Європейсько-українське
енергетичне агентство

European-Ukrainian Energy Agency

2022 IN RES

THE YEAR IN REVIEW

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2022 in RES Sector: the Year in Review

Content

Foreword

It was a year of battle for survival: survival of the Ukrainian nation, of the economy, and of the energy sector. Although there were months, when things looked gloomy for RES producers, overall, the year ended acceptably, taking into account the fragile state of the economy. The RES producers finished the year with 51% level of FIT payments, with the debts for imbalances, FIT arrears for current and prior years remaining a key question for the industry. Establishing the timeline for covering of these arrears payments as well as staying committed to it will be critical for further growth of the sector.

Despite such a turbulent year, Ukraine has been moving forward in implementation of EU-oriented legal framework and integration regulations. The major breakthrough was a successful connection to ENTSO-E in March, which later in the summer together with launch of energy exports played a critical role in financing RES producers. This was followed by obtaining EU candidate status, which opens up a new perspective, sets standards for energy sector regulations and creates shorter timeline for their implementation. In its annual Implementation report Energy Community supported the efforts of Ukraine to keep up with the timeline for implementation of renewable energy regulations and pointed out a number of key regulations, that should be considered.

A critical point, raised in the report, which also worries the RES producers, is the financial stabilization of the guaranteed buyer and implementation of functional market-based support scheme. While NEURC tries to balance between preservation the industry from higher tariffs and overseeing fulfillment of FIT obligations, such strategy results in systematic underfunding of the guaranteed buyer. It is timely to think about proper mechanisms for provision of funds to support FIT and fulfill arrears obligations to RES producers, assuming that there will be no extra funds from exports of electricity next year. Preserving existing investors' interests will be critical for new investments in the post-war economy.

Introduction of a law allowing for a virtual PPA contracts is a big step forward for the development of the new market model. The law will allow producers to sell directly to business consumers and enter into long-term agreements. A draft law on the guarantees of origin was prepared by the Ministry of Energy and submitted to the Parliament for review in September. Guarantees of origins could provide a fast track for additional income for RES producers under a new market model, which would be possible via the launch of domestic GO market. According to Energy Community Implementation report 2022, the registry of GOs for Ukraine has been already created and the agreement provided to the respective officials for signing. Pending the passing of the proper legislation, Ukraine could promptly launch its GO registry. Notably, in December 2022 Georgia became the first county to start using the GO registry, provided by Energy Community, hence launching a market for Energy Community participating countries. We sincerely hope that the topic of GO will be on top of the priorities list of lawmakers in 2023.

One more piece of legislation on the table of the lawmakers is the draft Law for extension of pre-PPA agreements until the end of 2023 for those WPP, construction of which slowed down due to war actions. We estimate that the construction of new WPPs for over 900 MW capacity have been put to a halt due to the invasion, with most of the equipment already delivered to Ukraine. This would be a fast solution to the current energy crisis and a step towards the development of decentralized generation.

Summing up, we want to praise the efforts of Ministry of Energy in keeping up the timeline for submission the renewable sector related law drafts. We anticipate that the lawmakers will put these law drafts in priority order, and the regulator will address the issue of underfunding of the guaranteed buyer. Also, we hope that the officials will pay attention to the remarks of Energy Community report and act accordingly.

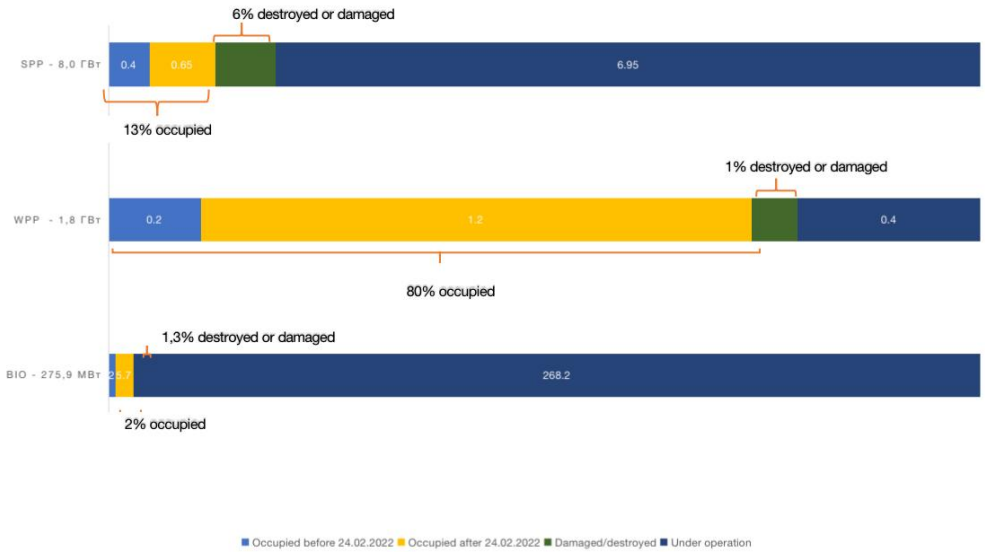
1.Key data for the market

Generation of renewables.

Capacities installed, capacities at the occupied territories, percentage of destroyed capacities.

The total installed capacity for RES generation (excluding large hydro power plants) in Ukraine was 9.6 GW as of the end of 2021**.** The total installed SPPs capacity (excluding 0.4 GW located in the territories temporarily occupied by Russia before February 24, 2022) reached 7.6 GW or 80% of the total RES installed capacity in Ukraine. As of September 2022, about 13% of Ukrainian SPPs capacities are under occupation, and 6% of the total installed solar capacity has been destroyed or damaged. As for WPPs, the total installed capacity in 2022 was 1.6 GW. As of the end of 2022, approximately 80 % of WPPs are located on the occupied territories, and, at least, seven wind turbines are known to be damaged or destroyed as a result of the hostilities by the russian army (about 1 % of the total installed wind capacity). Overall, it is **20% of total installed RES capacity** that has been damaged or occupied.

Occupied and destroyed capacities as of September 2022



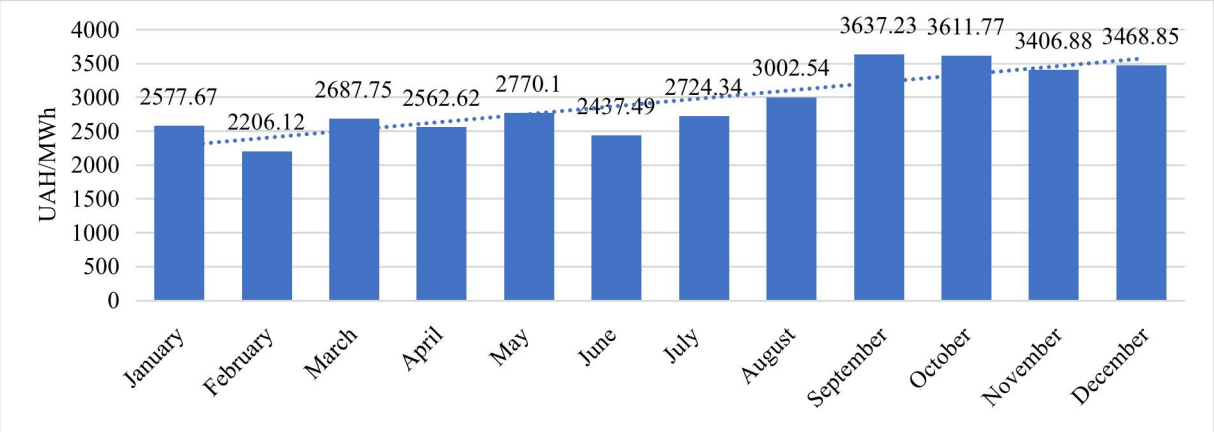
Source: Ministry of Energy of Ukraine.

Electricity Market.

IDM, DAM pricing/ market trading info.

The average price of electricity on the Intraday Market (IDM) of the Integrated Power System (IPS) of Ukraine for 2022 is UAH/MWh 2924.5. The lowest average price was in February and made up UAH/MWh 2206.12, and the highest average price was in September - UAH/MWh 3637.23. Compared to the beginning of 2022, the price on Intraday Market increased by UAH/MWh 891.

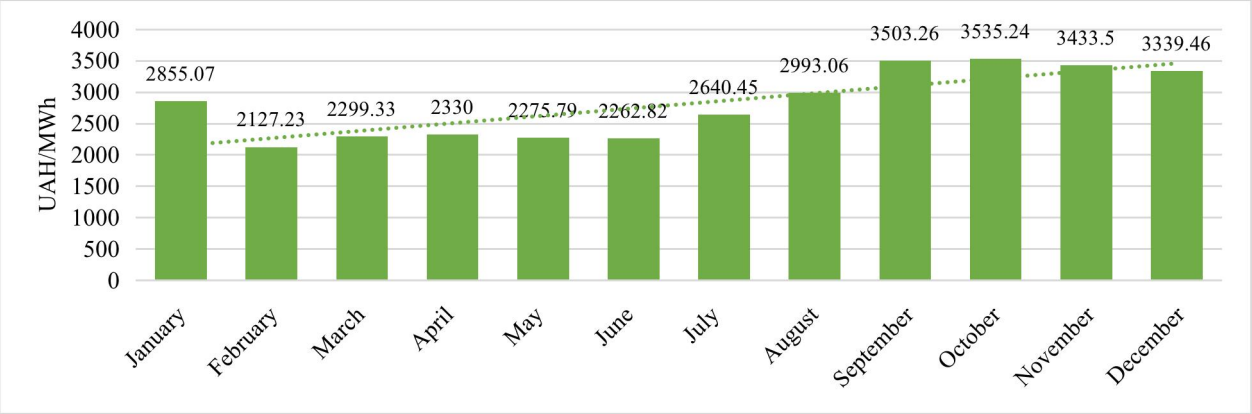
IDM IPS Price Dynamics as of 2022



Source: Official website of Market Operator of Ukraine/ https://www.oree.com.ua/?lang=english

The average price of electricity on the Day-Ahead Market (DAM) of IPS Ukraine for 2022 is UAH/MWh 2799.60. The lowest average price was in February - UAH/MWh 2127.23, and the highest average price was in October - UAH/MWh 3535.24.

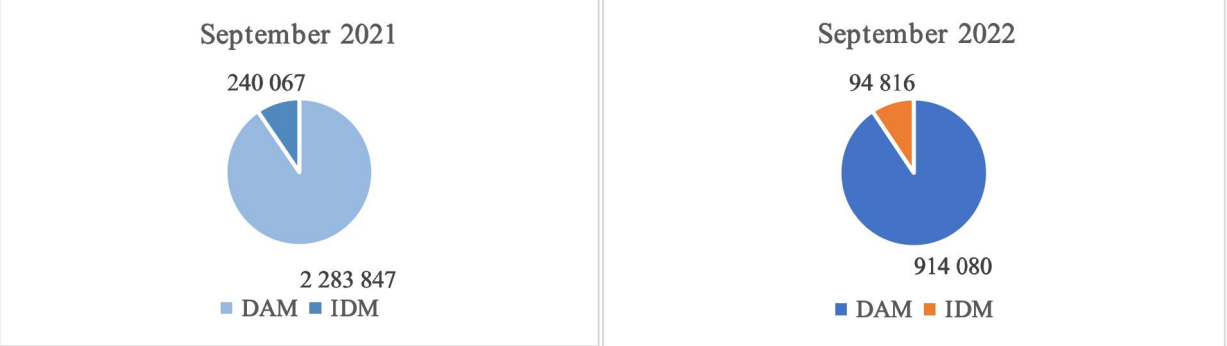
DAM IPS Price Dynamics as of 2022



Source: Official website of Market Operator of Ukraine/ https://www.oree.com.ua/?lang=english

If we compare the electricity traded volumes on the IDM and DAM in September 2022 (the last month before the massive attacks on the energy infrastructure) with the same month in 2021, we will see that the volume of trading declined by more than twice, while the breakdown between IDM and DAM remained the same, 8% and 92% accordingly. At the same time, it is notable, that the volume of trading has started growing since August and have been relatively stable in September-December.

Electricity IDM and DAM traded volumes in September 2021 VS September 2022, (MW)

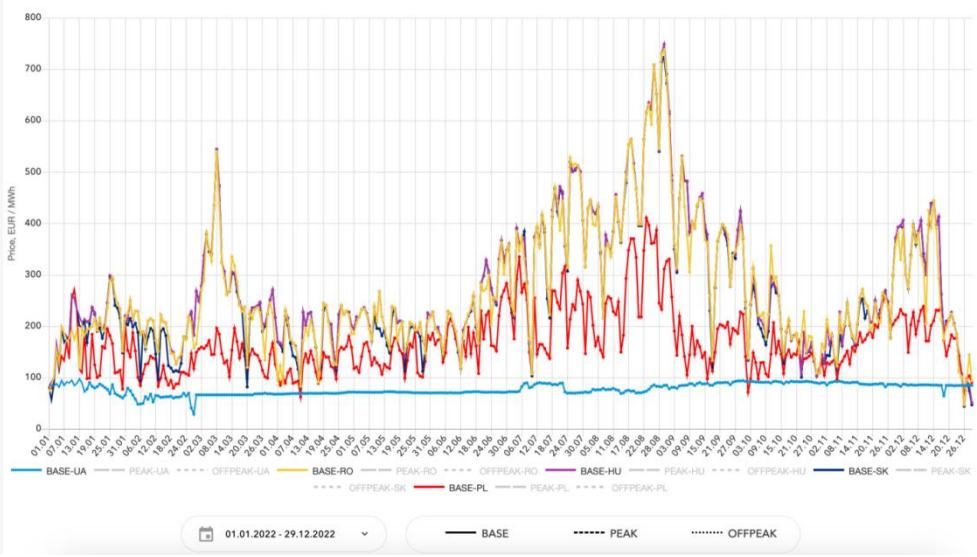


Source: Official website of Market Operator of Ukraine/ https://www.oree.com.ua/?lang=english

After the synchronization of the energy system of Ukraine with the network of continental Europe ENTSO-E, which took place on March 16, the Market Operator started working on accelerating market coupling with EU countries. (Source)

In 2022, the highest price for electricity in neighbouring countries (for base load) was on September 30, 2022: Hungary – 748.0 EUR/MWh; Slovakia – 723.7 EUR/MWh; Romania – 738.3 EUR/MWh; Poland – 311.9 EUR/MWh; IPS of Ukraine – 85.6 EUR/MWh. As of December 29, 2022, the average price on those countries is 73.6 EUR/MWh.

DAM index chart (Ukraine and neighbouring countries)

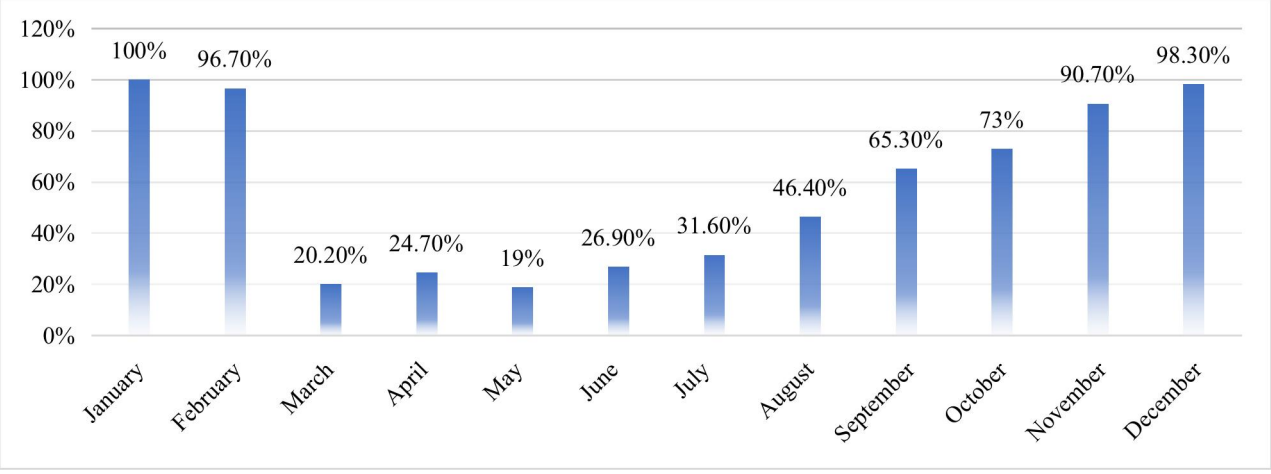


Source: Official website of Market Operator of Ukraine/ https://www.oree.com.ua/?lang=english

Level of payments under the "feed-in" tariff

As of December 26, 2022, the average payment rate of Guaranteed Buyer payments to RES producers for 2022 is 53.5%. The lowest level of payouts is from March to August 2022. Also the debt for October 2021 still remains outstanding. Debt of NPC "Ukrenergo" makes up UAH 12.3 billion. Note, that the payments for March-April were carried out in accordance with the provisions of the orders of the Ministry of Energy of Ukraine №140 dated 03.28.2022 and №206 dated 06.15.2022. The total amounts paid out by the Guaranteed Buyer paid for the purchased green electricity for 2021 - UAH 9.3 billion, for 2022 - UAH 19.8 billion.

Level of payments under the "feed-in" tariff as of 2022



Source: Guaranteed Buyer website./ https://www.gpee.com.ua/news_item/342

2. Key legislative changes

February 2022: Legislation on the Storage Systems passed.

The **Law №5436-d** creates a state enterprise Energy Storage Operator, determines the terms of operation of the Energy Storage System, and under some conditions allows energy producers to install a power battery without applying for the license. The expected need for the system capacity ranges from 0.5- 2 GW. The law is meant to motivate energy producers to install their own battery storage facilities in order to mitigate issues with imbalances in the system.

July 2022: Virtual PPAs introduced, Electricity market rules changes.

Law on Virtual PPA/ Price Minimization for RES producers mechanism

The **Law №2479-IX** among other things introduced a number of amendments, which outline a legal mechanism for the introduction of a Service by RES producers to ensure electricity price stability through an Agreement concluded by the RES producer and an electricity consumer. Effectively, this mechanism allows for contract-for-difference services between the producer and a consumer without a need for actual exchange of electricity. Only the RES producers outside the state support system are eligible for such contracts. The parties shall specify which RES facility is a subject of such contract. The contract is long-term with a period of at least 1 year, and it is not a subject of the approval from the Regulator or any other authority and can be concluded at any time either during the commissioning or operation of the RES station. The TSO shall be notified within 5 days of the conclusion of such contract, yet no confidential information about the contract terms shall be disclosed.

For the period of 2022, the provisions of some parts of the Article 43 of the Law on Electricity Market were modified. These were the provisions stipulating the use of funds from the access to interconnection. The use of funds for 2022 was defined as following:

Funds received in the period of January 1st- July 31st:

- 10% of funds for investments and increase of transmission capacity
- 45% of funds for the payment of debt of Ukrenergo on balancing market
- 45 of funds for the payment of debt of Ukrenergo to the Guaranteed Buyer. The Guaranteed Buyer is to pay these funds to Energoatom and the RES producers in proportion to the respective debts outstanding.

Funds received in the period of August 1st- December 31st:

- 50% of funds for the payment of debt of Ukrenergo on the balancing market
- 50% of funds for the payment of debt of Ukrenergo to the Guaranteed Buyer. The Guaranteed Buyer is to pay these funds to Energoatom and the RES producers in proportion to the respective debts outstanding.

Article 71 of the law on the Electricity Market was amended with a provision 4-1, which regulate the procedure of **exit from and return to the balancing group of the Guaranteed Buyer**, for RES producers, which operate under FIT.

Changes to the current laws on energy efficiency: comprehensive thermal modernization

On July 11, 2022, the President of Ukraine signed the **Draft Law №6485** "On Amendments to Certain Laws of Ukraine Regarding the Creation of Conditions for the Introduction of Complex Thermal Modernization of Buildings", namely the draft law introduces changes to two laws in the field of energy efficiency of buildings: The Law of Ukraine "On Energy Efficiency of Buildings" and the Law of Ukraine «On Energy Efficiency Fund". Innovations in the legislation will allow the Energy Efficiency Fund:

- ✓ provide grants for any housing policy programs, including housing restoration. According to the current law, the Fund can finance only complex energy-efficient projects, and in accordance with the new norms of the law, the Fund will be able to expand financing;
- ✓ reimburse gradually the costs of energy-efficient measures, which reduces the burden on housing cooperatives;
- ✓ finance additional measures, for example, if it is necessary to strengthen the structure of the coating before its insulation.

Changes to the Law of Ukraine «On Energy Efficiency of Buildings»:

- ✓ regulate technical issues of energy certification of buildings. However, the new legislation doesn't introduce conceptual changes that would stimulate large-scale energy certification of buildings in the country, as it happens in European countries.
- ✓ introduce the development of a strategy for thermal modernization of buildings;
- ✓ obligations are placed on state bodies to thermally modernize 1% of the heating area of state-owned buildings every year. Draft Law.

September 2022: Draft Law on Guarantees of Origin.

Draft Law on Guarantees of Origin was submitted to the Parliament committee by the Ministry of Energy

Ministry of Energy jointly with Ukrenergo have prepared and submitted Draft Law on the guarantees of origin to the consideration of the government. Implementation of the guarantees of origin is among obligations of Ukraine according to EU Directive 2018/2021 on the promotion of the use of renewable energy (RED II) and shall be implemented by December 31, 2022. The use of the guarantees of origin will stimulate the green transition. According to the communication from Energy Community, Ukraine and other contracting parties of the Energy Community have time until the end of June 2023 to sign an agreement with Grexel, regional electronic system of GO provider.

November 2022**:** The Law on Budget and draft Law of the extension of pre-PPA.

The Law on the Budget of Ukraine for 2023 was passed. This law stipulates **the cessation of validity of Article 8, part 3 of the Law of Ukraine On the Alternative Energy Sources**, which obliges the Cabinet of Ministers of Ukraine to preview in the state budget funds for payment of RES producers in the amount of no less than 20% of forecasted RES electricity production volume.

Draft Law №8191 on the extension of pre-PPA terms for WPPs registered. The law calls for:

- ✓ the extension of commissioning terms for power stations or their sections (except for solar stations) for the operators, who signed the pre-PPA agreement before December 31, 2019.
- ✓ the extension of the technical conditions for power stations or their sections (except for solar stations) that were issued under FIT before December 31, 2019.

December 2022: NEURC approved new transmission tariffs for 2023.

After several rounds of public debate, on December 21, 2022, NEURC approved the following tariffs for transmission and dispatching for NPC "Ukrenergo" for 2023.

1. Tariff for electricity transmission services: I quarter - UAH/MWh 380.28; II quarter - UAH/MWh 430.25; III-IV quarters - UAH/MWh 485.10; for "green" electrometallurgy enterprises for 2023 - UAH/MWh 209.42. This makes the average tariff rate for the year of UAH/MWh 445.18.
2. Tariff for dispatch management services: I quarter - UAH/MWh 68.28; II quarter - UAH/MWh 80.87/MWh; III-IV quarters - UAH/MWh 95.54.

3. Key events

March 2022: Emergency connection with the ENTSO-E completed.

As of March 16th Ukraine completed a trial synchronization with the ENTSO-E system and fully connected with the ENTSO-E grid. This opened an opportunity to grow its energy exports later in the year, and this connection with reinforce Ukraine's energy security and allows it to become a net exporter in the future.

April 2022: Ukraine Energy Support Fund launched by Energy Community Secretariat.

The Energy Community Secretariat by the request of the European Commission established an Energy Support Fund for Ukraine to counter the effects of the russian invasion in the 1st half of 2022. After the massive assault on the energy infrastructure in October, the fund started accepting donor funds for the purchase of the equipment. The donors of the Fund are EU member states, as well as international companies and corporations. Consolidated funds will be used to restore energy infrastructure that has been damaged or destroyed as a result of hostilities in Ukraine launched by russian military aggression. Official release.

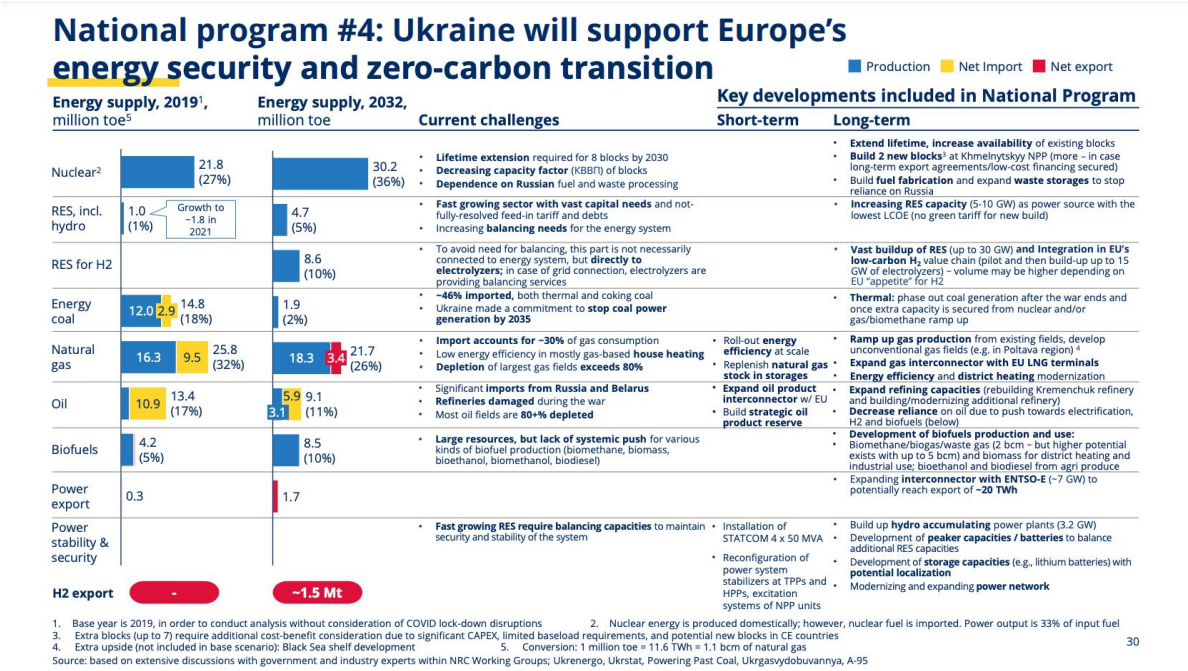
June 30th: Electricity exports of energy to the EU were started at the end of June and discontinued after the massive attacks on the energy infrastructure from October 10th.

In January-October the volume of sales of exports of electrical power was USD 543 mln, which makes the 2.5 times increase from the sales for the same period in 2021. This was driven by the access granted by ENTSO-E to interconnectors. As of September 20th, the capacity of the interconnection made up to 300 MW. Ukraine has started trial power exports to the EU on June 30th with an initial capacity of 100 MW. Additionally, this allowed for extra income for Ukrenergo: it is estimated that Ukrenergo received over UAH 5 bln of additional income over the period of 30.06-10.10. Ukraine exported electricity to Poland, Slovakia, and Romania.

July 4th: Ukraine Reconstruction conference in Lugano was held.

Ukrainian government presented a draft 10 year post-war reconstruction plan, which calls for EUR 750 bln investments and puts development and reconstruction of the energy sector among the key priorities. Among others, the plan calls for an increase in RES capacity by 5-10 GW (by a new market model), building up additional RES capacities of up to 30 GW for hydrogen production, development of hydrogen projects and integration into EU H2 value chain, installation of balancing facilities with the capacities of 0.5-2 GW, the introduction of smart grids and support of EU zero-carbon energy transition (see the chart below). The plan also calls for the expansion of interconnection with the EU to up to 6 GW by 2032. While the plan is voluminous, it is important to realize that there is a need for substantial work in order to coordinate donors' work, ensure transparency, adherence to the "build back better principle" and implement regulations compliant with the green transition and decarbonization course.

According to the officials, the key source of recovery funds should be the confiscated assets of russia and russian oligarchs. The other sources would be grants, soft loans from international financial organizations, and private sector investments. Recovery Plan of Ukraine. Ukraine Recovery Plan: Energy.



November 2022: Ukrainian government signed the memorandum with Blackrock.

The Ministry of Economy of Ukraine and BlackRock, the world's largest investment company, have signed a Memorandum of Understanding agreeing on a framework for consultative assistance in developing a special platform to attract private capital for the recovery and support of Ukraine's economy. The platform will focus on mobilizing investment in key sectors of the Ukrainian economy while taking into account the reconstruction needs resulting from the full-scale russian invasion. In particular, the agreement signed on November 10, 2022, in Washington, DC, provides that BlackRock's Financial Markets Advisory will consult the Ministry of Economy on the creation of a roadmap for the implementation of an investment platform, which will primarily attract private capital. This includes the structure of the platform, its mandate and governance. Official release.

Memorandum with Energy Community of the technical assistance.

The Memorandum provides a basis for strengthening the coordination of efforts, joint and individual activities of the Ministry of Energy and the Secretariat to support Ukraine in restoring the damaged energy infrastructure and ensuring the stable functioning of the energy system. The parties to the Memorandum will take measures to guarantee the most efficient, transparent and integral process of distribution of resources provided to Ukraine among end consumers. Official release.

December 2022: Ukraine signed a two-year cooperation program with the International Energy Agency

The joint work program focuses on Ukraine's key short- and long-term energy priorities, with an emphasis on energy security, clean energy transition and the energy sector recovery plan. According to the program, the IEA will provide support to the Ministry of Energy in the development of the Energy Strategy until 2050. The program outlines areas of cooperation, in particular: security of the energy system; energy saving; RES; low carbon hydrogen; biogas. Official release.

4. Important reports published in 2022.

July: Ukrainian Recovery plan, Ukrainian government.

September: Ukraine Rapid Damage and Needs Assessment Report, the World Bank.

December: Rebuilding Ukraine: Principles and Policies, Center for Economic Policy Research (CEPR).

Energy Community Implementation Report, Energy Community Secretariat.

Ukrainian Economy at War Times, Center for Economic Strategy.

5. About EUEA

European-Ukrainian Energy Agency (EUEA) is a non-governmental, non-profit organization, acting as a business association. Founded in 2009, EUEA has grown into an effective advocate for the realization of Ukraine's massive renewable energy and energy efficiency potential, by working with Ukraine's business community, government structures, and with other key energy market stakeholders.

EUEA MEMBERS: Acciona, Beycelik-Elawan Renewable Energy LLC, CES, DTEK Renewables, EMERGY AS, EMSOLT, Elementum Energy, Eurocape Ukraine, Fichtner, GOLAW, Guris, Greenfuture Energy, Green Genius, GrECo Ukraine, GSE&C, iC consulenten, IMEPOWER, Indian Solar, Investment Fund for Developing Countries, Irshanska SES, Khmelnytsky Bio Power Plant, Scatec Solar, Schneider Electric Ukraine, Sfera, Sumitomo, Thermosystems, TIU Canada, Ukrwindinvestments.

On October 14, European-Ukrainian Energy Agency held its signature event, the 13th Annual Energy Day with the participation of leading experts in the field. The event was devoted to current issues and questions of the future of the energy sector with a focus on renewable energy, energy efficiency, and sustainable development. The conference was held in Vienna with the participation of more than 100 guests, including representatives of key agencies involved in energy sector reforms, representatives of the European Commission, the European Investment Bank, the European Bank for Reconstruction and Development, the International Finance Corporation, the World Bank, GiZ, UNIDO, and RES producers. Post-release. Photos from 13th Energy Day. Speakers Presentations.

The review was prepared by Kateryna Polyakova and Iryna Pashchuk**.**

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