Generating Electricity from Renewable Sources in CEE & SEE

Energy Industry Group

Ukraine

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Country General Information

Capital: Kyiv

Location: Situated in the central part of Eastern Europe, Ukraine is the second largest country within European territory, with an area totalling 603,550 km². Ukraine borders the Russian Federation, Belarus, Poland, Slovakia, Hungary, Romania and Moldova.

Surface: 603,550 km²

Population: 41.3 million

Climate: continental, with four distinct seasons.

Resources: As of 2016, 70.8% of the territory of Ukraine was classified as agricultural land and 17.6% of the area was covered by forests. Ukraine has limited fossil-fuel energy reserves. The country is reliant on imports of oil, gas and coal. Nevertheless, the country has high potential for (i) wind power; (ii) expanded biomass use for energy purposes; and (iii) solar PV equipment that can be efficiently operated throughout the year (northern and southern regions).

Electricity Grid: In 2021, Ukraine generated 156,575 GWh of electricity, with state-owned enterprises accounting for most of that production. In the years 2022-2023, there was a notable decline in electricity production attributed to the destruction of numerous energy-generating facilities as a result of Russian military attacks. Additionally, the seizure of the Zaporizhya nuclear power plant by Russian troops exacerbated the situation, further impacting energy output. Currently, Ukrenergo has four regional power systems covering Ukraine: It operates high voltage equipment and manages more than 19,000 km of trunk and cross-border high voltage transmission lines. Each year, Ukrenergo transmits hundreds of thousands of GWh of electricity.

On 24 February 2022, Ukrenergo completed the planned transition of the Ukrainian power system to an isolated mode of operation –(i.e. the power system was disconnected from the Russian, Belarusian, and European power systems). Due to Russia's military invasion of Ukraine on 24 February 2022, it was decided not to return to synchronous operation with Russia and Belarus, and to accelerate synchronisation with the European Network of Transmission System Operators for Electricity (ENTSO-E). The emergency synchronisation of the power systems of Ukraine and Moldova to the ENTSO-E Continental Europe power grid was approved on 16 March 2022. Ukrenergo (the Ukrainian TSO) became the 40th member of ENTSO-E starting on 1 January 2024.

Electricity Transmission, Distribution and Supply: Supply and distribution is managed by either regional electricity supply and distribution companies, known as oblenergos (public and private ownership, including foreign-owned entities, with significant shares belonging to 5-7 individuals) or Distribution System Operators and Suppliers.

Official Language(s): Ukrainian

EU Member: n/a

NATO Member: n/a

United Nations Member: since 1945.

Currency: Ukrainian Hryvnia (UAH)

Schengen: no – but has joined the Deep and Comprehensive Free Trade Area (DCFTA). Autonomous Trade Measures (ATMs) suspending import duties and quotas on Ukrainian exports to the EU for the duration of the war with Russia have been in place since June 2022.

Political System, Administrative Organisation and Economy: Ukraine is a unitary state. State power in Ukraine is exercised on the principles of its division into legislative, executive and judicial power. The President of Ukraine is the Head of State and a guarantor of national sovereignty, territorial integrity and adherence to the Constitution. The only legislative body of Ukraine is the Parliament. Ukraine undertook decentralisation reforms in 2014, in order to create a capable institution in the form of local Governments. This reform created the basic level – communities - and the middle (sub-regional) level – districts - and thereby moved more power to these institutions. Following a period of stabilisation and consistent growth, the Ukrainian economy encountered a significant setback as a result of the Russian invasion in 2022, which led to the blockage of vital export and import routes, the occupation of certain territories and the destruction of production facilities. Despite these challenges, the government implemented internal financial measures, which coupled with substantial foreign financial aid, helped stabilise the economic situation. Furthermore, in 2023, the economy showed signs of resilience, experiencing some growth amidst the adversity.

1. Defined Terms for the Main Permits required for RES-Electricity Generation Facilities

Balancing Group Entry	Legal requirement for RES producers to enter into the balancing group of the SE "Guaranteed Buyer" (**"Guaranteed Buyer"**) in order to sell electricity on the new electricity market under a feed-in tariff or at auction price;
Construction Permit	Administrative deed issued by the local body of the state architectural and construction control (**"SACC"**) (applicable to facilities qualified as SS2 or SS3 class of harmful consequence facility);
Commissioning Certificate	Administrative deed issued by the local body of SACC in order to authorise the commissioning of the relevant RES Facility (applicable to facilities qualified as SS2 or SS3 class of harmful consequence facility);
Construction Project Examination	Mandatory examination conducted by authorised expert organisations in case the relevant RES Facility qualifies as a SS2 or SS3 class of harmful consequence facility;
Environmental Approval	Administrative deed issued by the local Environmental Authority evidencing the compliance of the RES-Electricity facility with the environmental requirements as provided by law;
Grid Connection	Actions performed and administrative deeds issued by the grid operator to connect a new generating facility or to modify or replace the connection of an existing generating facility to the grid;
Guaranteed Purchase of Electricity Produced from RES Facilities	Set of rules and conditions based on which a Guaranteed Buyer is obligated to purchase all RES-Electricity within quotas acquired by the Producers at RES auctions;

Licence for Electricity Production	Administrative deed issued by the National Regulatory Commission on Energy and Utilities (**"NEURC"**) for electricity production according to the licensing conditions for commercial electricity production, approved by NEURC Resolution No. 1467 dated 27 December 2017. Under this Licence, the producer has the right to operate an RES-Electricity facility and to sell the generated RES-Electricity on the market;
NEURC	The National Energy and Utilities Regulatory Commission of Ukraine is the single authority for regulating gas and electricity in Ukraine. One of the NEURC's main functions is to issue licences to business entities operating in the fields of energy and public utilities and to exercise control over their licensed operations;
RES-Electricity	Electricity obtained from RES sources such as solar, wind, aerothermal, geothermal, hydrothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment gas and biogas;
RES Support Scheme	State-aid measures in two forms (i) feed-in-tariff (or "green tariff", as specified by the Ukrainian legislation) effective until 31 December 2029 for RES Electricity producers that commissioned their facilities by 31 December 2023 at the latest; (ii) RES auction mechanism introduced in 2019, aiming to replace the green tariff scheme. State support will be provided by means of guaranteed purchase through a Guaranteed Buyer of all electricity produced from RES Facilities within the quota acquired at the auction.

2. Envisaged need of RES investments in Ukraine

Ukraine has demonstrated significant commitment to reforming its energy sector, in order to reach the sustainable growth targets set by numerous international obligations. The country joined the European Energy Community in February 2011 and in October 2014 set the goal of increasing its renewable energy share as part of the national power mix to 11% by 2020. In 2022, a new Ukrainian Energy Strategy was adopted through 2050 (the full text of the strategy has not yet been made public due to public safety considerations) and aims to ensure sustainable economic development through access to reliable, modern energy sources. By 2050, the strategy aims to achieve climate neutrality, promoting clean energy adoption, overcoming energy poverty, and developing decentralised systems. Aligned with the National Economic Strategy and international commitments, key goals include reducing coal dependence, modernising infrastructure, improving resource efficiency, integrating with EU markets, ensuring energy security, and fostering innovation in alternative energy solutions.

Ukrainian cities are among the key players that are poised for changes in the sustainable growth of the country in the renewable energy field. The city of Zhytomyr (located in the northwest of Ukraine) approved a plan in 2018 to achieve 100% renewable energy by 2050. This ambitious goal was also followed by the cities of Kamianets-Podilskyi, Chortkiv and Lviv. The State Agency of Ukraine on Exclusion Zone Management, which manages the Chernobyl zone, agreed that within the implementation of Ukraine's commitment under the Kyoto Protocol, a photovoltaic power station will be constructed in Chernobyl. Moreover, the Government allocated seven (7) hectares of land in 2018 for the construction of wind energy facilities within the zone's territory, where initial phases of the project were already commissioned.

Investments into RES Facilities officially began in 2008, when numerous (including foreign) players entered the market. Since then, RES projects (mostly solar and wind) have been mushrooming around the country. Such a rapid development of the RES sector during 2008-2022 can be explained by the adoption of the green tariff in 2008, which essentially guaranteed prices until the end of 2029 and was the highest in Europe.

By the end of 2021, a total of 8.1 GW of RES capacity had been officially installed. However, starting in 2022, several RES facilities were damaged by Russian attacks and fighting on the frontlines. Establishing the current total capacity of operational renewable energy facilities remains an ongoing process. According to the Minister of Energy, Ukraine has lost about 80% of its wind power generation due to Russian military aggression.

The Government has made significant efforts to stimulate and encourage the flow of foreign investment in RES projects (e.g. granted VAT exemptions on the import of certain RES equipment, simplified the process of land allocation, etc.).

Despite the development of the RES market over the years, Ukraine has faced problems regarding the attractiveness of RES incentives and the support scheme. In the last two years before the full-scale Russian invasion of 2022, over 3 GW of green capacity have been put into operation at an increased feed-in green tariff (mostly solar), at the highest tariff in Europe. As a result, the energy system of Ukraine started facing difficulties with balancing green generation capacities. There have also been defaults on payments by the Government to investors in the RES sector. However, despite the ongoing war, the Ukrainian government has managed to reduce its debt to RES producers for the supplied electricity. As at February 2024, these producers have received 77.3% of the funds owed to them for the electricity they supplied in 2023.

Therefore, it seems inevitable that substantially more investment will be required in renewable energy (RES) electricity once the conflict with Russia is resolved. Moreover, legislation and regulations governing the RES market are expected to undergo significant changes in the near future, so as to adapt to the evolving landscape both domestically and internationally, as well as to spur post-war reconstruction of the RES energy sector in Ukraine. It is clear that local communities will play an ever-increasing role in this process, since they will need to formulate their own development and recovery strategies, identify priorities and develop a list of specific projects.

Starting on 1 January 2020, investors or future RES producers may enter the Ukrainian renewable market in two ways: (i) by investing into existing RES projects that are entitled to operate under the green tariff regime; (ii) by investing into RES projects operating under the new Auction Law.

3. Executive Summary-RES Market Status and Development of RES Facilities

3.1 Market Overview-Factsheets

- After the introduction of a special green tariff, tax and customs relief, as well as incentives for purchasing locally made equipment in 2008, the RES sector in Ukraine started to grow rapidly at an average of 31% annually;
- The Energy Strategy of Ukraine has sought to increase the overall share of renewables to 12% by 2025, and to 25% by 2035, including RES-Electricity generation. According to the new Strategy adopted in 2022, by 2050 Ukraine should achieve climate neutrality, promote clean energy adoption, overcome energy poverty, and develop decentralised systems;
- RES producers exploiting equipment of Ukrainian origin enjoy a higher green tariff or auction price (by up to 20%), provided the respective equipment is commissioned between 1 July 2015 and 31 December 2024;
- There is no import VAT on certain RES-related equipment and materials imported into Ukraine;
- In 2018, after a sharp fall in the cost of equipment for the construction of RES projects, the Government insisted on an urgent reduction of the green tariff from 1 July 2019;
- Ukraine's new electricity market model was introduced by the Ukrainian Law No. 2019-VIII, "On the Electricity Market", dated 13 April 2017, and was put into operation on 1 July 2019;
- In 2018, Ukraine became a member of IRENA. In 2019, Ukrainian law was amended to introduce state support auctions (instead of the green tariff) for RES-Electricity facilities commissioned after 1 January 2020;
- With these recent changes in the electricity market, Ukrenergo has become responsible for compensating the Guaranteed Buyer for the green tariff. Considering the difficulties with payments, the Guaranteed Buyer faced challenges in meeting its obligations to green energy producers and investors. However, despite the ongoing war, as at February 2024 RES producers have received 77.3% of the funds owed to them for the electricity they supplied in 2023;

- The installed capacity of RES-Electricity generating facilities in January 2022 stood at 8,199.30 MW nationwide. The largest increase in RES-Electricity generation during 2020-2021 was by solar power farms (67.8%), followed by wind farms (47.5% increase).
- Beginning in 2022, numerous Renewable Energy Source (RES) facilities suffered damage due to Russian military attacks and conflict on the frontlines. Determining the present aggregate capacity of operational renewable energy facilities continues to be a work in progress. As stated by the Minister of Energy, Ukraine has experienced a reduction of approximately 80% in its wind power generation due to the Russian military aggression. In spite of this, certain smaller solar and wind facilities were put into operation even during the war;
- Currently, solar and wind projects constitute the vast majority of the RES projects in Ukraine.

4. RES Market Status, permitting, Grid Connection, Licensing of RES Facilities in Ukraine

4.1 RES Market Status, Permitting, Grid Connection, Licensing of RES-Electricity facilities in Slovenia

General Market Data	
RES Target 2050	Achieving climate neutrality
Overall installed General Capacity including RES (overall production) as of 2021	56,297 MW (generating capacity excluding Crimea)
8,199 MW (RES capacity excluding the currently occupied territory of Crimea)	3,983.4 MW (in 2022)

RES Support Scheme	
Beneficiaries of RES Support Scheme	Business entities intending to generate RES-Electricity, regardless of the facility's installed capacity and the RES source (except for blast furnace and coke-oven gas, and in case of hydropower use with only micro, mini and small hydro plants)[1].
Priority and guaranteed off take into the grid	RES-Electricity is not granted priority connection.
Other incentives	○ Guaranteed purchase of RES-Electricity; ○ Premium green tariff for the use of equipment manufactured in Ukraine (up to 20%); ○ Exemption from import VAT on certain RES equipment; ○ Simplification of the designated purpose land requirement; ○ Exemption from zoning requirements; ○ Exemption from the requirement for a construction permit for wind plants.
Other conditions	○ Green tariff rates decreased significantly since 2020 in an effort to relieve the burden on the state budget created by a large number of RES facilities going online within a short period of time to benefit from high green tariff rates.
Grid Connection Specifics	
Approvals	Electricity distribution and transmission system operators cannot deny access to their grids provided that the applicant meets the technical requirements.
Permitting	○ Construction permits for construction works, design documentation (including its examination) and connection to the grid.

1 Construction of wind plants has been given SS1 class of harmful consequence facility, thus construction works may be undertaken without a specific construction permit.

Timing	○ It takes around 5-10 days after filing the relevant application, and subject to compliance with all applicable requirements, for connection to be made.
Licensing	
Procedure	The Licence for electricity production is issued after the construction and commissioning phases (i.e. after obtaining the Commissioning Certificate) are finished. The RES producer applies for a Licence for electricity production by submitting a standard form application to the NEURC along with the supporting documents.
Duration of administrative procedure	Ten (10) working days following the submission of the application.
Licence's validity	N/A

5. Key changes to the RES Support Scheme since 2016 - Implementation of the Auction Scheme

5.1 New Electricity Market Model

Ukraine's new electricity market model was introduced by Ukrainian Law No. 2019-VIII, "On the Electricity Market", dated 13 April 2017, and was put into operation on 1 July 2019. The new model provides for direct (without intermediaries) and diversified electricity purchase arrangements between producers and power supply companies. It also contains such elements as intra-day, day-ahead and balancing markets.

Under Law No. 2019-VIII, the Guaranteed Buyer has been registered as an independent entity responsible for increasing the share of RES-Electricity by purchasing the produced electricity from RES Producers eligible for the green tariff, or within the quota acquired at a RES auction. Additionally, Law No. 2019-VIII sets requirements for the unbundling of the functions of the distribution system operator. Law No. 2019-VIII also introduced responsibility for imbalances.

5.2 Introduction of RES Auctions

In 2019, Ukrainian law was amended to introduce state support auctions for RES-Electricity facilities instead of the green tariff. Under the auction scheme, the Ukrainian state will purchase all electricity produced by the RES project within the limits of the quota purchased at auction, based on the feed-in premium (FIP) mechanism, as described below. The auctions are mandatory for entities operating RES Facilities with a capacity of at least 1 MW for solar facilities or 5 MW for wind facilities. Operators of facilities under 1 MW and other types of facilities may voluntarily participate in the auctions. RES facilities already working under a green tariff are not eligible for the auction support scheme.

RES auctions are conducted through a dedicated online platform within the annual auction support limits approved by the Ukrainian Cabinet of Ministers each year. The Guaranteed Buyer is responsible for organising and holding the auctions and for establishing and documenting relations with the auction winners. In order to establish contractual relations with the Guaranteed Buyer after the auction, RES Producers will have to provide, among other things, evidence of title or lease rights to land and a grid connection agreement.

RES auctions are held regularly by the Guaranteed Buyer and should be held until 31 December 2029. State support will be extended for a period of 12 years, commencing from the first day of the calendar month following the commissioning of the power facility and its connection to the power grid.

6. Significant and/or expected changes in 2023/2024

6.1 The RES support regime has undergone a significant overhaul

On 30 June 2023, Ukraine passed the Law "On Amendments to Certain Laws of Ukraine on the Restoration and Green Transformation of the Energy System of Ukraine" No. 3220-IX (the "Law No. 3220-IX") , which introduces amendments to certain Ukrainian laws aimed at enhancing energy security and promoting the green transformation of the country's energy system, and which significantly amended Ukrainian law provisions concerning RES electricity generation.

6.1.1 Certain important changes to the incentive mechanisms

The government may allocate funds in the state budget to support RES Producers, specifically for green tariff payments, based on calculations by the NEURC. If budget provisions are made for RES Producers, the NEURC will incorporate these costs into transmission tariffs. Otherwise, the NEURC will set tariffs to cover RES support.

RES Producers under the green tariff must join the Guaranteed Buyer's balancing group upon the NEURC's secondary legislation adoption. Repairs to RES plants without capacity increases won't impact the green tariff – this is very important given the large number of damaged electricity generating facilities that require reconstruction or repairs.

RES producers under the green tariff scheme have the option to leave the Guaranteed Buyer's balancing group with a 20-day notice (however they can return upon 60-days' notice). They can then suspend their PPA and opt for a Contract for Difference (CfD) to increase their share of RES electricity, facilitated by a standard form regulated by the NEURC for the green tariff duration. Alternatively, RES producers can terminate their PPA and potentially renegotiate it at a later date. This scheme may also be described as a feed-in premium (FIP) and is also applicable to producers eligible for state support under the auctions scheme.

CfD is designed to encompass electricity sold by RES producers through bilateral contracts, as well as in day-ahead and intraday markets. Payments under CfD seem to be calculated based on the difference between the established green tariff or the auction price and the higher of the average index prices in either the day-ahead market or regulated bilateral contracts market, as specified by the law. Should the larger average market price surpass the auction price / green tariff, the producer would be responsible for paying the difference to the Guaranteed Buyer. Transitioning between different forms of support does not alter the established green tariff rate. Additionally, RES producers are expressly allowed to export and import electricity from/to Ukraine.

6.1.2 Introduction of Guarantees of Origin

The NEURC is designated as the authority responsible for issuing Guarantees of Origin (GOs) in Ukraine, which certify the renewable origin of electricity. These electronic GOs will be provided at no cost and will contain detailed information about the renewable energy source, operating period, location, issuance date, country of origin, and identification code.

GOs for electricity generated from renewable sources are freely tradable and can be transferred to any participant in the electricity market. While they can be exported from and imported to Ukraine, their recognition abroad or by foreign GOs in Ukraine will be determined by agreements between Ukraine and other countries.

The purchase and sale of GOs will be conducted on a market basis at negotiated prices. For producers benefiting from feed-in tariffs, GOs will be sold to the Guaranteed Buyer alongside the corresponding electricity volume. The price paid by the Guaranteed Buyer will cover the value of the GOs, and the Buyer can then sell these GOs separately from the electricity.

The NEURC developed procedures for issuing, transferring, and utilising GOs, which are pending approval by the Cabinet of Ministers of Ukraine. The operational register of GOs is expected to be established within six months following the approval of these procedures, ensuring transparency and accountability in the renewable energy market.

6.1.3 Aggregators

Under the new legislation, the aggregator, operating under a license, serves as an important market entity that unifies power generation or storage facilities with consumers, facilitates the purchase and sale of electricity, and also provides ancillary and/or balancing services. This entity establishes an aggregated group governed by the terms outlined in the aggregator group participation agreement. The aggregator is responsible for maintaining the balance of electrical installations within its aggregation, excluding those serving consumers obtaining electricity elsewhere.

While it is not involved in the transmission, distribution, or market operator functions, the aggregator engages in electricity trading, including buying and selling, and offers balancing and ancillary services as stipulated by relevant regulations. Aggregators play a vital role in consolidating consumers and small electricity producers (with capacities up to 20 MW) into a virtual power plant, thereby enabling electricity trading and service provision in the market.

Each electrical installation is exclusively associated with one aggregation group, ensuring that no installation is part of multiple groups. Within each aggregated group, the electrical installations are collectively considered as a single aggregated installation.

6.2 Important regulation enacted

On 24 January 2024, the NEURC adopted Resolution No.178, which introduces a number of legislative acts in line with Law No. 3220-IX.

The regulation provides, inter alia that in order to sell electricity under the green tariff, RES producers must enter into (i) a power purchase agreement (the PPA) with the Guaranteed Buyer, on the basis of a new standard agreement approved by the NEURC and (ii) a new standard agreement approved by the NEURC on participation in the Guaranteed Buyer's balancing group. The Resolution lays down new requirements for RES producers entering into PPAs and receiving payments under the green tariff. For example, they must:

1. Enter into an agreement with the transmission system operator aimed at reducing the load (if the capacity of any generation installation equals or exceeds 1 MW);
2. Provide documents confirming the commissioning of the generation facilities, including the passport for the distribution point (required from prosumers) and so on.

The procedure for the Guaranteed Buyer to acquire electricity from RES producers expressly covers the feed-in premium mechanism (FIP) for both producers under the green tariff and auction winners. The procedure for entering into agreements on rendering services under the FIP is expected to be established by a respective procedure approved by the Cabinet of Ministers of Ukraine.

6.3 PPAs under the new rules

As a result of these previously mentioned legal amendments (and due to the gradual phasing out of the green tariff) PPAs are currently primarily entered into by two main categories of entities: (i) those which have secured agreements prior to 2020 and have completed or are completing the construction of their RES facilities, and (ii) smaller industrial producers and household RES electricity producers.

The new form of PPA has been approved by the NEURC's Resolution No.178. To facilitate the buying and selling of electricity under the green tariff, a candidate for a seller under the green tariff enters into the green tariff PPA with the Guaranteed Buyer. The green tariff PPA is concluded for the entire validity period of the green tariff. NEURC regulations outline a comprehensive procedure for the conclusion of green tariff PPAs, specifying those documents that must be submitted to the regulator. These documents include those pertaining to grid connection and evidence of the completion of construction of the power generating facility.

Pursuant to the new rules, RES auction winners, as well as producers operating under the green tariff who opt to do so, engage in Contracts for Difference (CfDs). CfDs are concluded between the Guaranteed Buyer and the auction winner or the producer under the green tariff. The procedure for the conclusion of CfDs, while sharing similarities with the process for PPAs, was only introduced in January 2024 and has not yet been subject to practical testing.

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