania, which provides for the establishment of cooperation between government agencies, scientific institutions, civil society organisations and businesses, particularly in the energy sector.

The Export Credit Agency [signed](#) the first agreement to insure an investment loan against war risks – an agreement between Flexores LLC and MTB Bank PJSC for the

purchase of a mini-CHPP plant under the Affordable Loans 5-7-9% programme.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

The International Energy Agency's [special report](#) «Ukraine's Energy Security and the Coming Winter» identifies 10 key measures that are needed to «safeguard an essential level of energy services in Ukraine through the coming months». These measures are as follows:

1. Bolster the physical and cyber security of Ukraine's critical energy infrastructure. This includes protecting assets against further attacks, especially at crucial nodes in the system like the network substations near nuclear power plants.

2. Expedite the delivery of equipment and spare parts for repair, including by streamlining import procedures and prioritising the needs.

3. Increase and decentralise power supply. This includes backup power systems, gas-fired thermal power plants, as well as solar and wind power plants supplemented by energy storage systems. A particular focus is needed on supply for hospitals, schools, water pumps and mobile networks.

4. Expand electricity transmission capacity with the European Union. The existing restrictions can be removed by revising the «relatively conservative guidance on network risk management».

5. Engage consumers in energy saving and demand response, while continuing investments in energy efficiency. It is proposed to reduce the default temperature of the heat carrier in district heating systems; set a social tariff that safeguards a certain volume of consumption at subsidised rate, after which consumers pay a higher price; conduct public information campaigns to explain the content of energy efficiency measures.

6. Prepare back-up options for winter heating. Expedited delivery of smaller combined heat and power units should focus on bolstering supply in the worst-affected regions.

7. Build up natural gas storage levels.

8. Strengthen firm gas import capacities from the European Union. Operating the trans-Balkan pipeline system in reverse mode can be a viable option.

9. Coordinate with Moldova to ensure reliable energy supply due to the «inter-related nature of risks across the region».

10. Lay the groundwork for a modern, market-based, resilient and sustainable Ukrainian energy system, well integrated with the EU system, including investment in common energy corridors

These measures by the IEA experts are not new and are mostly [being considered](#) by the Ukrainian government, but their implementation should be accelerated, as the heating season is less than a month away.