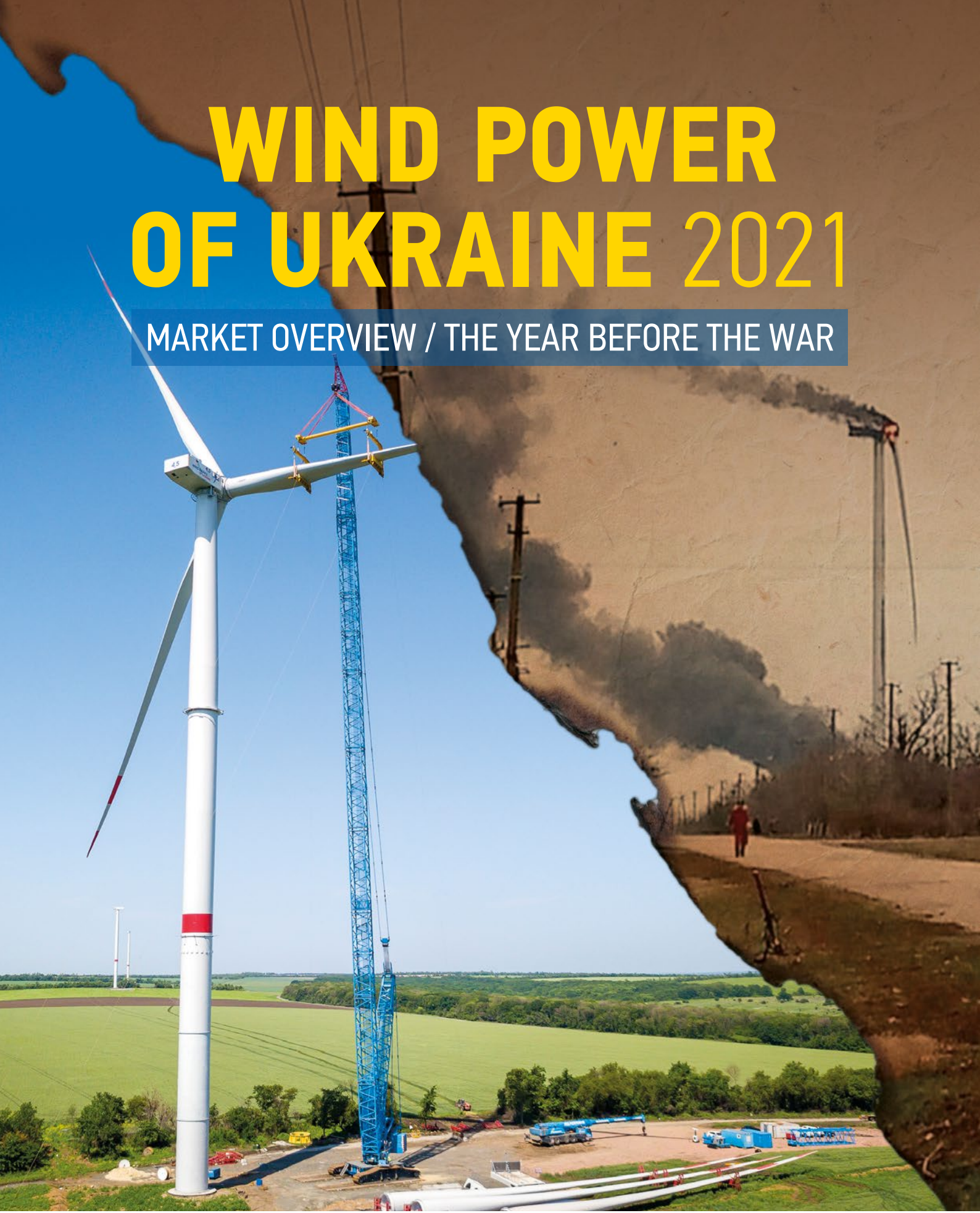


# WIND POWER OF UKRAINE 2021

MARKET OVERVIEW / THE YEAR BEFORE THE WAR



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# WIND POWER OF UKRAINE 2021

## MARKET OVERVIEW / THE YEAR BEFORE THE WAR

Ukrainian Wind Market Overview 2021 was developed by Public Union **Ukrainian Wind Energy Association** in collaboration with **EVERLEGAL**.

The reported statistics are based on the official information published by the Ministry of Energy of Ukraine, PJSC NPC Ukrenergo, National Energy and Utilities Regulatory Commission, SE Guaranteed Buyer, State Agency on Energy Efficiency and Energy Saving of Ukraine, Ukrainian Wind Energy Agency-K LLC and the UWEA member companies.

This **Ukrainian Wind Market Overview 2021** was completed in early February 2022. On 24 February 2022, the Russian aggressor attacked Ukraine, unleashing unprovoked and unjustified war against Ukraine, against humanity and democracy. All the information presented in the Overview reflects the status of wind development in Ukraine as of January 31, 2022.

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The photos used in the Overview have been kindly provided by **MC Wind Parks of Ukraine LLC**, **Elementum Energy LLC**, **Yuzhne Energy LLC**, **Vindkraft Tavriya LLC**, **EuroCape Ukraine I LLC**.

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**Public Union Ukrainian Wind Energy Association (UWEA)** is the largest renewable energy industry association in Ukraine. It's a non-profit organization that serves as the principal communication and co-operation platform for the large-scale adoption of wind technologies in the country and further advancing the "green" transformation of the Ukrainian energy system.

The UWEA was founded in 2008 to protect the interests and support the activities of both, the national and international stakeholders of the Ukrainian wind energy market, which as of the end of 2021 unities **84 companies** from 14 countries including 100% of wind electricity producers, investors and wind farm developers, equipment manufacturers, construction, consulting and logistic companies, lawyers, and environmentalists involved in the wind industry.

The Ukrainian Wind Energy Association has been closely cooperating with various national, regional and local authorities, and such international institutions and organizations as International Energy Agency, International Renewable Energy Agency (IRENA), BloombergNEF, Wood Mackenzie, REN21. The UWEA is a full member of the World Wind Energy Association and the WindEurope.



Since 2020, the UWEA explores the potential of offshore wind power development in the Black Sea. Within this framework, the UWEA and the Offshore Wind Energy Association of Turkey signed the Protocol on Initiating Black Sea Offshore Wind Energy Federation.

Numerous awards and distinctions have proven the high-level professionalism of the association. Thus, the UWEA has been twice recognized as the choice of the year: in 2017 it was awarded the Honorary award "Choice of Ukraine 2017" and in 2019 – the Honorary award "Choice of the Country 2019".

**EVERLEGAL** is an independent Ukrainian law firm focusing on the energy sector. The firm was established in 2015 and now unites 50 lawyers and occupies a place among TOP-10 law firms in Ukraine and TOP-5 law firms in the energy sector.

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# ACRONYMS AND ABBREVIATIONS

<b>AMCU</b>	Anti-Monopoly Committee of Ukraine	<b>NAS</b>	National Academy of Sciences
<b>ASEU</b>	Solar Energy Association of Ukraine	<b>NDC2</b>	Second Nationally-Determined Contribution to the Paris Agreement
<b>BioPP</b>	Bioenergy power plant	<b>NGTS</b>	Natural gas transmission system of Ukraine
<b>bln</b>	Billion	<b>NEF</b>	New Energy Finance
<b>CBAM</b>	Carbon border adjustment mechanism	<b>NERP</b>	National plan for emission reduction from large-scale burning plants
<b>CJEU</b>	Court of Justice of the European Union	<b>NEURC</b>	National Energy and Utilities Regulatory Commission of Ukraine
<b>CHP</b>	Combined heat and power plant	<b>NGO</b>	Non-governmental organization
<b>CMU</b>	Cabinet of Ministers of Ukraine	<b>NNEGC</b>	National Nuclear Energy Generating Company of Ukraine
<b>CO<sub>2</sub></b>	Carbon dioxide	<b>NPC</b>	National Power Company
<b>DAM</b>	Day-Ahead Market	<b>NPP</b>	Nuclear power plants
<b>DSO</b>	Distribution System Operator	<b>NREAP</b>	National Renewable Energy Action Plan
<b>EBRD</b>	European Bank for Reconstruction and Development	<b>PAEU</b>	Professional Association of Ecologists of Ukraine
<b>EIA</b>	Environmental Impact Assessment	<b>PC</b>	Public Company
<b>ESS</b>	Energy Storage System	<b>PPA</b>	Power Purchase Agreement
<b>EIC</b>	Energy Identification Code	<b>PrJSC</b>	Private joint stock company
<b>EU</b>	European Union	<b>PSH</b>	Pumped-storage hydroelectric power plant
<b>EUEA</b>	European-Ukrainian Energy Agency	<b>PSO</b>	Public Service Obligations
<b>FIP</b>	Feed-in Premium	<b>PU</b>	Public Union
<b>FiT</b>	Feed-in Tariff	<b>PV</b>	Photovoltaic
<b>GO</b>	Guarantees of Origin	<b>RES</b>	Renewable energy source
<b>GW / GWh</b>	Gigawatt / Gigawatt-hour	<b>REN21</b>	Renewable Energy Policy Network for the 21 <sup>st</sup> Century
<b>GWEC</b>	Global Wind Energy Council	<b>SAEE</b>	State Agency on Energy Efficiency and Energy Saving of Ukraine
<b>HPP</b>	Hydro power plant	<b>SE</b>	State Enterprise
<b>IDM</b>	Intraday market	<b>sHPP</b>	Small hydropower plant
<b>IEA</b>	International Energy Agency	<b>SPP</b>	Solar power plant
<b>IFA</b>	Inter-Fractional Association	<b>thsnd</b>	Thousand
<b>IFC</b>	International Finance Corporation	<b>TPP</b>	Thermal power plant
<b>IPS</b>	Integrated Power System	<b>TSO</b>	Transmission System Operator
<b>IRENA</b>	International Renewable Energy Agency	<b>trll</b>	trillion
<b>ISO</b>	International Organisation for Standardization	<b>TW / TWh</b>	Terawatt / Terawatt hour
<b>JSB</b>	Joint-stock bank	<b>UARE</b>	Ukrainian Association of Renewable Energy
<b>JSC</b>	Joint-stock company	<b>UBA</b>	Ukrainian Bar Association
<b>kV</b>	Kilovolt	<b>UWEA</b>	Ukrainian Wind Energy Association
<b>KW / kWh</b>	Kilowatt / Kilowatt hour	<b>WB</b>	World Bank
<b>LLC</b>	Limited liability company	<b>WPP</b>	Wind power plant
<b>M&amp;A</b>	Mergers and acquisitions	<b>WTG</b>	Wind turbine generator
<b>MC</b>	Management Company	<b>WWEA</b>	World Wind Energy Association
<b>Ministry of Reintegration</b>	Ministry of Reintegration of Temporarily Occupied Territories		
<b>MoU</b>	Memorandum of Understanding on the Settlement of Problematic Issues in the Renewable Energy Sector		
<b>MP</b>	Member of Parliament		
<b>MW / MWh</b>	Megawatt / Megawatt-hour		



# **WIND POWER INTERNATIONAL RESEARCHES AND PROGNOSIS**

Photo WindEurope



5





# 1.1. THE ROLE OF WIND ENERGY IN COMBATING GLOBAL CLIMATE CHANGE

Unlike the year 2020, when the entire world learned how to live under new rules and coronavirus pandemic (COVID-19) forced us to transit from face-to-face to online meetings, the year 2021 demonstrated that life in such circumstances was possible. New technologies and innovations, high-profile international agreements and alliances, ambitious projects and policies characterized the global renewable energy industry in 2021.

Last year the entire global community of politicians, power engineers and experts, ecologists, and climate change activists watched the speeches of Heads of states at the COP26 Global Climate Summit in Glasgow, Scotland, increasingly aware of the importance of the renewable energy industry and the inevitability of a green power transition.

Like any other economic sector, the development of green power worldwide is accompanied by several ups and downs. For example, in spring 2021, the entire European wind energy community faced a large-scale decrease in wind speed across northern Europe. It dropped by as much as 15% on average and became one of the reasons for rising prices for energy carriers and raw materials for wind equip-

ment manufacturers. Yet, paradoxically, according to the report “Climate Change Mitigation Potential of Wind Energy”, even though climate change affects wind power potential, wind power could play a more prominent role in averting the climate crisis than all other energy sources. The study found that the world wind energy generation capacity could reduce global warming by 0,3-0,8°C by 2100.

GWEC experts also consider wind energy crucial for combating climate change. To deliver on the EC climate goals the annual wind power growth should triple over the next decade. To keep global warming well below 2° C, GWEC experts have estimated that annual wind installations must average 180 GW by 2030 and up to 280 GW – by 2050.

The GWEC calculations have been proven by the IEA experts in “2021 World Energy Outlook”. They emphasise that despite annual rapid increase in growth rates of wind and solar power all over the world, 2021 was seeing a large rebound in coal use and largely for this reason, it’s also seeing the second-largest annual increase in CO<sub>2</sub> emissions in history. According to “Electricity Market Report, January 2022” by IEA, coal-fired generation grew by 9%,

## WIND ENERGY AT THE HEART OF EXPERT DISCUSSIONS AT COP26

To consolidate the agreements reached during the COP26, the parties to the Paris Agreement adopted the Glasgow Climate Pact, which called on all countries “to rapidly scale up clean power generation and accelerate efforts towards the phasedown of coal power and phase-out of inefficient fossil fuel subsidies.” As a large-scale, cost-competitive local source of energy, onshore and offshore wind will be at the heart of the sustainable energy systems of the future. Nearly 800 GW of wind power worldwide already helps to avoid more than 1.1. bln tonnes of CO<sub>2</sub> emissions annually – equivalent to Latin America’s entire annual carbon emissions.

According to the roadmaps to net zero by 2050 presented by IEA and IRENA at COP26, wind power will make the largest technology contribution to the global “green” energy transition over the next three decades. Moreover, it plays the leading role in revitalising national infrastructure, transforming economies, increasing welfare of local communities and protecting the environment and biodiversity.

One of the key results of COP26 was the conclusion of the Global Wind Energy Manifesto, which, in addition to the existing decommissioning schedules, called for rapid closure of coal-fired power plants since 2022. As a result, together with 45 countries globally, Ukraine has committed itself to completely stopping internal coal consumption by 2035.

serving more than half of the increase in demand and reaching a new all-time peak as high natural gas prices led to gas-to-coal switching. In total, CO<sub>2</sub> emissions from power generation rose by 7%, also reaching a record high, after having declined the two previous years.

Remarkable are also data provided by “The Guardian”, according to which 2021 was the year of temperature records with 107 countries beating their monthly heat records, and 5 – their monthly low temperatures. Moreover, according to the publication, 2022 has already begun with a number of temperature records already broken in the United Kingdom and the United States. Therefore, IEA experts consider that, while the deployment of RES has returned to the pre-Covid levels across 2021, the pace of deployment is still insufficient to meet global climate goals by 2050. One of the solutions is massive wind power deployment together with the increase of other ecological and clean technologies.

According to the IEA’s “Renewables 2021 Report: Analysis and Forecasts to 2026”, in the period from 2021 to 2026, the amount of installed green power capacities will be 50% higher than in the corresponding period from 2015 to 2020, 25% of which – only onshore wind power capacities.

Wind will cover two-thirds of global power consumption by 2030, according to the report “Wind Accelerates Past Nuclear, Hydro in Post-Covid Power Markets” by Rethink Energy Company. Wind power will become the most significant source of energy worldwide by 2030, leaving both nuclear and hydropower behind. In terms of capacity, the wind power sector is expected to record and increase from 765 GW at the end of 2020 to 2,126 GW by 2030, a three-fold increase, with China as the largest proponent of this growth.

The assumption of the IEA experts on the insufficient development of the RES for delivering on climate goals is also true for Europe. Thus, the calculations of Wood Mackenzie experts show that Europe needs fundamental changes in its climate policy, as it may not achieve its 2030 target of a 55% reduction in carbon emissions compared to 1990 levels. According to analysts, to solve this problem, the total capacity of the European wind power industry should increase by an additional 162 GW by 2030, along with decommissioning of 85 GW of the power plants on fossil fuels by 2030 at the latest.

WindEurope with ETIPWIND, the European Platform for Technology and Innovation in the Global Energy industry in their report “Getting Fit for 55 and set for 2050: Electrifying Europe with wind” have concluded that renewables-based electrification is the key



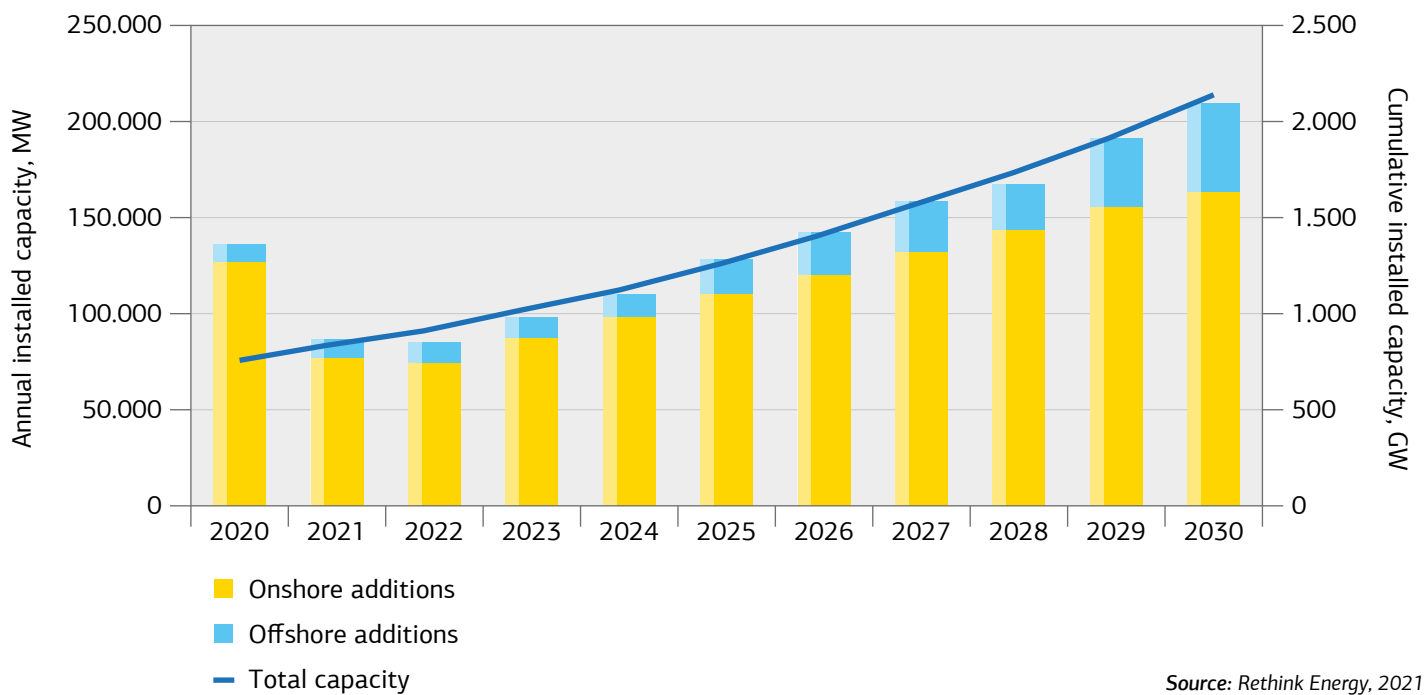
to deliver climate neutrality by 2050. Referring to the data of the European Commission, experts expect electricity to directly cover 57% of final energy use and provide another 18% indirectly through renewable hydrogen and its derivatives. In order to achieve such results, wind share in the EU electricity mix should reach 50% by and 25% – already in 2030.

According to experts from WindEurope, although at the end of 2021, 180 GW of wind power capacities were commissioned in the EU countries, “politicians want more wind”. Therefore, the European Union goals provide for delivering 450 GW of wind power by 2030 and 1 300 GW by 2050. Furthermore, Germany, the Netherlands, Belgium, Austria, and Ireland already raised their national wind targets last year. Thus, for example, the new Germany Government has raised the 2030 renewables target from 65% of electricity to 80%. That means 30 GW of offshore wind instead of 20 GW and around 100 GW of onshore wind, up from 56 GW today.

While further RES development forecasts by different international organisations and companies may differ in the final indices, all of them call on Governments for more ambitious national climate and energy targets. Such recommendation runs through a number of official statements by IEA and WindEurope and underlines most of official calls of the international alliances.

A global think tank REN21 is convinced that the focus should be made on stimulating local authorities to develop green energy rather than setting ambitious renewable energy national goals. REN21 proves that RES development in the cities is more rapid than the corresponding political steps at the national level. In 2019 and 2020, local governments demonstrated leadership in advancing their energy and climate agenda. According to the REN21 report “Renewables in Cities. 2021 Global Status Report”, by the end of 2020, more than 10,500 cities exceeded the target for CO<sub>2</sub> emission reduction; 799 municipalities developed regulatory regulations, policies, tax,

**Graph 1.1.1.** Global wind power forecast 2020-2030



and fiscal incentives for renewable energy development. The effectiveness of such approach is best illustrated by wind farm community ownership, when a local community becomes one of the shareholders of not only wind farm, but even of one wind turbine. For example, in 2021 a project started in Wales with 907 residents crowdfunded EUR 2.6 mln in installing one wind turbine, which will start generate electricity in 2022. While not directly powering the homes of those who funded it, the turbine will generate electricity to be sold to Co-operative Energy, which

subsequently will supply the owners with discounted electricity. The discount is based on how much energy it generates, electricity prices and the amount of the turbine owned by the resident.

For all those reasons, it remains evident that global wind energy is defined as the most efficient instrument for combating climate change and reducing CO<sub>2</sub> emissions, while investors' "appetite" for wind energy projects has been increasing rapidly due to their profitability and liquidity.



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## 1.2. INVESTMENT ATTRACTIVENESS OF RENEWABLE ENERGY SOURCES. UKRAINE IN THE RANKING OF INVESTMENT POTENTIAL FOR GREEN ENERGY TRANSITION

Since 2016 investments in renewable energy sources have been steadily higher than in fossil fuel, including oil and gas. Thanks to the rapid improvement of technologies and reducing expenses, the dollar spent on wind and solar energy projects today gives four times more electricity than the dollar spent on the same technologies ten years ago. In addition, due to constant improvement of technical efficiency of wind power plants, the installation costs of wind power plants globally fell by 5% in 2020 and will continue to decrease.

To put the world on track to meet its climate goals, apart from the development of green energy technologies, especially wind power, it is necessary to increase investments in clean and green projects and infrastructure to almost USD 4 trll by 2030. At the same time, according to the annual survey Climatescope by Bloomberg NEF, investments in clean energy sources in developing countries fell by 10% over the 2019-2020 years, as international financial institutions preferred countries with minimal country and investments risks. In 2020, developed countries received USD 262 bln, or 57% of global investment in green energy, including support for developing renewable energy sources, electric transport, and energy efficiency, while developing countries received USD 195 bln for developing these sectors which amounts to 43% of global investments, respectively. Thus, over the past two years investment in renewable energy sources has fallen by 9% in developing countries and grown by 24% in developed countries.

Remaining a country with significant country risks (*ed. according to the Economic Freedom Index for 2021, calculated since 1995 by the US Heritage Foundation, Ukraine has reached the non-free economy group and ranked 127 out of 169 countries globally*), with a cumulative rating of 1.74 out of 5, Ukraine ranked 21<sup>st</sup> in the ranking of the investment potential of developing countries in 2021 or 48th globally according to Bloomberg NEF. Referring to the data of the Ukrainian Wind Energy Association, Bloomberg NEF analysts noted the country's significant progress in fulfilling the First Nationally Determined Contribution to the Paris Agreement, according to which Ukraine committed to reduce greenhouse gas emissions to 60% of the 1990 levels by 2030. In 2019, according to the draft Ukraine's Greenhouse Gas Inventory for 1990-2019, CO<sub>2</sub> emissions amounted to 332 mln tonnes – 37.6% from 1990 level.

At the same time, it's clear that the increase in renewable energy investments leads not only to the progress in the country's fulfilment of its climate commitments but to the national market growth and economic development of the whole nation. According to IEA estimates, if the world reaches zero CO<sub>2</sub> emissions by 2050, annual capital markets for manufacturers of wind turbines, solar panels, lithium-ion batteries, and electrolyzers will grow ten times to USD 1.2 trll by 2050. Therefore, the issue of maintaining the country's investment attractiveness is not only related to the image of the country but also to the liquidity of its economy and the efficiency of its business.





# WIND POWER IN UKRAINE



## 2.1. KEY INDICATORS AND TRENDS

After a record year in 2019 followed by a year of stagnation and struggle for survival in 2020, in 2021 the renewable energy industry was at a crossroads, expecting the Ukrainian Government's decision on energy sector's development vector. Will it be a fundamental change of the energy paradigm and modernization of the energy system which leads to an ecologically clean future with large-scale and balanced use of the renewables or further development of the fossil power generation, which also shortly requires significant investments in the replacement of the used capacities with new ones?

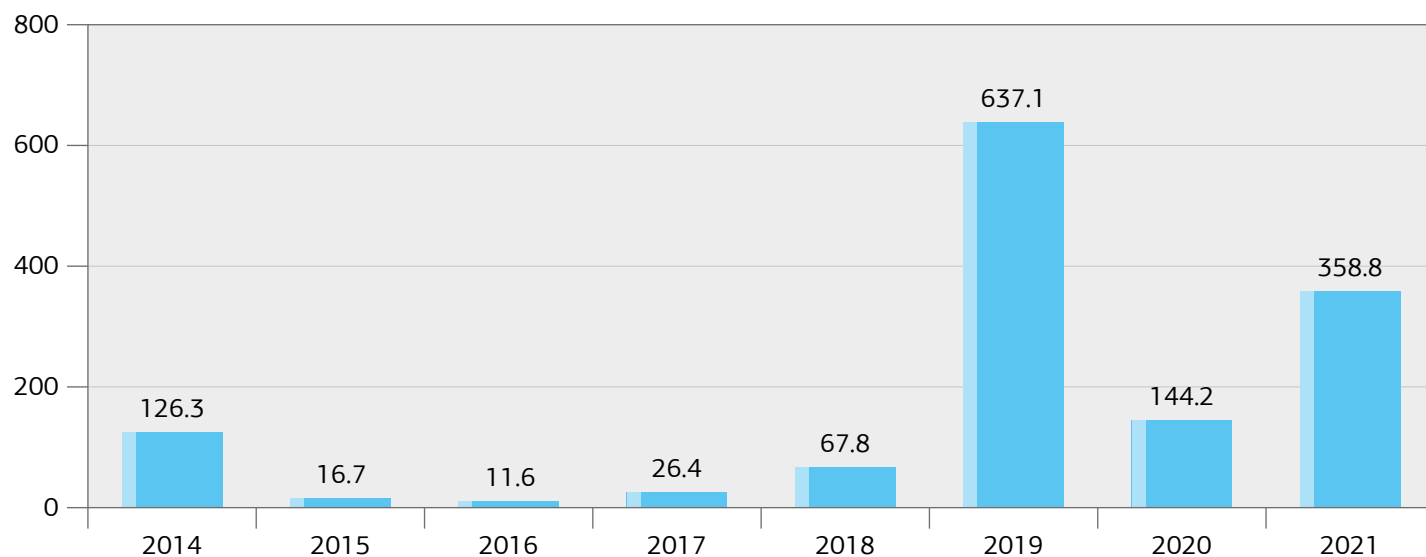
At the end of 2021, it is fair to say that the RES market is still showing signs of wariness. On the po-

sitive side, the Government of Ukraine has started to fulfil its financial obligations to the RES producers and repaid the debts accumulated in 2020-2021; the President of Ukraine has committed our country to gradually shift away from coal by 2035. On the negative side, in late December 2021 the CMU approved the Concept of the State Targeted Economic Program for the Nuclear Industrial Complex Development until 2026, which provides for increasing the production of uranium to fully meet the needs of domestic nuclear power.

Furthermore, the following issues have yet to be addressed: the decision of the Constitutional Court of Ukraine on the petition on recognition of



**Graph 2.1.1. Annual wind power additions, 2014 – 2021, MW**

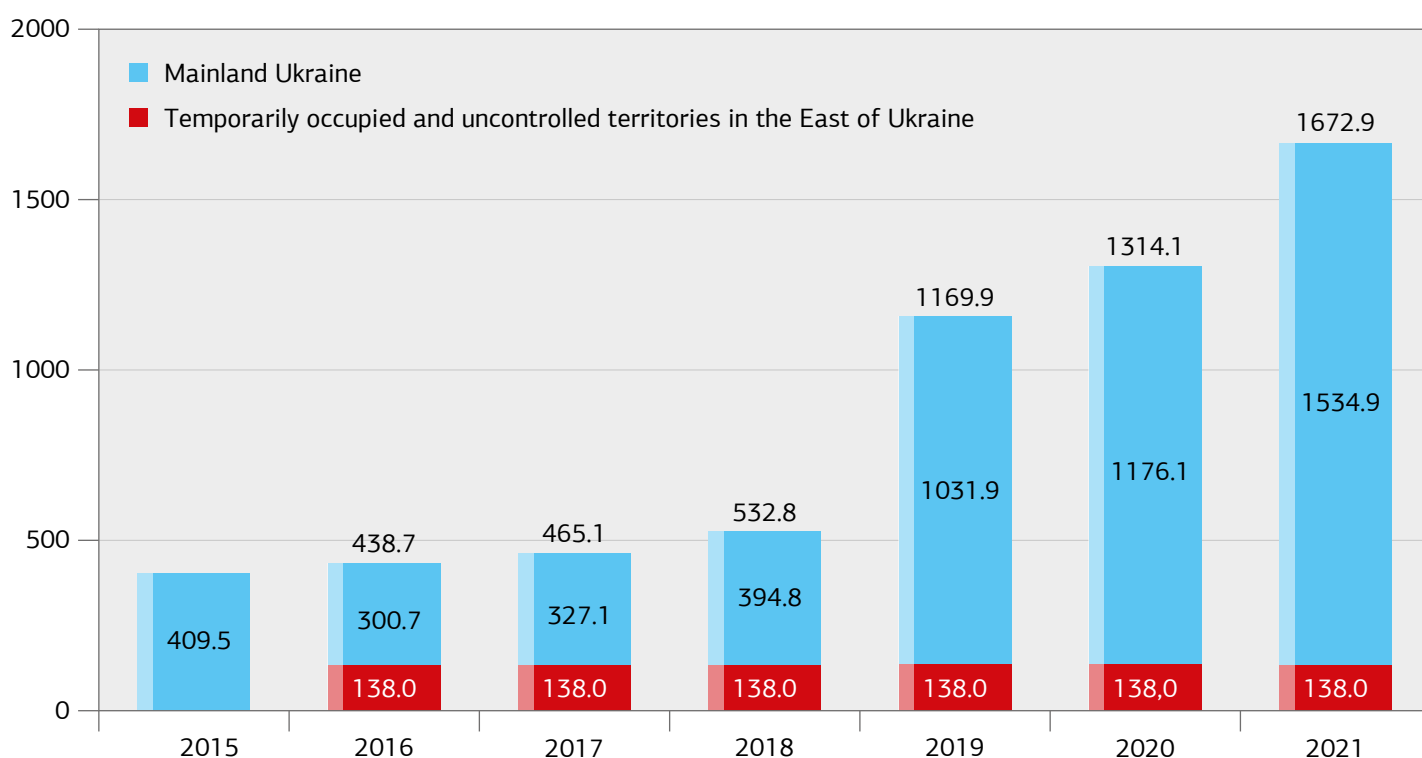


Source: PU UWEA, 2021

the green tariff as not complying with the Constitution of Ukraine initiated by 47 People's Deputies of Ukraine on July 17, 2020, and the complaint regarding qualification of the green tariff as illegal state aid for the RES producers filed by the NGO League of Antitrust before the AMCU (see Section 2.6.). All these factors negatively effected the RES market. Renewable energy sector cannot progress on the basis of state ephemeral decisions and therefore

needs a coherent, well-thought-out and balanced public policy. Despite the fact that wind capacity additions in 2021 were rather the result of completing wind farms construction started back in 2020 than commissioning of new wind projects implemented in 2021, investors still continue to invest in Ukraine, aware of all the "country risks" and hoping that the Government will fulfil its obligations.

**Graph 2.1.2. Installed wind capacity, mainland Ukraine, 2015 – 2021, MW**



Source: PU UWEA, 2021

**Table 2.1.1.** WPPs that supply electricity at green tariff, as of 31 December 2021

#	Wind Power Plant	Wind Power Plant Operator / Owner	Installed capacity, MW	Number & model of WTG	WPP status
<b>MYKOLAIV REGION</b>					
1.	Wind Park Ochakivskyi	MC Wind Parks of Ukraine LLC	57.1	17 x 2.5 MW WTU2.5 2 x 3.3 MW WTU3.3 1 x 3.5 MW WTU3.5 1 x 4.5 MW WTU4.5	in operation
2.	Wind Park Blagodatnyi	MC Wind Parks of Ukraine LLC	14.3	2 x 2.5 MW WTU2.5 1 x 4.5 MW WTU4.5 1 x 4.8 MW WTU4.8	in operation
3.	Wind Park Prychornomorskyi	MC Wind Parks of Ukraine LLC	42.8	3 x 2.5 MW WTU2.5 2 x 3.0 MW WTU3.0 6 x 3.2 MW WTU3.2 2 x 3.3 MW WTU3.3 1 x 3.5 MW WTU3.5	in operation
4.	Wind Park Pivdennyi	MC Wind Parks of Ukraine LLC	10.5	3 x 3.5 MW WTU3.5	in operation
5.	Wind Park Schaslyvyi	MC Wind Parks of Ukraine LLC	7.0	2 x 3.5 MW WTU3.5	in operation
6.	Wind Park Shvydkyi	MC Wind Parks of Ukraine LLC	14.4	3 x 4.8 MW WTU4.8	in operation
7.	Wind Farm Mykolaiv region	Singa Energy LLC	6.0	2 x 3 MW Vestas 2.0	in operation
<b>LUHANSK REGION</b>					
8.	Wind Park Krasnodonskyi	MC Wind Parks of Ukraine LLC	25.0	10 x 2.5 MW Fuhrlander FL2500 – 100	located in the temporarily occupied and uncontrolled territories, do not supply electricity to the Power System of Ukraine
9.	Wind Park Lutuginskyi	MC Wind Parks of Ukraine LLC	25.0	10 x 2.5 MW Fuhrlander FL2500 – 100	located in the temporarily occupied and uncontrolled territories, do not supply electricity to the Power System of Ukraine
<b>DONETSK REGION</b>					
10.	Wind Park Novoazovskyi	MC Wind Parks of Ukraine LLC	57.5	23 x 2.5 MW Fuhrlander FL2500 – 100	located in the temporarily occupied and uncontrolled territories, do not supply electricity to the Power System of Ukraine
11.	Wind Power Plant Vetroenergoprom	MC Wind Parks of Ukraine LLC	30.53	204 x 0.1075 MW USW56 – 100 6 x 0.6 MW Turbowinds T600 – 48 2 x 2.5 MW Fuhrlander FL2500 – 100	located in the temporarily occupied and uncontrolled territories, do not supply electricity to the Power System of Ukraine
12.	Kramatorska WPP	MC Wind Parks of Ukraine LLC	13.5	3 x 4.5 MW WTU4.5	in operation
<b>KHERSON REGION</b>					
13.	Novorosiiska WPP	Vindkraft Ukraina LLC	9.225	3 x 3.075 MW Vestas V112	in operation
14.	Stavky WPP	Vindkraft Ukraina LLC	9.225	3 x 3.075 MW Vestas V112	in operation



#	Wind Power Plant	Wind Power Plant Operator / Owner	Installed capacity, MW	Number & model of WTG	WPP status
15.	Beregova WPP	Vindkraft Ukraina LLC	12.3	4 x 3.075 MW Vestas V112	in operation
16.	Novotroitska WPP	Vindkraft Tavriya LLC	72.6	12 x 3.65 MW Vestas V126 8 x 3.6 MW Vestas V136	in operation
17.	Overyanivska WPP	Vindkraft Ukraina LLC	68.4	19 x 3.6 MW Vestas V -136	in operation
18.	Myrnenska WPP	Vindkraft Kalanchak LLC	163.0	35 x 4.2 MW Vestas V – 150 4 x 4.0 MW Vestas V – 150	in operation
19.	Syvaska WPP	SyvashEnergoProm LLC	2.92	16 x 0.1075 MW USW56 – 100 2 x 0.6 MW Turbowinds T600 – 48	in operation
20.	Syvaska WPP / Total Iren	SyvashEnergoProm LLC	245.7	63 x 3.9 MW Nordex N131/3900	in operation
<b>ZAPORIZHZHIA REGION</b>					
21.	Botievska WPP	DTEK Renewable	199.875	65 x 3.075 MW Vestas V112	in operation
22.	Prymorska WPP-1	DTEK Renewable	99.58	26 x 3.83 MW GE 3.8 – 130	in operation
23.	Prymorska WPP-2	DTEK Renewable	99.58	26 x 3.83 MW GE 3.8 – 137	in operation
24.	Orlivska WPP	DTEK Renewable	98.8	26 x 3.8 MW Vestas V126	in operation
25.	Zaporizhzhia WPP	EuroCape Ukraine I LLC	98.01	27 x 3.63 MW GE 3.6 -137	in operation
<b>ODESA REGION</b>					
26.	Ovid Wind WPP	Ovid Wind LLC	32.67	9 x 3.63 MW GE 3.6 -137	in operation
27.	Uzhne Energy WPP	Uzhne Energy LLC	76.5	17 x 4,5 MW Nordex Delta4000	in operation
28.	Dnistrovsk WPP First Phase	Elementum Energy LLC	40.0	10 x 4.0 MW GE 4.0 -137	in operation
<b>LVIV REGION</b>					
29.	Stryi Sambir 1 WPP	Eco-Optima LLC	13.2	4 x 3.3 MW Vestas V112	in operation
30.	Stryi Sambir 2 WPP	Karpatskyi Viter LLC	20.7	6 x 3.45 MW Vestas V136	in operation
<b>KYIV REGION</b>					
31.	Bonus WTG	Production– Commercial Firm Ligena LLC	0.45	1 x 0.45 MW Bonus 450/37	in operation

#	Wind Power Plant	Wind Power Plant Operator / Owner	Installed capacity, MW	Number & model of WTG	WPP status
<b>IVANO-FRANKIVSK REGION</b>					
32.	Shevchenkove -1 WPP First Phase	Wind Energy LLC	0.6	1 x 0.6 MW Nordex N43	in operation
<b>TERNOPIL REGION</b>					
33.	Zborivska WPP	Zborivska Poultry Firm LLC	1.98	3 x 660 kW Vestas V47	in operation
34.	Bioenergoproduct WPP	Bioenergoproduct LLC	4.0	2 x 2.0 MW Enercon E70	in operation
<b>TOTAL:</b>			<b>1,672.945 MW</b>	<b>699 WTGs</b>	

Source: PU UWEA, 2021

Based on the data available, the UWEA forecasts 7 GW of wind power capacity to be installed in Ukraine by 2030, provided favourable business conditions in the country.

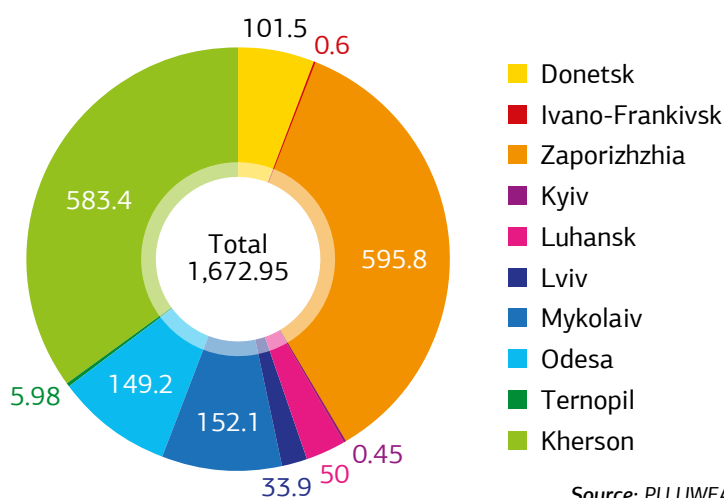
In 2021, 91 new wind turbines with a total capacity of **358.81 MW** were commissioned in three regions of Ukraine, in particular:

- 40 MW Phase 1 of Dnistrovskia wind farm in Odesa region;
- 76.5 MW Yuzhne Energy wind farm in Odesa region;
- 98.01 MW Phase 1 of Zaporizhia Wind Park in Zaporizhzhya region;
- 144.3 MW Phase 2 of Sivaska wind farm in Kherson region.

Thus, the total installed capacity of the wind power industry reached **1 672,945 MW** by the end of 2021. Today in Ukraine, 699 wind turbines with average **nameplate capacity of 3.5 MW**, generate green electricity.

In terms of total installed capacity at the end of 2021, **wind energy remains the second renewable technology after solar PV in Ukraine**. However, it should be noted that the wind power accounts for the largest share of new capacities added to the green energy mix of Ukraine last year. In total, wind capacity additions increased two and half times compared to 144 MW last year.

**Figure 2.1.3.** Wind power capacity per regions, mainland Ukraine, 2021, MW



Source: PU UWEA, 2021

**Figure 2.1.4.** Map of wind farms generating electricity at the “green” tariff, 2021



Source: PU UWEA, 2021

In 2021 the share of wind in total installed capacity of national power sector slightly increased. Thus, as of the end of December 2021, the share of wind accounts for **19.8% of the total RES capacity** installed in Ukraine and **2.72%** – of the national power capacity.

In terms of annual wind capacity additions Kherson region (144.3 MW) became the leader followed by Odesa region (116.5 MW). Also, new wind power capacities were put into operation in the Zaporizhzhia region, namely 98 MW.

In 2021, Ukraine generated **3,866 mln kWh of green electricity from wind**. This would be enough to power more than 650,000 households. Moreover,

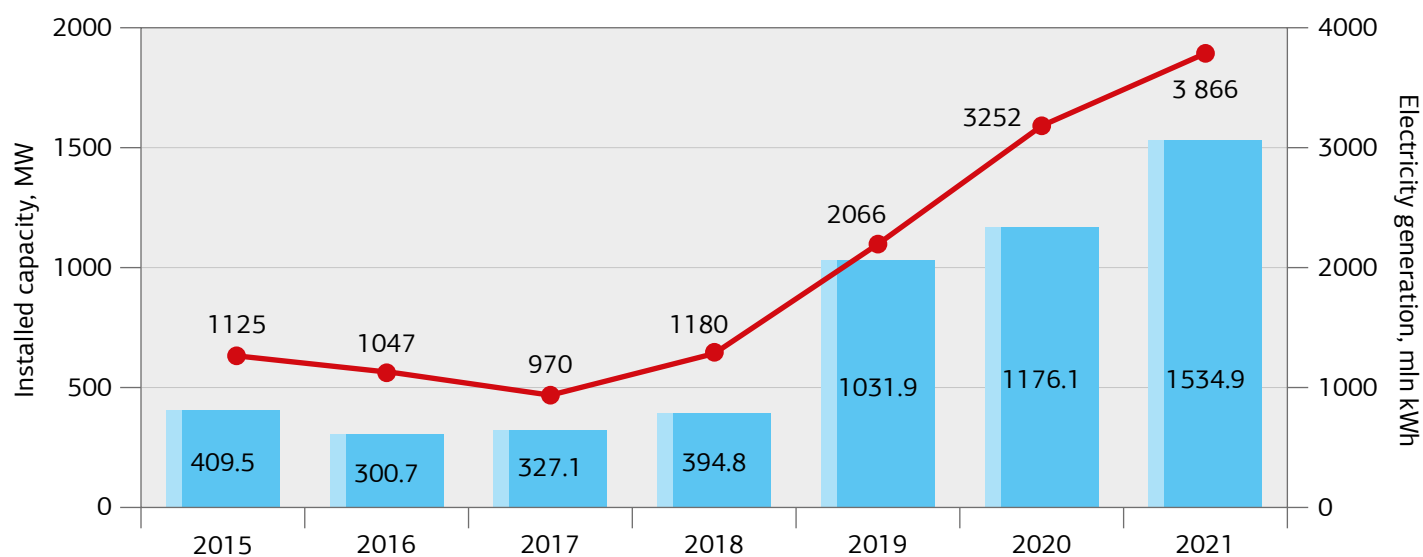
in 2021, wind power helped to reduce CO<sub>2</sub> emissions **by 3,1 mln tonnes** and saved more than **1.8 mln tonnes of coal** or **1,171.4 thsnd m<sup>3</sup> of natural gas**.

Despite the state policy instability, international and national investors are still interested in investing in wind energy projects and improving investment attractiveness and business climate in Ukraine. Thus in 2021, investments in national wind power sector amounted to more than **EUR 500 mln**, that is almost twice less than in the record year 2019 (**EUR 1 bln**).

Apart from attracting investments, the wind power industry continues to be one of the most significant contributors to the state and local budgets of Ukraine. According to a survey carried out by the



**Graph 2.1.5.** The ratio between wind power capacity and electricity generation, mainland Ukraine, 2015-2021



Source: PU UWEA, 2021

UWEA among its member companies, only wind electricity producers' annual tax contribution to the state budget was about **UAH 3,16 bln** (appr EUR 97.8 mln) in 2021.

Employment in wind sector has increased significantly since 2015, with around **1000** full-time employees in 2021, while women account for 28% of

total staff in wind companies. It should be noted that wind energy supplies chain jobs across all regions of Ukraine. The total of individuals involved, directly or indirectly (including machine-building industry, engineering and design, transport, law firms etc) in the country's wind power sector is estimated at more than 3 000 people.



## 2.2. WIND POWER ADDITIONS IN 2021

**Table 2.2.1.** Wind power additions in 2021, MW

#	Wind Power Plant	Wind Power Plant Operator / Owner	Installed capacity, MW	Number & model of WTG	WPP status
<b>KHERSON REGION</b>					
1.	Syvaska WPP / Total Eren	SyvashEnergoProm LLC	144.3	27 x 3.9 MW Nordex N131/3900	in operation
<b>ZAPORIZHZHIA REGION</b>					
2.	Zaporizhzhia WPP	EuroCape Ukraine I LLC	98.01	27 x 3.63 MW GE 3.6 – 137	in operation
<b>ODESA REGION</b>					
3.	Uzhne Energy WPP	Uzhne Energy LLC	76.5	17 x 4,5 MW Nordex Delta 4000	in operation
4.	Dnistrovskia WPP First Phase	Elementum Energy LLC	40.0	10 x 4.0 MW GE 4.0 – 137	in operation
<b>TOTAL:</b>			<b>363.31 MW</b>	<b>92 WTG</b>	

Source: PU UWEA, 2021

Against the background of uncertainty over debts repayment to the RES producers for electricity delivered in 2020 and 2021, continuation of the COVID-19 pandemic and possible changes in RES legislation, the wind power industry of Ukraine continued to increase its capacity, albeit at a slow pace compared to 2019. As already noted in Section 2.1., in 2021 91 new wind turbines totalling 358.81 MW were put into operation in three regions of Ukraine, of which: two wind farms of 40 MW and 76.5 MW – in Odesa region, 98.01 MW – in Zaporizhzhia region and 144.3 MW – in Kherson region.

### ZAPORIZHZHIA WIND PARK

On June 2, 2021, Eurocape Ukraine I LLC, the UWEA Member Company, officially opened the first phase of Zaporizhzhia Wind Park located near Nadezhdyn village in Zaporizhzhia region. Phase I was sponsored by LongWing Energy SCA, VLC Renewables Fund 1 and GE Energy Financial Services.







With an installed capacity of 98.01MW, phase 1 comprises 27 GE 3.6 MW onshore wind turbines with a rotor diameter of 137 m and a hub height of 110 m. The phase 1 will generate enough clean energy to power more than 57,000 households.

Mykhaylo Chulkov, Executive Director of Eurocape Ukraine I LLC: *“Our project is based on three pillars: fiscal, social and environmental responsibilities. Our company is a strict and transparent taxpayer, which creates jobs and fills the local budget. In the last 20 years our company has implemented more than 20 different social projects with a total value of more than USD 1 mln. And the last but not least, we closely co-operate with leading environmental organizations”.*

Eurocape Ukraine I LLC definitely plans to construct the next phases of Zaporizhia Wind Park to achieve its total installed capacity of 500 MW. Once it has been fully implemented, the project is expected to be one of the largest onshore wind power plants in Ukraine, powering approximately 290,000 homes and offsetting 575,000 tonnes of CO<sub>2</sub> emissions per year.

The second phase of the project with capacity of 50-100 MW could be still implemented in 2022, but it is unlikely in view of the complicated foreign-policy situation regarding Ukraine. Notwithstanding this, the company currently negotiates financing of the further phases of Zaporizhia Wind Park and new RES projects in Ukraine with investors. The next phases of Zaporizhia Wind Park are likely to be implemented after new market-based mechanisms to promote renewable generation have been introduced in the country.

#### **FIRST PHASE OF DNISTROVSKA WIND POWER PLANT IN ODESA REGION**

In May 2021, VR Capital Group commenced commercial operation of the 40 MW Phase I of Dnistrov-ska wind power plant. The project comprising 10 GE 137-4.0 MW wind turbines with hub height of 131 m was implemented by Elementum Energy, VR Capital's renewable energy subsidiary, and Ukraine Power Resources, a US renewable energy projects developer. Both companies invested approximately EUR 59 mln into the project.







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Dnistrovsk WPP sits on a plateau that rises above the Dnistrovsk estuary in Ukraine's Odesa region and benefits from an excellent wind resource. The Phase I of Dnistrovsk WPP is expected to generate 146 GWh of electricity per year and avoid annual CO<sub>2</sub> emissions of 115,000 tonnes. Elementum Energy and Ukraine Power Resources are currently in the process of constructing 60 MW Phase II of Dnistrovsk WPP which is anticipated to be commissioned in Q2 of 2022.

Richard Deitz, President of VR Capital Group Ltd. and Chairman of Elementum Energy's Board of Directors, commented: *"It is a tribute to the professionalism of our employees and partners that, in the midst of the global pandemic, we managed to complete Dnistrovsk WPP on time and on budget. Despite the ongoing challenges in the renewable energy industry in Ukraine, we believe that these growing pains will be successfully managed. Green energy is destined to play a growing role in the Ukrainian energy sector. Ukraine has a tre-*

*mendous opportunity in the medium term to transform its role in Europe's energy value chain in line with the European Green Deal principles, and we are committed to supporting this future as a leading foreign investor in the country."*

#### YUZHNE ENERGY WIND PROJECT

Yuzhne Energy LLC completed construction of its 76.5 MW Yuzhne Energy Wind Power plant. The project, construction of which started back in 2020, was fully commissioned in August 2021.

Yuzhne Energy WPP is located near the town of Yuzhne in Lymanyskiy district, Odesa region, and comprises 17 Nordex wind turbines of 4,5 MW capacity with hub height of 125 m and rotor diameter of 149 m. The company also constructed a 35 kV/110 kV substation and 20 km 110 kV transmission line. In addition, 7 km of 4th category road was also constructed within the project, which brings a lot of convenience to the local community.

It should be noted that the project has been slowed down due to the COVID-19 pandemic and the related quarantine caused delays in the construction progress and installation works. All sanitary and epidemiological measures recommended by the Ministry of Health of Ukraine were implemented.

The expected annual clean electric power of the project could support around 44,000 household consumption, and will reduced carbon emissions by approximately 212,000 tonnes, which will contribute to achievement of Ukraine's energy independence and improvement of clean energy ratio.





### SYVASKA WIND POWER PLANT

250 MW Syvaska WPP located in the coastal zone of the lake Syvash, in the south of Kherson region, was fully completed and fully operational in 2021. The project was jointly implemented by Total Eren, France, and Emergy, Norway, with funding from the international financial organizations, including the EBRD.

Syvaska WPP comprises wind turbines of the N131-3.9 model with unit capacity of 3.9 MW and hub height of 120 m and rotor diameter of 131 m, manufactured by Nordex. 37 wind turbines were installed and commissioned in 2020, while another 26 wind turbines were added in 2021. Thus, Syvaska WPP comprising 63 wind turbines with a total installed capacity of 245.7 MW is the largest wind power plant in Ukraine to date.

Syvaska WPP is expected to generate about 860 GWh of electricity per year, enough to power 143,000 household and avoid CO<sub>2</sub> emissions by 680,000 tonnes per year.





## 2.3. POWER SYSTEM OF UKRAINE

The total installed capacity of the Integrated Power System of Ukraine reached 56,169 GW as of the end of 2021, of which thermal power plants accounted for 49,7%, nuclear power plants – 24,6%, hydro power plants and pumped-storage hydroelectric power plants – 11,2%, and renewable power plants including WPPs, SPPs, BioPPs – 14,3%.

Nuclear energy provides over half of total electricity generation in Ukraine. TPPs and CHPs with their 29,2% share were the second in the ranking followed by renewable power plants (8,1%), HPPs and PSHs (6,5%) and block stations (1%).

Ukraine has 15 nuclear power units ensuring baseload for national energy system and operating at four nuclear power plants with a total capacity of 13,835 GW, of which 13 power units have a unit capacity of 1,000 MW, 1 power unit – 415 MW, and 1 power unit – 420 MW. As of the end of 2021, 12 power units have already reached the end of their 30-year design lifespan, and are operating with an extension of another 10 – 20 years. However, the “extended” licenses for 10 power units totaling 9,420 MW will be expired by the end of 2030. In addition, another 1,000 MW will reach the end of their design 30-year lifetime in 2026. Thus, the SE NNEGC Energoatom

would have to further extend the lifespan of the operating power units, which could pose serious technological threats to health and environment. It is necessary to note that in the winter period of 2021-2022, all 15 nuclear power units operated simultaneously for the first time in the history of Ukraine.

Hydropower, with a total installed capacity of 6.3 GW, plays a vital role in the energy mix of Ukraine. The HPPs and PSHs smooth out peaks and night “failures” in electricity consumption. However, these capacities largely depend on seasonal and weather conditions, making their share in the total electricity generation substantially different. It is worth noting that in the second half of 2021, the long-awaited commissioning of the 4th unit at the Dnister HPP with a capacity of 324 MW took place. PJSC Ukrhydroenergo has ambitious plans to construct the 5th, 6th, and 7th units at the Dnister PSH as well. In addition, the company’s plans provide for implementation of two more projects, namely Kaniv PSH and Kakhovka HPP-2 and a project aiming at constructing hybrid systems for electricity production. The grid connection and commissioning of the 3d unit at 160 MW Tashlyk PSH, which was tested at the end of 2021, are scheduled for early March 2022.

**Table 2.3.1.** Installed electricity capacity in Ukraine, by source and per years, GW

YEAR	Total installed capacities	NPP	%	TPP EGC	%	Other TPP	%	HPP and PSH	%	WPP, SPP and BioPP	%
2014	55.1	13.8	25.1	27.7	50.3	6.6	12.0	5.9	10.6	1.1	2.0
2015*	54.8	13.8	25.2	27.8	50.7	6.5	11.8	5.9	10.7	0.8	1.5
2016	55.3	13.8	25.0	27.8	50.3	6.5	11.8	6.2	11.2	1.0	1.7
2017**	51.7	13.8	26.7	24.6	47.5	5.9	11.5	6.2	12.0	1.2	2.3
2018	49.7	13.8	27.8	21.8	43.9	6.1	12.3	6.2	12.6	1.7	3.4
2019	54.4	13.8	25.4	21.8	40.0	6.1	11.2	6.3	11.6	6.4***	11.8
2020	54.7	13.8	25.2	21.8	39.8	6.1	11.1	6.3	11.5	6.6	12.1
2021	56.11	13.8	24.6	21.8	38.8	6.1	10.8	6.3	11.2	8 <sup>1</sup>	14.3

\* Since 2015, without the Crimean electrical system

\*\* Since 2017, without the temporarily occupied and uncontrolled territories in the Donetsk and Luhansk regions

\*\*\* According to the NEURC.

<sup>1</sup> Without 394.8 MW of RES capacity that have been granted FiT, but do not generate electricity and 1205 MW of solar systems for private households

Source: NPC Ukrrenergo, PU UWEA, 2021



**Table 2.3.2.** Dynamics of electricity production in Ukraine, bln kWh

YEAR	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Electricity	▲	▲	▼	▼	▼	▼	▼	▲	▼	▼	▲
	194.947	198.87	194.377	182.815	163.682	155.414	155.414	159.351	153.967	148.854	156.601

Source: NPC Ukrenergo, 2021

The power system of Ukraine is overloaded and its reliability is deteriorating. This is partly due to a lack of maneuverable capacities. Therefore, the thermal power units totalling 21.8 GW initially designed for operation in base modes, are also used to balance the power system. However, only 5-6 GW of heat generation was available during the year as some thermal power units located in the temporarily occupied territories of Ukraine, were decommissioned or mothballed, under planned or emergency repairs, or even suspended its operation due to the lack of fuel, especially during Q4, 2022. Under such conditions, the main capacities to regulate workload are coal units of 150–200–300 MW. Because of excessive use of thermal power plants to balance the power system, equipment wear levels have increased, which in turns resulted in growth in accidents and fuel consumption. At the same time, the overtime operation

of some thermal power plants have already exceeded 270,000 hours on average (*with design life limits of up to 200,000 hours*), which in turns increased the risk of equipment failure.

Moreover, according to the National Plan for Emission Reduction from Large-Scale Burning Plants which aims to gradually reduce emissions of sulfur dioxide, nitrogen oxides, and fine dust from large combustion plants until 2033, Ukraine is obliged to upgrade or shut down a significant part of its thermal generation capacities. If the plan is not implemented until 2033, Ukraine will be forced to stop all the heat facilities under the NERP. According to the NPC Ukrenergo analysis, the installed thermal generating capacity of Ukraine, in this case, would drop to 3,957 MW, of which only 882 MW to be available.

**Graph 2.3.3.** Dynamics and structure of electricity generation in Ukraine, mln

	2020		2021		+/- as compared to 2020	
	Electricity output, mln kWh	Share in total production, %	Electricity output, mln kWh	Share in total production, %	mln kWh	%
<b>Total electricity output including:</b>	148,854.0	100	156,601	100	7,747	5.2
TPPs and CHPs	52,360.8	35.2	45,843	29.2	-6,517.8	-12.4
TPPs	39,562.6	26.6	37,224	23.7	-2,338.6	-5.9
CHPs	12,798.2	8.6	8,619	5.5	-4,179.2	-32.6
HPPs and PHSs:	7,583.5	5.1	10,172	6.5	2,588.5	34
HPPs	6,026.2	4.0	8,879	5.6	2,852.8	47.3
PHSs	1,557.3	1.0	1,293	0.8	-264.3	-16.9
NPPs	76,202.5	51.2	86,206	55	10,003.5	13.1
RES (WPPs, SPPs, BioPPs)	10,862.1	7.3	12,804	8.1	1,941.9	17.8
Block-stations and other sources	1,845.1	1.2	1,576	1	-269.1	-14.5

Source: NPC Ukrenergo, PU UWEA, 2021

Ukrainian combined heat and power plants with a total capacity of 6.1 GW are also in critical condition. According to NPC Ukrenergo, their installed capacity utilization factor does not exceed 24% on average in Ukraine in recent years. Moreover, half of cumulative installed capacity of Ukrainian TPPs and CHPs is maximum available at times of peak loads. In addition, the shortage of coal and the historical increase of natural gas prices have led to the shutdown of a significant part of Ukraine's heat generation units.

In general, all power plants of Ukraine generated 156,601 mln kWh in 2021, which is 7,747 mln kWh or 5.2% more than in 2020. In particular, nuclear power plants increased electricity generation by 13.1% to 86.2 bln kWh, the highest production rate in the last six years. The annual electricity output of HPPs (*ed. with a capacity exceeding 10 MW*) and PSHs also rose to 10.17 bln kWh or up 34% over the previous year, while electricity generation at the TPPs and CHPs was down to 45.8 bln kWh, 12.4% lower than in 2020. Block-stations and other sources produced 1.5 bln kWh of electricity in 2021, 14.5% less than in 2020.

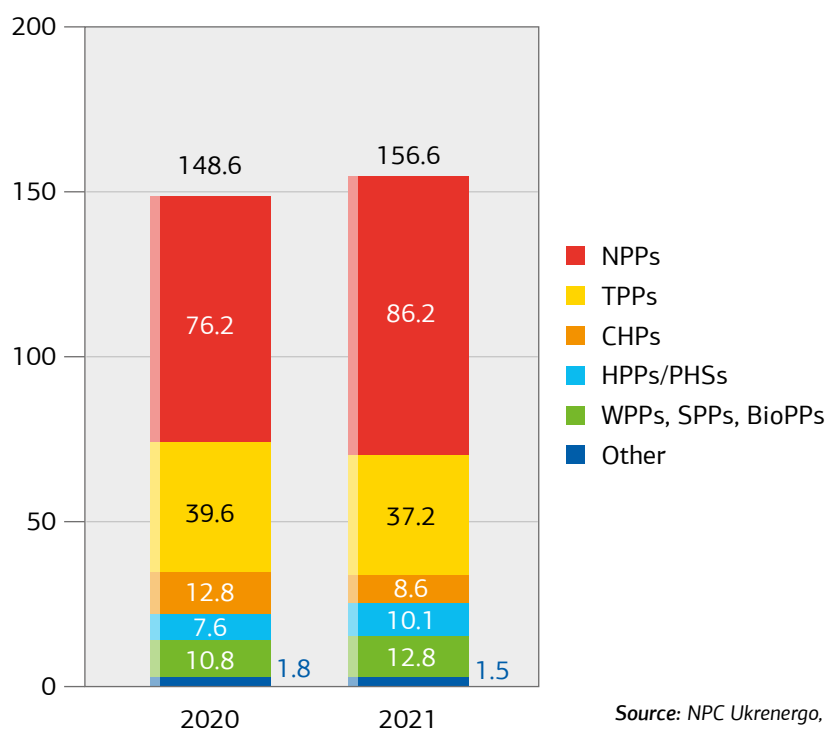
In 2021 RES generation (*WPPs, SPPs, BioPPs, and small HPPs*) significantly increased. Thus, for 12 months of 2021, renewable power plants delivered 12.8 bln kWh of green electricity, 17.8% more compared to the same period of 2020.

In general, nuclear power plants with a 55% share continued to dominate in electricity, followed by TPPs and CHPs which accounted for 29.2%, RES – 8.1%, HPPs, and PSHs – 6.5%, while block stations' share amounted to 1%.

As reported by NPC Ukrenergo, the electricity export of Ukraine in 2021 reached 3,395 mln kWh, which is down by 26.4% or 1,259.1 mln kWh compared to 2020 (*4,741 mln kWh*). Nevertheless, in 2021 electricity exports exceeded electricity imports twice – 3,395 mln kWh against 1,692 mln kWh, respectively. On the other hand, electricity imports to Ukraine from neighboring countries in 2021 decreased by 25% or 592.9 mln kWh.



**Graph 2.3.4.** Structure of electricity production in Ukraine, 2020-2021, bln kWh



The power system of Ukraine is characterized by a predominant share of baseload capacities, while generation capacities to balance the grid (*currently, mainly TPPs*) have already exhausted their park resources. Thus, the Ukrainian power sector remains one of the most inflexible energy sectors in the world with almost complete depreciation of the equipment of the main sources of power supply: nuclear, ther-

mal, and hydropower. New electricity generating technologies based on renewable energy sources could solve the problem. According to NPC Ukrenergo, to accelerate the deployment of renewables and ensure stability of power system, at least of 0.74 GW of energy storage systems and 1.45 GW of high maneuverable capacities are required.



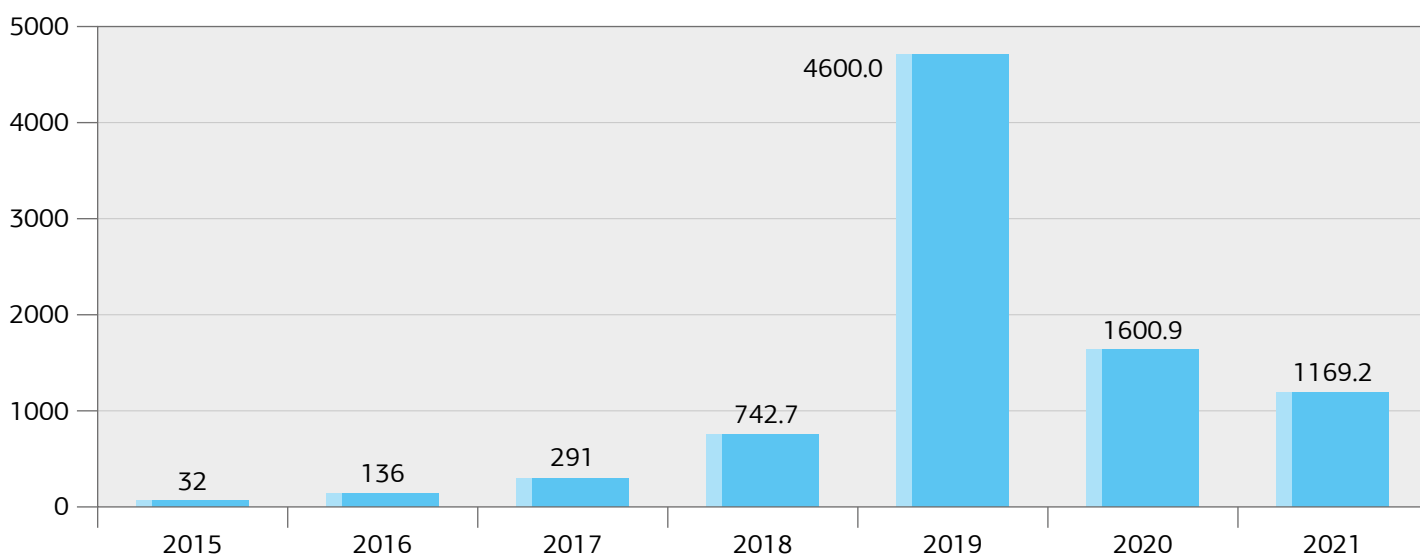
## 2.4. NATIONAL RENEWABLE ENERGY MARKET



In spite of continuing lack of liquidity of the SE Guaranteed Buyer to settle existing debts to the RES producers, uncertainty regarding future support scheme mechanisms and systematic RES generation curtailments, Ukraine's renewable energy sector withstood and even increased its capacity by 1,169.05 MW (*SPPs for private households included*).

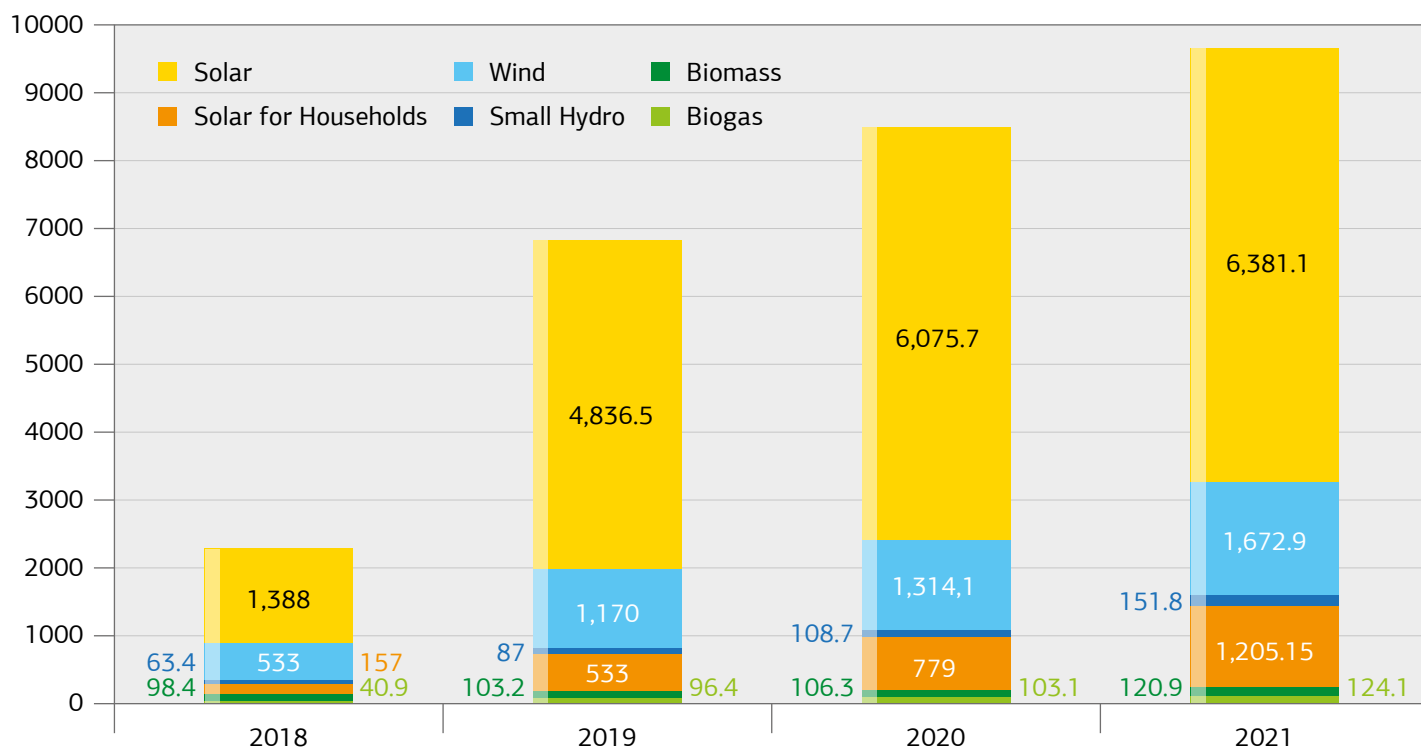
According to the NEURC, the installed capacity of the renewable power sector of Ukraine reached **8,450.8 MW** (*SPPs for private households excluded*) by the end of 2021. However, according to NPC Ukr-energo, only 8,148.5 MW delivered green electricity to the grid. According to the NEURC and the State Agency on Energy Efficiency and Energy Saving of

**Graph 2.4.1.** Annual RES additions in Ukraine, MW



Source: NEURC, PU UWEA, 2021

**Graph 2.4.2. Dynamics of RES capacities, MW**



Source: NEURC, PU UWEA, 2021

Ukraine, 1,169.05 MW of renewable capacities were added in 2021, that is 1.3 times less compared to 2020 (1,660.9 MW) and 3.6 times less than the record year 2019 (4,600 MW). In general, renewable energy capacities in Ukraine reached **9,655.95 MW** (SPPs for private households included).

Like the previous years, the most significant growth was in residential solar PV capacity which expands from 779 MW in 2020 to 1,205.15 MW in 2021. On the contrary, the utility-scale solar power sector demonstrated a poor record on new installations last year with dramatic drop in growth rates. As a result, in 2021 only 305.5 MW of new solar capacity or 26.1% of all RES additions were put online, which is 3.6 times less than in 2020 (1,123.6 MW). As a result, at the end of the year, the total installed solar power capacity amounted to 7,586.35 MW (SPPs for private households included).

At the same time, wind power sector of Ukraine experienced a partial recovery from stagnation last year. The share of wind power farms commissioned in 2021 accounts for 30% or 358.8 MW, that is 2.5 times more than wind power additions in 2020 – 144.2 MW.

The gas crisis at the end of 2021 confirmed the prospects for significant deployment of bioenergy technologies in the country. Last year against the

background of the ever-increasing prices for natural gas, bioenergy showed the ability to cover the shortfall of natural gas to generate heat and electricity. In total, in 2021, biogas plants with total installed capacity of 21 MW (1.7% of total annual RES additions) were commissioned last year, which is twice as much as in 2020, while 43.1 MW of biomass plants (3.6% of total annual RES capacity) were put online, which is double the increase during 2020.

The share of small hydropower capacity commissioned in 2021 amounts to 1.2% or 14.

In terms of annual RES additions Mykolaiv region with 168.7 MW added in 2021 surpassed other regions of Ukraine. Odesa region (149.1 MW) is ranked second followed by Kherson region (145 MW), and Zaporizhzhia region (98.8 MW).

The Top-3 leaders in terms of cumulative installed RES capacity include Dnipropetrovsk region (1,350.06 MW), Kherson region (1,139.65 MW) and Mykolaiv region (1,121.16 MW). These regions account for more than 37.3 % of cumulative RES capacity installed in Ukraine.

As noted in Section 2.3 of this Overview, in 2021 all RES power plants produced 12,804 mln kWh of green electricity, which is 1,941.9 mln kWh or 17.8% more than for the preceding year.

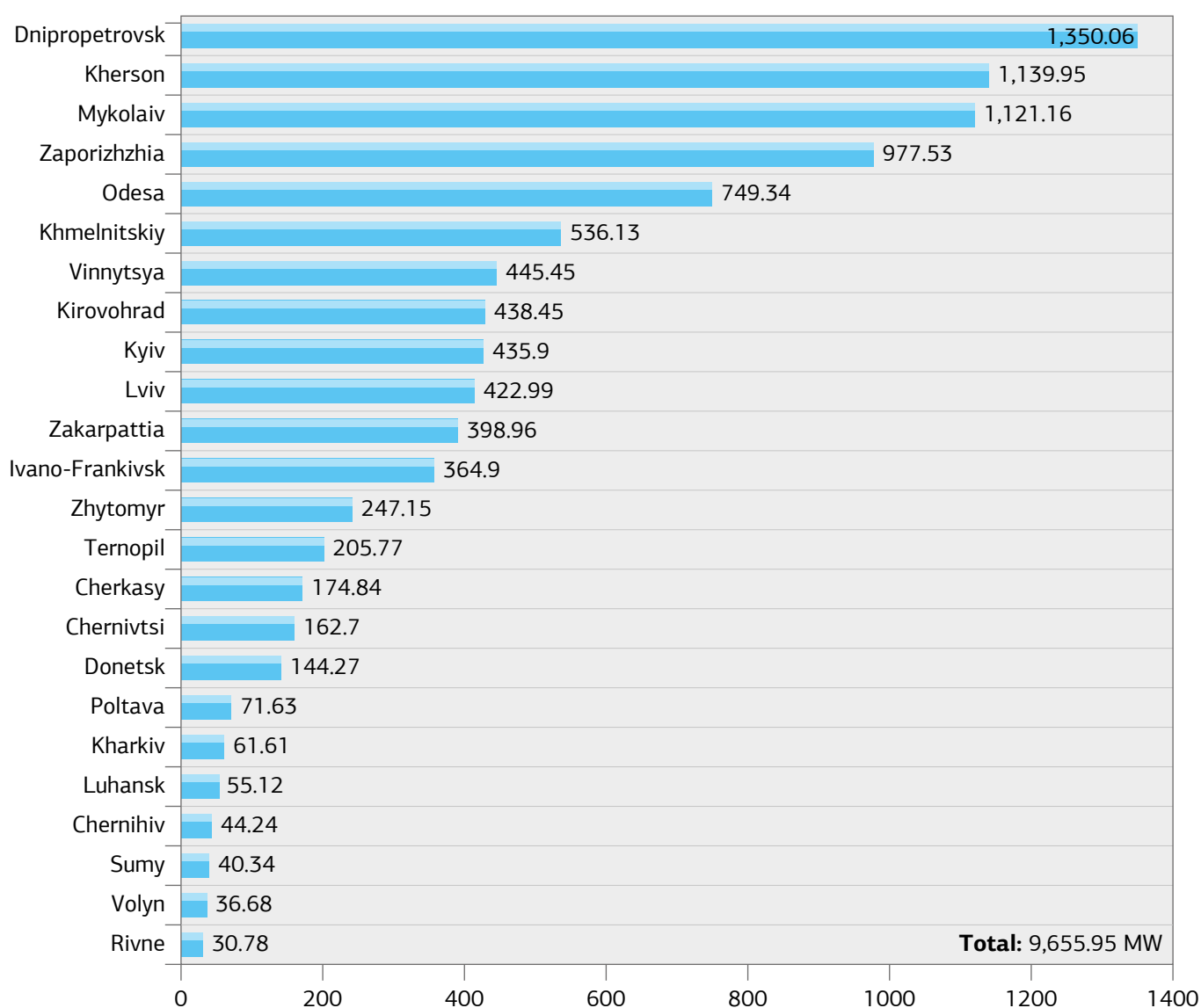
All wind farms in Ukraine generated 3,866 mln kWh in 2021 or 614.4 mln kWh more than in 2020, which accounts for 2.4% of total electricity generation in the country. For 12 months of 2021, SPPs delivered 7 670 mln kWh (4.8% of total electricity output) which is 1,065.4 mln kWh more than for the same period last year. The annual electricity generation at HPPs increased by 56.1 mln kWh to reach 276 mln kWh or 0.17% of the total electricity balance. In 2021, Ukraine's bioenergy capacities generated 992 mln kWh of electricity (0.6% of total electricity output), which is 206 mln kWh more than in 2020.

At the same time, it should be noted that 2021 was a remarkable year for the national RES sector, as on May 11, 2021, for the first time in the history of Ukraine, daily electricity generation from RES exceeded the TPP and CHP generation – 79 mln kWh versus 77 mln kWh.

In addition, according to the Forecast Electricity Balance of the IPS of Ukraine for 2022, an increase in electricity generation from RES by 17.2% up to 14,850 mln kWh is expected in 2022. At the same time, the most significant growth by 43% is projected for wind generation – up to 5,750 mln kWh, for bioTPPs – up to 1,080 mln kWh and solar generation – up to 8.02 mln kWh.

In 2021 NPC Ukrenergo introduced the RES Congestion Management System (*hereinafter – the "System"*) – the software enabling the automation of generating and issuing the dispatch instructions to change the current load of RES generation. The System allows issuing such instructions simultaneously to a large number of power plants. At the same time, it maintains the principles of proportionality and non-discrimination in the application of generation constraints. In order to provide the curtailment

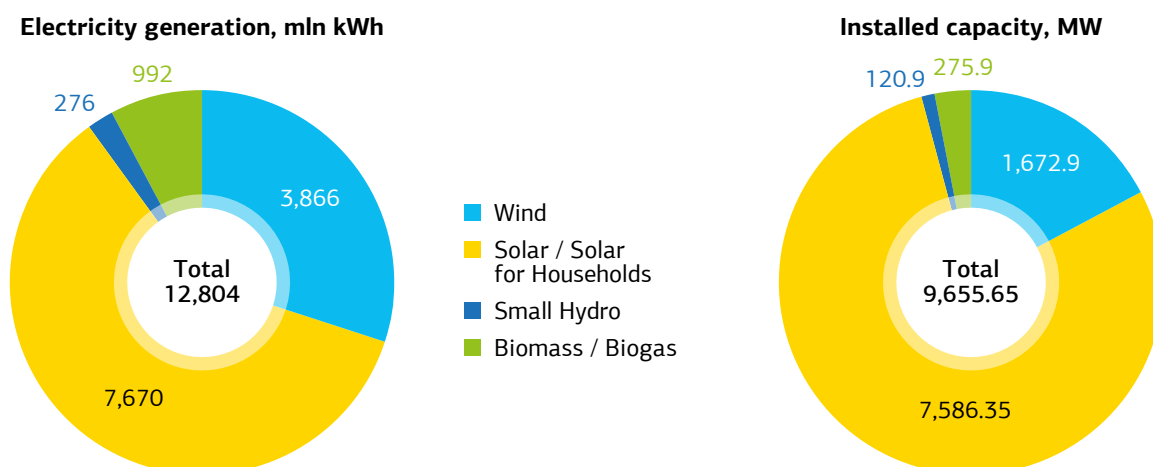
**Graph 2.4.3. Installed RES capacities, per regions, 2021, MW**



Source: the NEURC, SAE, PU UWEA, 2021



**Diagram 2.4.4.** Green electricity generation and RES installed capacities, by source, 2021



Source: the NEURC, SAE, PU UWEA, 2021

services and receive compensation from the TSO for fulfillment of commands to reduce the power load costs for the curtailed electricity (*as provided for by the laws of Ukraine*) a RES producer should be registered in the balancing group of the Guaranteed Buyer and join a curtailment service agreement with NPC Ukrenergo. Otherwise, the TSO will not be obligated to pay compensation for the fulfillment of the dispatcher's commands.

Thanks to successfully implemented renewable energy projects in Ukraine, annual CO<sub>2</sub> emissions have been reduced by more than 10.3 mln tonnes, equivalent to emissions from more than 2.2 mln cars.

However, in 2021 two international arbitration cases against Ukraine were initiated by foreign RES investors due to the Ukrainian Government's failure to fulfill its obligations. In particular, the Lithuanian company Modus Energy, the sole shareholder of three SPP operators – Solar Zalukva, Bolokhiv Solar Park 1 and Bolokhiv Solar Park 2, initiated an arbitration case against Ukraine for retrospective reduction of the FiT of approximately EUR 11.5 mln.

Late October 2021, Belgium's SREW N.V., a co-owner of 100 MW Dnipro-Buzka wind farm, initiated another lawsuit against Ukraine in international arbitration claiming recovery of at least EUR 70 mln.

The claimant states that amendments to RES legislation introduced in summer 2020 (*see Section 2.10.*) violated the state guarantees on protection of foreign investments and stability of RES legislation.

Remarkable, that last year Ukraine adopted quite ambitious renewable energy targets for the next decade. Thus, the National Economic Strategy of Ukraine until 2030 (*March 2021*), provides for 25% RES share in the country's energy balance by 2030. Another strategic documents such as Energy Security Strategy and the Second National Determined Contribution also envisage significant increase in the national renewable energy capacity.

The UWEA expects that several strategic documents to be drafted and approved in the near future, namely: Ukraine's Energy Strategy until 2050, the Decarbonisation Plan, the Integrated National Power and Climate Plan until 2030, the National Renewable Energy Development Action Plan for the period up to 2030, the Hydrogen Strategy of Ukraine until 2030, the Roadmap for the Development of Offshore Wind Power.

## 2.5. SETTLEMENT OF THE DEBTS TO THE RES PRODUCERS

On June 10, 2020, the Memorandum of Understanding on the Resolution of Problematic Issues in the Renewable Energy Industry of Ukraine (*hereinafter – the “MoU”*) was concluded between the Government of Ukraine, the NEURC and two RES industry associations, namely the UWEA and the EUEA.

According to the Memorandum, the debts owed to RES producers in 2020 (*hereinafter – the “historical debt”*) had to be repaid until 31 December 2021 in accordance with the following schedule:

40% of these debts or UAH 8.96 bln to be repaid by the end of 2020, with the remaining 60% set to be paid off during the course of 2021 in equal quarterly instalments (15% or around UAH 3,36 bln). Moreover, State authorities guaranteed full and timely payment for all electricity produced by the RES generators commencing from August 1, 2020.

During autumn and winter 2020, Guaranteed Buyer payments to the RES producers fell behind schedule with an approximately one-month delay.

To pay off the debts to the RES producers accumulated in 2020 and 2021, NPC Ukrenergo obtained loans from state-owned banks and issued Green and

Sustainability-linked Eurobonds. However, the anticipated repayment target by the end of 2021 was not met. As of December 31, 2021, SE Guaranteed Buyer paid only 83,5% for the total RES electricity deliveries in 2021.

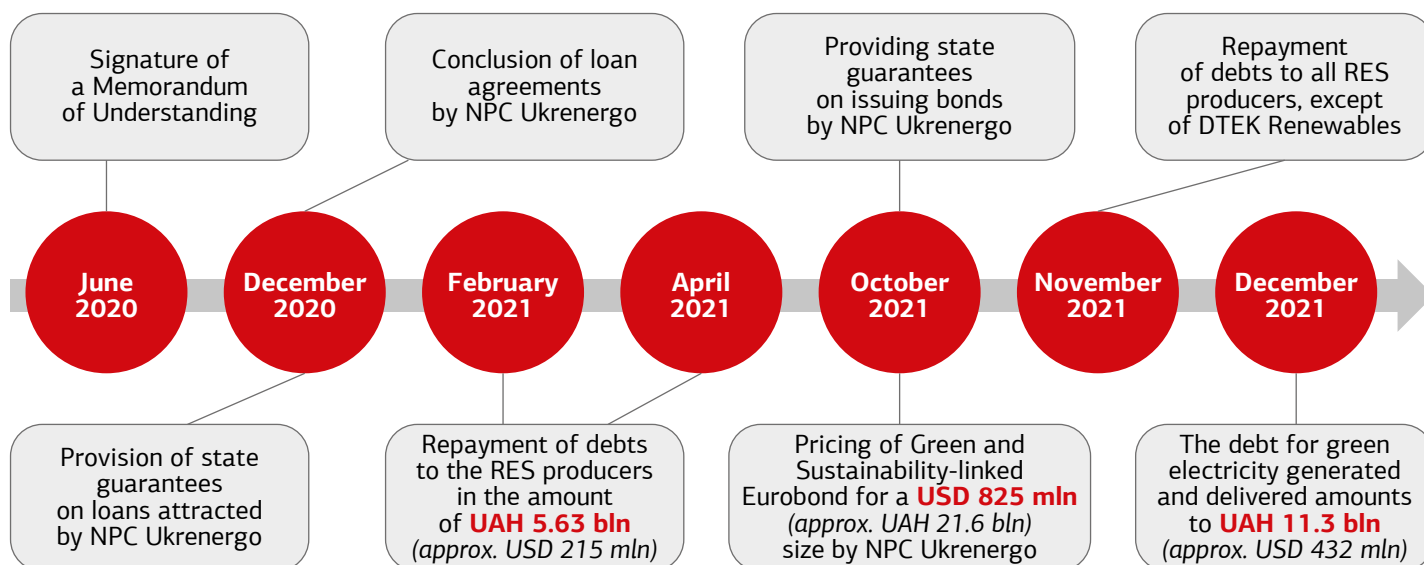
### 2.5.1. LOAN AGREEMENTS

In accordance with the Law of Ukraine “On the State Budget of Ukraine for 2020”, on December 9, 2020, the Cabinet of Ministers of Ukraine by its Resolution №1208 approved the provision of state guarantees for NPC Ukrenergo to attract loans from state-owned banks to pay off its debts to SE Guaranteed Buyer. On December 31, 2020 NPC Ukrenergo signed loan agreements for a total amount of UAH 10.25 bln with three state-owned banks, including:

- UAH 5 bln from Oschadbank JSC;
- UAH 4 bln from JSC Ukreximbank;
- UAH 1.25 bln from JSB Ukrgasbank.

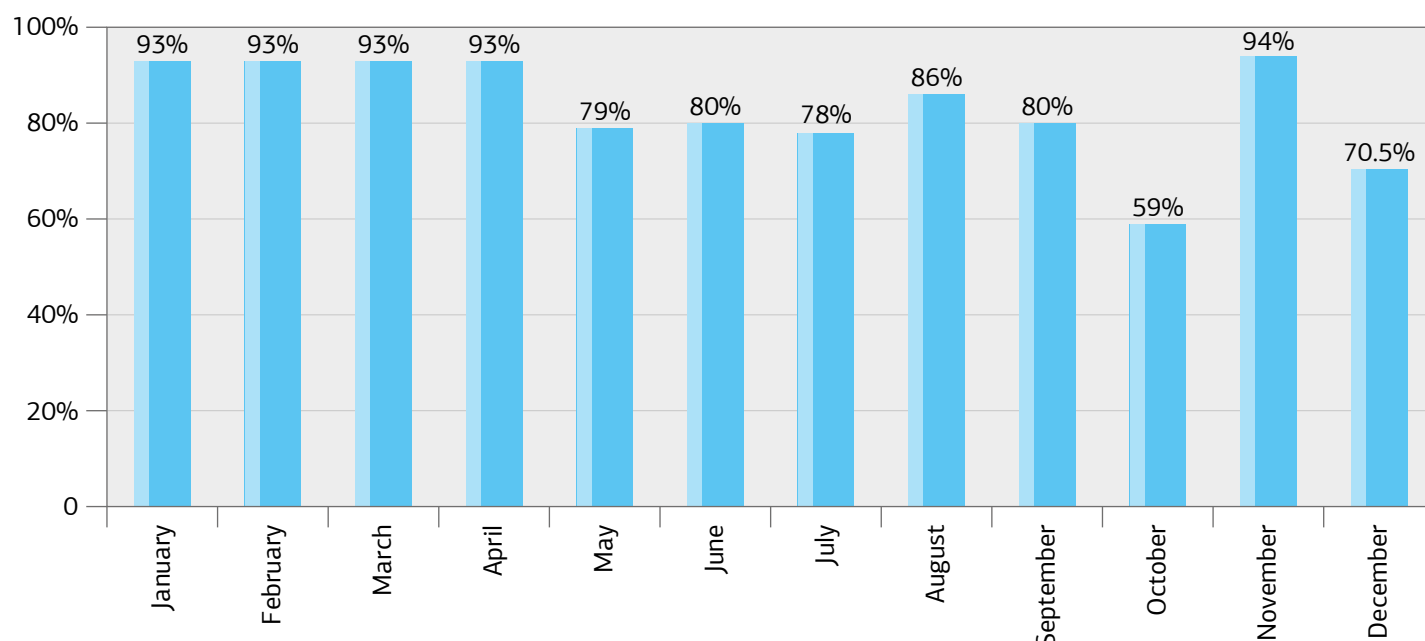
However, despite the expectations of the RES producers, they received only half of this amount. According to the NEURC’s “instruction” the remainder was distributed to SE NNEGC Energoatom and Ukgidroenergo, which had also suffered losses due to public service obligations and low household rates.

**Figure 2.5.1. Chronology of debt repayment to RES producers in 2021**



Source: PU UWEA, 2021

**Graph 2.5.2.** Payments to RES producers in 2021, by month



Source: SE Guaranteed Buyer, 2021

### 2.5.2. GREEN AND SUSTAINABILITY-LINKED EUROBONDS

In October 2021, the Cabinet of Ministers provided NPC Ukrenergo with the state guarantees of up to UAH 22.8 bln for the issuance of Green and Sustainability-linked Eurobonds (*hereinafter* – “Eurobonds”) to repay debts for electricity produced from renewable energy sources. On November 3, 2021, NPC Ukrenergo announced the placement of USD 825 mln debut 5-year Eurobonds at 6.875% yield. The Eurobonds were issued under irrevocable and unconditional state guarantees. The “Use of Proceeds” section of the Eurobond Prospectus states that “an amount equal to the amount of funds received from the Bond issue will be used to finance or refinance, in whole or in a part, the identified Green Projects” described in the Issuer’s Green and Sustainability-Linked Bond Framework.

In November 2021 NPC Ukrenergo transferred to SE Guaranteed Buyer about UAH 19.5 bln (*appr. USD 745 mln*) to pay off historical debt using the funds received from the issue of Eurobonds. By the end of 2021, the issue of non-payment for electricity supplied in 2020 was fixed for all but one power producer – DTEK Renewables. In late December 2021 – January 2022, SE Guaranteed Buyer finally paid off UAH 3.04 bln (*appr. USD 116 mln*) debt owed to DTEK Renewables’ companies.

But even the borrowed funds from state bank loans and issue of Eurobonds turned out to be insufficient to repay all debts to the RES producers accu-

mulated in 2020-2021. Despite of fully settlement of historic debt to the RES generators, SE Guaranteed Buyer still has payment arrears for electricity deliveries in 2021.

In December 2021, the National Securities and Stock Market Commission admitted Green Eurobonds of NPC Ukrenergo to circulation in Ukraine. For the first time, Green Eurobonds became available in the domestic market.

### 2.5.3. REASONS FOR FURTHER ACCUMULATION OF DEBTS TO THE RES PRODUCERS

The main reason for the accumulation of debts to the RES producers is the insufficient transmission tariff, which by law should “cover the economically justified costs of the Guaranteed Buyer to fulfill special obligations for the purchase of electricity at green tariff”.

To benefit from the green tariff, producers must participate in the electricity market and sign contracts with a state enterprise Guaranteed Buyer buying and selling electricity on a “day-ahead” basis. The electrical power is then sold by the SE Guaranteed Buyer on the wholesale market at the market price, and the difference between the green tariff price paid by SE Guaranteed Buyer and the market price is compensated by another state enterprise – NPC Ukrenergo. This compensation is part of the electricity transmission tariff paid by the transmission system end users.



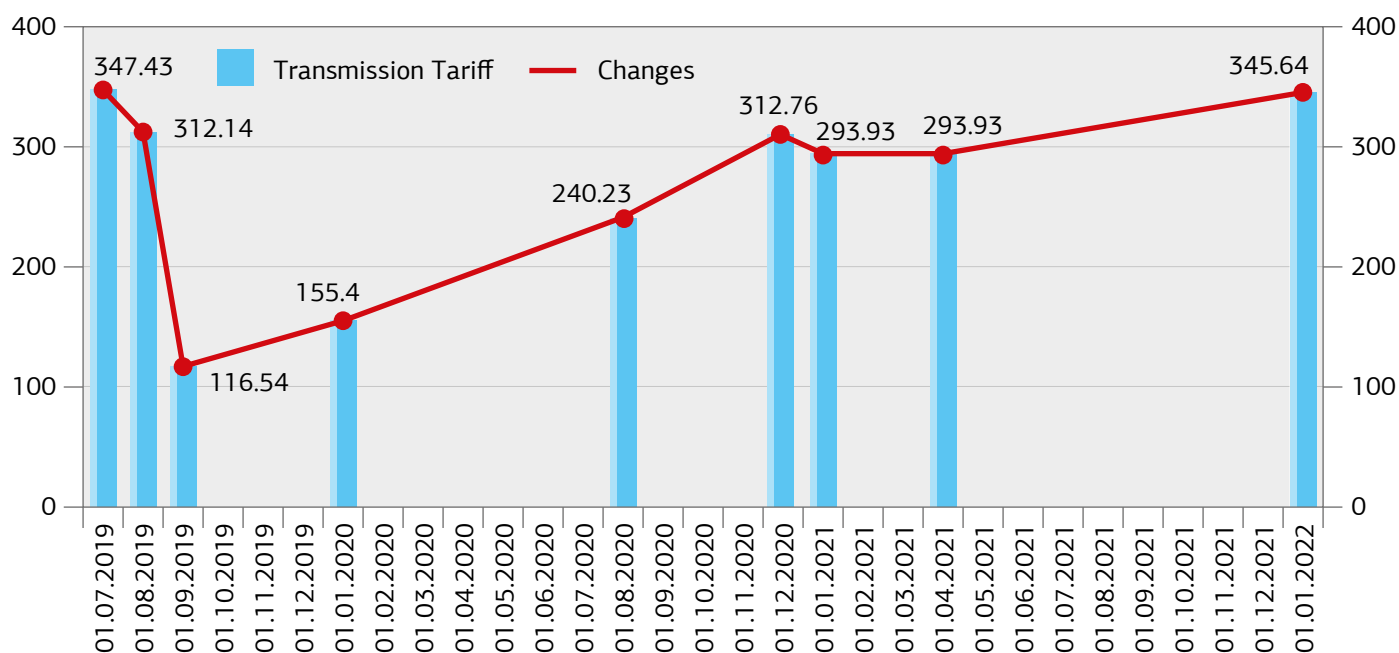
In November 2021, the NEURC held its public meetings to approve tariff for electricity transmission services by NPC Ukrenergo for 2022. It should be noted that the NEURC rejected to include costs to cover 20% of projected volumes of green electricity generation in 2022 to the tariff, claiming that such decision was in line with Law of Ukraine “On Alternative Energy Sources” and that 20% of the projected volumes of green electricity generation in 2022 should be covered by funds from the State budget.

In early December 2021, the Law of Ukraine “On State Budget of Ukraine for the year 2022” was adopted by the Verkhovna Rada of Ukraine. According to the clause 3 of the Final Provisions of this Law, in 2022 paragraph 3 of Article 8 of the Law of Ukraine “On Alternative Energy Sources” is suspended. It means that there are no allocations in state budget for the financial support of the SE Guaranteed Buyer to pay for electricity generated from RES

in the amount of not less than 20% of the forecasted marketable products of electricity generation from RES.

After an official publication of the Law of Ukraine “On State Budget of Ukraine for 2022”, the UWEA addressed Valeriy Tarasiuk, Head of the NEURC, and Volodymyr Kudrytskiy, Chairman of the NPC Ukrenergo Board, regarding the revision of the earlier approved electricity transmission tariff for 2022. In its Letter, the UWEA requested the national authorities to ensure the full recovery of the costs of NPC Ukrenergo related to “increase of the share of electricity produced by alternative energy sources, excluding private households”. To ensure stable revenues for timely payments to producers of electricity from renewable sources, tariff increase is an inevitable step in securing payments to the RES producers in the future.

**Graph 2.5.3. NPC Ukrenergo Transmission Tariff, UAH**



Source: NEURC, 2022

## 2.6. FEED-IN TARIFF AND STATE AID

On February 2021 NGO “Council for protection of competition and consumers” acting as the League of Antitrust (*hereinafter – the “League”*) applied to the Anti-Monopoly Committee of Ukraine with the complaint under the Law of Ukraine “On State Aid for Business Entities” regarding qualification of the feed-in tariff as illegal state aid for the RES producers.

In its complaint the League admitted the current RES support scheme to be illegal state aid because of using the state resources (*funds of the state-owned entities SE Guaranteed Buyer and NPC Ukrenergo*) for the benefit of RES producers granting them with the advantages over the other electricity producers.

Therefore, the League asked AMCU to declare the FiT as the inadmissible state aid and order to suspend the payments under the FiT for the time of the relevant investigation.

In course of consideration of the complaint brought by the League, the AMCU requested the relevant positions from the Ministry of Energy, NEURC and leading associations of the RES producers.

The Ministry of Energy and NEURC in their statements have informed the AMCU that the FiT support scheme to their belief does not constitute the state aid in accordance with the applicable law. Indeed, the RES industry associations, namely, UWEA, UARE, EUEA and ASEU provided the AMCU with the detailed explanations on this matter. According to the associations’ experts, the FiT could not be qualified as state aid, as:

- the funds used for the payments to the RES producers are not allocated from the state/ local budgets and do not affect the balance of the relevant budgets;
- the funds for the FiT-related payments are de-facto funds of the electricity consumers;
- the State does not possess effective control over the FiT-related funds, and NPC Ukrenergo and SE Guaranteed Buyer does not have full discretion and power of disposal of the FiT-related funds otherwise than for the payments to the RES producers.

In addition, with regard to the fact that the AMCU is obliged to apply the EU acquis and caselaw of the CJEU, the associations supported their statement with the CJEU judgement in case C-405/16 P (*Germany v. European Commission*) regarding (non)qualification of the German renewable energy support scheme under EU state aid legislation.

Subsequently, the associations demonstrated proactive approach in cooperation with the AMCU and the Ministry of Energy and ordered the legal opinion from the expert in EU state aid regulation – Professor Leigh Hancher (*Florence School of Regulation*) where the LCF Law Group acted as the local counsel on the matters of Ukrainian law.

The research results were presented to the representatives of AMCU and the Ministry of Energy in September 2021.

In addition to the previous argument regarding the absence of the state resources in the FiT support scheme, the authors of the research admitted that:

- the elements of the FiT support scheme could be qualified as the PSO under Altamark criteria, and therefore such mechanism could not be treated as one to provide the advantages to the RES producers over other participants at the electricity market;
- Ukrainian FiT mechanism did not create risks to impair the competition at the electricity market as the RES producers did not make direct sales at the organized electricity market segments.

The full text of the report was provided to the Ministry of Energy and AMCU for taking the relevant decisions and for subsequent development of the perspective RES support schemes such as feed-in premiums, contracts for difference and green certificates.

Currently, the associations with their experts are keep monitoring of the regulatory developments on this matter and are ready to cooperate and assist the Ministry of Energy and AMCU to ensure compliance of the national renewable energy legislation with the applicable EU acquis standards and avoidance of any infringement to the interests of the RES investors in Ukraine.

## 2.7. HYBRID RENEWABLE POWER PLANTS

Compared to traditional generation, which significantly depends on fuel prices, causes environmental pollution, and increases the country's power dependence, the use of renewable energy sources has several advantages. However, there are no superior technologies. Moreover, intermittent nature of wind and solar power, sometimes called “the Achilles heel” of these technologies, hinder their widescale deployment. As the share of variable renewables in power grids increases, more maneuverable capacities in the energy system are required.

There are two ways to balance the power system: to balance the system with of maneuverable generating capacities and power storage systems; or to balance the green electricity generation by using hybrid renewable power plants. The latter is becoming increasingly common globally. Australia and India are currently the world leaders in implementing hybrid renewable power projects. The government of India has even set up hybrid-specific auctions.

Thus, different types of renewable energy sources such as hydro, solar, wind, biofuel, or even geothermal, could be put together to provide more stable power output overtime. Even during a “failure” period for one type of renewable energy source, for example, solar at night, the total power output will be stable due to another renewable energy source, for example, wind or biofuel. Moreover, power storage systems are often used in such system to increase the reliability of the power plant and provide auxiliary services to the power system (*balancing, flatter power generation profile, etc*).

There are a number of different hybrid renewable power plants configurations and designs depending on their functionalities: for the internal electricity consumption by the enterprise or for electricity supply to the regional or national grids. Appropriately configured Hybrid renewable power plant guarantees a high level of reliability and security of electricity supply, which is critical in Ukrainian realities.

Hybrid renewable power plant consists of two or more RES technologies combined into a single system.

When wind and solar resources are complementing at the site is the most commonly used configuration. Generally, there are several types of hybrid renewable power plants configuration. Let's consider two of the most popular designs.

The first configuration provides for wind and solar to share the same grid connection and substation. The second design offers integration of solar panels with wind turbines which leads to avoiding separate converter for the SPP (*the cost of which reaches up to 10% of capital costs of SPP*). In addition, the combination of technologies allows more efficient utilisation of a converter.

Both configurations significantly reduce capital and regular operation and maintenance costs compared to wind and solar plants located separately. According to the AECOM, the international engineering company, the combination of several types of green generation results in reduction of capital costs from 3% to 13% and operational costs – from 3% to 16%.

Overall, developers of Hybrid renewable power plant can obtain benefits within the development and permitting process as well as for the operation and maintenance of the plant. In terms of permitting, the advantage of such power plant is that only a single grid connection needs to be set up or upgraded.

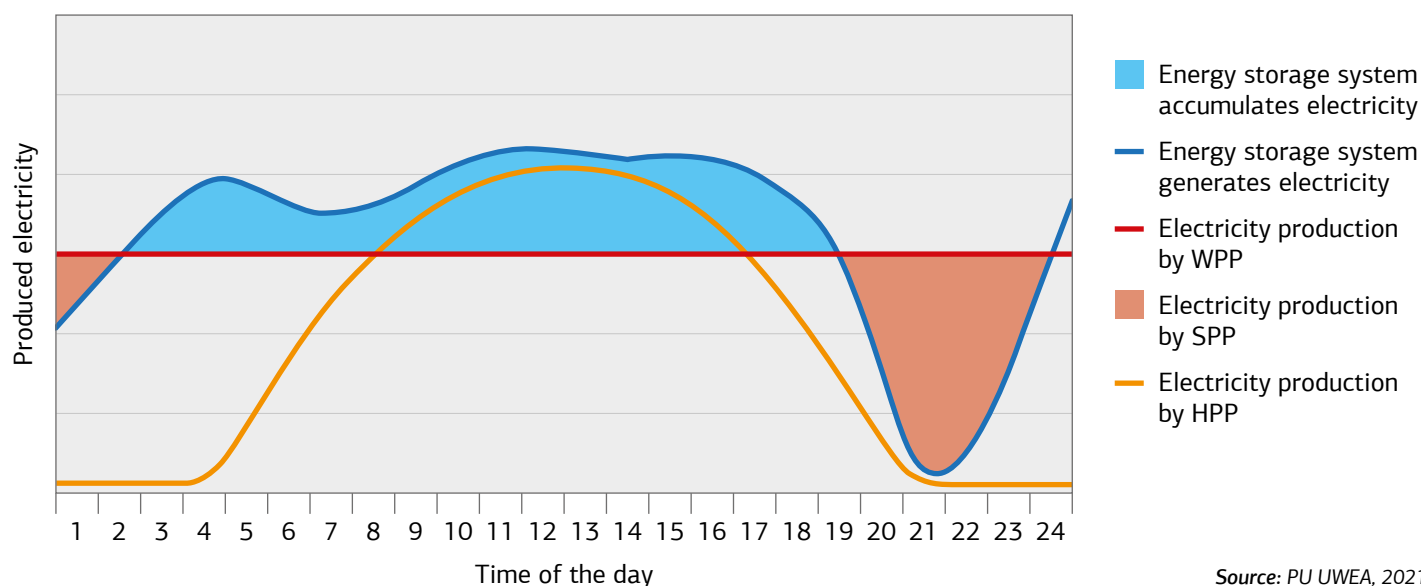
For example, according to Arena, the Australian Renewable Energy Agency, the construction of the 10 MW Gullen Range SPP in Australia on the territory of the already operating 165 MW wind farm, cost about USD 5 mln less than the construction of the new separate SPP. At the same time, the ParcCynog Hybrid Power Plant construction in Wales led to 10% savings in CAPEX only due to one power infrastructure sharing.

Nevertheless, there are some challenges in operating hybrid renewable power plants.

First of all, the lack of familiarity with hybrid projects on the part of grid connection and accounting for electricity generation could become a real challenge for the state authorities as these issues have not been yet considered in Ukraine. This is especially the case when an existing power plant is “hybridised” and one of the existing RES installations has been



**Figure 2.7.1.** Operating principle of hybrid renewable power plant (wind, solar and energy storage) within 24 hour period



Source: PU UWEA, 2021

delivering electricity at green tariff. The problem related to a transparent metering of the individual technologies' energy flows could arise.

Hybrid renewable projects' critics also argue that such a close neighborhood causes a significant decrease in the solar panels' effectiveness due to the shadow casting from the wind turbine. However, according to the study by Berlin Reiner Lemoine Institute, the average PV panel efficiency reduction will reach only 1-2%.

Despite this, Ukrainian realities confirm several strategic advantages of Hybrid renewable power plant compared to the generating facilities, using only one type of renewable energy source. First of all, it's the ability to provide a predictable and stable generation. After leaving the balancing group of the SE Guaranteed Buyer, an operator of the Hybrid renewable power plant will have much better opportunities to sell electricity, both in all market segments and through the conclusion of corporate PPA.

Hybrid renewable power plant is also efficient in reducing imbalances for which RES generators have 100% financial responsibility commencing from 1 January 2022 according to the Ukrainian legislation. The controlled and predictable generation also helps to reduce electricity curtailments and build a long-term efficient business model.

It is also worth noting the importance of Hybrid renewable power plant for green hydrogen production since stable power generation is crucial for the long-term power supply to electrolyzers thus increasing and improving the efficiency of hydrogen production. For example, the Massachusetts Institute of Tech-

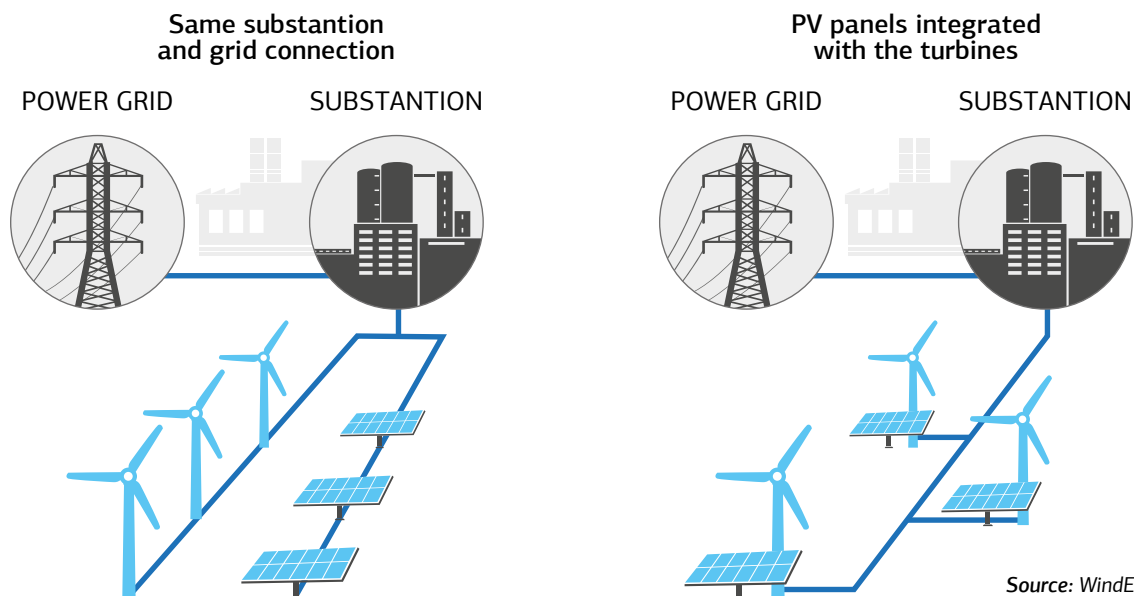
nology study shows that the Hybrid renewable power plant in Southern Europe comprising wind and solar capacities, delivers electricity for 70% of the time.

But the actual range of opportunities for hybrid renewable power plants is opened in the context of the introduction of a carbon border adjustment mechanism. Under such conditions, the electricity generated at the Ukrainian thermal power plants will become uncompetitive in the EU markets. Moreover, in the future, the EU plans to extend the scope of the CBAM to indirect emissions and to more products down the supply chain. This is particularly relevant for Ukrainian enterprises producing metallurgical products, mineral fertilizers, and cement, that are also subject to CBAM regulation. The isolated operation mode of renewable hybrid power plant, with purpose to cover their own electricity demand, offer several advantages for such enterprises as they can fully meet their hourly electricity demand through controlling the electricity generation schedule. Thus, these companies, consuming green electricity, will be free from the possible additional taxation of their products, which in turn, will increase their competitiveness in the European market.

The hybrid renewable power plants also offer benefits to the system operator as it eases balancing issues. Hybrid renewable power plants help system operator to balance the grid by ensuring predictable and stable power generation through the use of own resources for balancing.

The current Ukrainian legislation does not design for hybrid renewable power plants. Though this technology with several renewable energy sources integrated into one power facility is relatively new,

**Figure 2.7.7.** Integration and operation of different generating modules



it becomes relevant to clearly establish it in the regulatory framework. For example, Poland and Greece have recently fixed hybrid renewable power plants in their national legislations, while this process is still in progress in most European countries. To implement hybrid renewable power projects in Ukraine the following actions are required:

- a clear regulatory framework starting with the definition of the Hybrid Renewable Power plants should be elaborated;
- procedures related to grid connection and operation of Hybrid renewable power plant need to be standardized and formalised.

The relevant regulatory framework is required not only for new hybrid renewable power plants but also for the existing RES facilities to be “hybridised”.

While promoting RES deployment, the hybrid renewable power plants offer solutions to the current problems related to balancing power system.

## 2.8. DISTRIBUTED POWER GENERATION

### 2.8.1. WIND INSTALLATIONS FOR HOUSEHOLDS

According to the UWEA experts' assessment, small and medium-sized wind power generating systems (*wind turbines range in size from 20 to 500 kW*) have pretty good perspectives in Ukraine. However, in 2021 this segment of the national wind power market developed relatively slowly.

The significant increase in prices for energy carriers, power outages and sometimes lack of electricity grid, encouraged the consumers' interest in small and medium-sized solar and wind installations to power their homes, farms and small private facilities. However, the grid-connected residential solar systems, which deliver electricity at the green tariff, remained the leading position in this segment of RES market in 2021. At present, there are almost 40 thsnd residential solar systems installed in Ukraine. According to the State Agency on Energy Efficiency and Energy Saving of Ukraine, the total capacity of household power systems in Ukraine reached 1,205.15 MW at the end of 2021 with more than 426.15 MW added in just one year.

The main barriers to more rapid deployment of small wind turbines include their higher capital costs, much lower FiT compared to residential solar power systems, and more complicated installation and maintenance process.

Small wind power generation is unlikely to become a profitable business or completely replace the central power supply. However, experts note significant advantages of small and medium-sized wind power generators. Small wind turbine is the best option for remote "off grid" locations or in the periods of seasonal "drop" in solar generation. The wind power system provides the owner with free renewable resource, reduces the customer's dependence on the power supply system and solves problems with unstable voltage.

The main disadvantage of solar power generation is its dependence on such factors as time of the day, season and weather. Solar energy could only be harnessed for various activities during the daytime when there is ample sunlight available. In winter the solar

power system operates at 10-15% of its summer potential. Therefore, solar power storage or batteries are often used to increase effectiveness of the solar power system. In Ukraine, a budgetary lead-acid battery with a relatively short service lifespan is mainly installed at households. However, even more expensive lithium-ion batteries are not able to provide full solutions to the shortages of energy in winter; they still need a backup energy system for charging. Combined wind-solar generating system could be a real solution. In a typical wind day, a 0,8 kW wind turbine produces as much energy as a 20-25 kW solar system generates.





In 2019 Ukraine witnessed essential legislation changes concerning small wind power generation. By amendments to the Law “On Alternative Energy Sources” the government increased the capacity of small wind system for households to 50 kW and set FiT rate at 11,63 eurocents per kWh, while for electricity delivered by residential solar installation with a capacity of less than 30 kW, FiT rate amounts to 18,09 eurocents per kWh. In addition, the category of “combined wind-solar generating system” with a fairly good FiT rate at 16.37 eurocents per kWh was introduced. These legislative changes were supposed to accelerate the development of more balanced solar + wind systems to generate electricity during the year, regardless of the season. Unfortunately, the Government’s plans to promote combined wind-solar generation have so far proved to be declarative. Although the Verkhovna Rada of Ukraine voted to introduce combined wind and solar systems for households as early as the end of April 2019, the NEURC approved the tariff for combined systems only in August 2019. Further 25% drop in FiT rate for combined wind-solar generating system for private households to 12.28 eurocenters per kWh negatively affected the sector. According to the UWEA experts, the delay in introducing FiT coupled with a significant tariff reduction made the use of wind generators in the combined wind-solar generating system economically unattractive. Therefore, today, consumers are not in a hurry to register their residential wind and solar installations as “combined wind-solar generating system” since the FiT for such systems is much lower than for the residential solar one.

Unfortunately, there is no official statistics on off-grid small or medium-sized wind turbines in Ukraine. Only those solar and wind installations for residential applications that have been granted FiT are included in the official statistics.

According to the report by the State Agency on Energy Efficiency and Energy Saving of Ukraine there are only 4 small wind turbines and 8 combined wind-solar generating systems totaling 0,321 MW installed in Ukraine by the end of 2021. However, thousands of households have been already using wind and solar power systems to cover their own consumption, according to the companies specialized in small wind installations. While total annual generation by small wind turbines operating under FiT reached only 1,639 kWh, combined wind-solar generating systems generated 163,148 kWh in 2021.

However, given the expected rising electricity prices and poor state of power grids in Ukraine, the UWEA experts and owners of residential power generating systems assess the market for such systems as quite complex but promising.

## 2.8.2. WIND TECHNOLOGIES FOR SMALL AND MEDIUM-SIZED ENTERPRISES

The small and medium business segment is another promising market for using wind power technologies in Ukraine. A continuously rising electricity prices (*ed. in 2022, prices are expected to rise further*), has forced the entrepreneurs to look for alternatives

**Table 2.8.1.1.** Small wind turbines and combined wind-solar generating systems at FiT, as of 31 December 2021

Region	Wind turbines		Combined wind-solar generating systems	
	Amount	Installed capacity, MW	Amount	Installed capacity, MW
Total	4	0.057	8	0.264
Volyn	1	0.02		
Dnipropetrovsk	1	0.03	1	0.05
Donetsk			1	0.0242
Zakarpattia	1	0.004		
Kirovohrad			1	0.05
Mykolaiv			1	0.05
Sumy			1	0.05
Ternopil			2	0.01
Kherson	1	0.003		
Kyiv			1	0.03

Source: SAE, PU UWEA, 2021



to a centralized power supply. In view of the fact that the seasonality of electricity consumption at enterprises coincides with the seasonality of wind electricity generation (*there is an increase in both electricity consumption and wind power generation in winter time*), wind power becomes an economically and environmentally suitable alternative to the expensive electricity. Increasing interest in wind power technologies among representatives from small and medium-sized enterprises in 2021 indicates the potential for this wind market segment in Ukraine.

Zboriv Poultry Factory in Zboriv town in Ternopil region is a good example of deploying wind power technology to power medium-sized enterprises. In 2018-2019, three Vestas V-47 wind turbines with a unit capacity of 660 kW each were installed at the poultry factory. At present, the green power is supplied also to the Zboriv local community.

During 2022 the UWEA expects at least 20 MW of new wind turbines to be installed in Ukraine by enterprises to cover their electricity consumption. Remarkable, the geographic scope of such small and medium business with off-grid wind turbines includes different regions of the country, from the west of Ukraine to Mariupol. Such wind turbines of up to 2 MW would generate environmentally clean electricity under market mechanisms without any FiT.

## 2.9. WIND ENERGY AND GREEN HYDROGEN

On 10 December, 2021, the scientific journal *Energies* published an article “Legal regulation of hydrogen in Germany and Ukraine as a precondition for energy partnership and energy transition”, prepared by Maryna Hritsyshyna, Member of the UWEA Board, Counsel at Sayenko Kharenko and Nataliia Hutarevych Senior Associate at Sayenko Kharenko.

The article contains a detailed analysis of the legal regulation of green hydrogen production in Germany and Ukraine and the possibility of green hydrogen production to increase the flexibility of Ukraine’s energy system.

In order to understand the perspectives for the implementation of hydrogen projects in Ukraine and identify key barriers, the UWEA conducted a survey among its companies-members in September 2021 addressing green hydrogen production. The survey featured nine companies, including leading wind electricity producers, one wind turbine manufacturer and several consulting companies.

The questions to the respondents concerned the following main issues:

- the impact of green hydrogen development on renewable capacities growth;
- perspectives of green hydrogen projects performance by the respondents;
- potential of green hydrogen projects to become rationale for the implementation of RES projects under market conditions;
- development of regulation for implementation of hydrogen project in Ukraine.

In order to clarify the participants’ vision on the German-Ukrainian Energy Partnership, the questionnaire included a question on the possible consequences of cooperation with Germany for Ukrainian business entities in the framework of the energy partnership.

Almost all respondents confirmed promising prospects for green hydrogen projects to increase renewable capacities in Ukraine.

Each company has its own motivation to produce green hydrogen. Some companies consider green hydrogen as a priority area for innovation, while others believe that green hydrogen will significantly increase

the demand for green energy, especially wind power, to produce hydrogen for consumption in Ukraine and abroad. It should be noted that more than half of the companies participating in the survey plan to implement green hydrogen projects.

At the same time, the UWEA member companies mentioned obstacles to increasing renewables for the Ukrainian hydrogen projects. Among the main barriers the participants of the survey mentioned the following:

- legal and political framework;
- lack of corporate renewables PPAs and RES auctions;
- lack of technical regulations for hydrogen, transmission fees and regulation for customs regulations;
- lack of proper state planning of green hydrogen development;
- uncertainty regarding potential consumers and prices;
- lack of Guarantees of Origin;
- lack of strategy and infrastructure.

At the same time, not all companies consider hydrogen projects a rationale for implementation of renewable projects under market conditions, claiming high prices for green hydrogen and concerns regarding the sufficiency of a market-based approach. For this reason, most respondents mentioned the importance of a supportive scheme for green hydrogen production.

One of the respondents stressed that high cost of green hydrogen could hold back demands for the product; while low demand in the market, in turn, would be disincentive to invest in the industry. According to a study, the cost of green hydrogen amounts to USD 4–6 per 1 kg compared to the USD 1–2 per 1 kg for fossil fuels-based hydrogen. The problem could be solved when cost parity of green and fuels-based hydrogen is achieved, and a competitive market is established.

Concerning Ukrainian-German energy partnership, five Ukrainian companies believe in success of such interstate cooperation. At the same time, some companies expressed their concern about unclear conditions of cooperation for Ukrainian companies.





For most companies interviewed, the list of key amendments to the Law of Ukraine to be introduced includes: corporate PPAs, guarantee of origin, rules for hydrogen production and transportation, initiatives for green hydrogen. There was general agreement among the respondents on necessity to draft and approve hydrogen strategy for Ukraine.

Based on the survey outcomes, the following conclusions have been made:

- Ukraine and Germany have a lot of preconditions for energy partnership and energy transition.
- Ukraine has high RES potential that could be considered as a precondition for green hydrogen production not only for its own needs, but also for delivering it to Germany; in this case Germany could cover its internal demand for green hydrogen and meet its goals on climate neutrality.
- At the same time, to tap opportunities, it is important to remove the significant difference in the level of regulatory development. Ukraine significantly lags behind Germany in development and implementation of a regulatory base for hydrogen production and consumption. Ukraine has just started drafting its Hydrogen Strategy, while Germany has already adopted not only a strategy but also the regulations required for hydrogen

production with incentives and hydrogen grids.

- Investors were unable to assess perspectives for such projects in Ukraine. Implementation of the announced hydrogen pilot projects in Ukraine is subject to state support or special funding for such projects.

Based on the survey the UWEA has proposed further steps to remove the above-mentioned barriers:

- It is important to accelerate development of the regulatory framework in Ukraine and its harmonisation with Germany while considering the already existing norms and obligations of Ukraine in the field. Among which, the priority areas are (i) safety standards for the use of hydrogen in various technical processes, (ii) regulation of the permissive framework for the use of hydrogen in business activities, (iii) laying the foundations for the green hydrogen market (*GO for electricity and hydrogen, supportive mechanism for the implementation of green hydrogen projects*). Availability of joint German-Ukrainian green hydrogen projects in Ukraine can also contribute to the elimination of this barrier.
- It is important to remove uncertainty regarding possible technical restrictions. Logistic issues for the transportation of green hydrogen from

Ukraine to Germany are still subject to discussion. The Gas TSO and other market participants consider different approaches to these issues. Taking into account that the gas pipeline requires modernisation for the transportation of green hydrogen, the construction of a separate hydrogen pipeline is considered as a possible solution. Alongside transportation issues, the production of hydrogen requires the use of water resources and special permits for this activity, but these issues have not been analysed enough yet.

- It is important to launch and intensify scientific and technical studies on the impact of hydrogen on the potential existing logistical infrastructure (*gas pipeline*), both in Germany and Ukraine, the sufficiency of other natural resources (*water*) for production purposes, and feasibility studies for the construction of a separate pipeline between Ukraine and Germany.
- It is important to increase the installed capacities of renewables. However, the implementation of renewable projects could be restricted due to a lack of balancing capacities in Ukraine. Electrolyser capacities could be considered as an option for improving energy system flexibility, but this approach has not been yet considered.
- It is important to consider and analyse possible solutions to improve the flexibility of the UPS through construction of electrolyzers for hydrogen production.
- It is important to remove uncertainty about availability of consumers of the green hydrogen. The cost of green hydrogen is higher than for fossil fuels and, currently, the demand for green hydrogen is not as high as expected to be in 2030. For this reason, one of the main concerns of investors in hydrogen projects is the possibility of finding a consumer for green hydrogen. Although, market trends in fossil fuels costs need to be taken into account.
- It is important to analyse the production structure in Ukraine and Germany, development of clear scenarios for green hydrogen use, a clear justification of the benefits of its use, and based on the above, data identification of the list of potential green hydrogen consumers (*groups*).

### 2.9.1. PILOT GREEN HYDROGEN PROJECTS IN UKRAINE

A number of companies stand ready to present their hydrogen projects to national and international investors even though Ukraine has not yet adopted its national hydrogen strategy. It is worth recalling that Ukraine has the potential to provide an average annual production of 505 bln m<sup>3</sup> of green hydrogen, according to the research conducted by the Institute of Renewable Energy of the NAS of Ukraine and presented in the UWEA's White Paper "Offshore wind

power and green hydrogen: discovering new limits of Ukraine's generating capacity".

Such UWEA Member Companies as MCL Group, Eco-Optima LLC, Vuglesyntezgaz of Ukraine have already presented their pilot green hydrogen projects, while DTEK was the first Ukrainian company to join Hydrogen Europe in the summer of 2020. Representatives of these companies believe that large-scale production and use of hydrogen coupled with the massive RES deployment in Ukraine will promote the decarbonization of national energy, infrastructure and industry sectors.

### PILOT PROJECT BY MCL GROUP AIMING AT HYDROGEN PRODUCTION FOR LOCAL CONSUMPTION

In April 2021, MCL Group presented its pilot project for the green hydrogen production from wind energy at the UWEA's Annual International Event "Wind power sector of Ukraine: transition from green tariff to market conditions". The project is planned to be implemented in the north part of Rivne region and provides for the local consumption of green hydrogen without its transportation. The company is convinced that such a hybrid project will effectively solve the problems of balancing and dispatching curtailments. Construction of 72 MW Volodymyrets WPP located near the village of Dovhovolya in Varaskyi district of the Rivne region envisages installation of 12 wind turbines with unit capacity of 6 MW. The annual electricity generation at Volodymyrets WPP is projected at 240 GWh.

Currently, the company conducts feasibility study on the green hydrogen production site selects the type and installed capacity of the main electrolyzer and infrastructure technology equipment (*including energy storage systems*). The plant siting based on optimal logistics conditions is still in progress.

The project concept provides for 100% use of green hydrogen by producers of ammonia fertilizers, cement and bricks manufacturers or even by households.

Experts of the company inform that the site development for the production of green hydrogen is carried out jointly with the representatives of several European manufacturers of electrolyzers. This will help to put theory into practice.

According to MCL, the project is to be implemented during 2023-2025. The project envisages the attraction of foreign investors; therefore, the Company's team is in active search for funding and in the mobilization of new partners. The project so far has been implemented with MCL's own funds.



### ECO-OPTIMA LLC – A PARTNER TO INTERNATIONAL PROJECT “H2EU+STORE”

Company Eco-Optima joined the international project aims at production of hydrogen from sun and wind in Ukraine with its further storage for seasonal demand in Central Europe.

In order to accelerate and ramp up the production of green hydrogen for Europe, which is vital for a climate-neutral future European energy supply, the international industry partnership consisting of Bayerngas GmbH, bayernets GmbH, Eco-Optima LLC, Open Grid Europe GmbH and RAG Austria AG has designed the H2EU+Store project.

In line with a phased step plan up to 2050, green hydrogen produced in Western Ukraine will be fed into the international gas transport network of Western Ukraine in dimensions significant for Europe and transported to the energy storage facilities of RAG Austria AG via the gas pipeline systems of Slovakia and Austria.

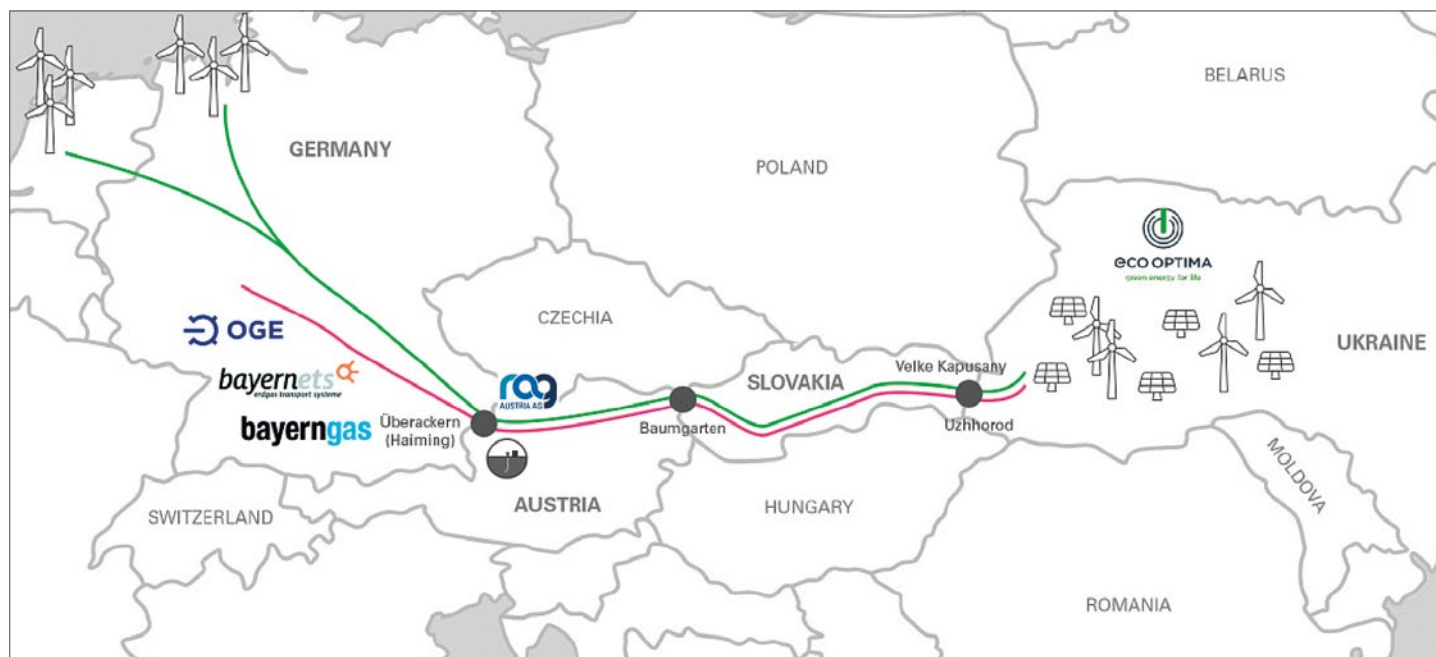
“H2EU+Store” will on the one hand create the necessary capacities for renewable electricity and hydrogen production in Ukraine and on the other hand promote expansion of storage volumes in Austria and Germany, accompanied by adaptations in the area of gas transportation to Central Europe.

### 2.9.2. OFFSHORE WIND POWER FOR GREEN HYDROGEN PRODUCTION

Vuglesynteegaz of Ukraine, subsidiary company of JSK Naftogaz of Ukraine and the UWEA Member Company, announced even more ambitious plans. The company is exploring the prospects of WPPs construction in the Black Sea to produce green hydrogen, and its further domestic consumption. Ukraine has the technical and infrastructural capacities to construct offshore wind farms and connect them to the national grid. In addition, there is the possibility of developing national production, for example, the manufacture of special offshore foundations. As we informed in the UWEA’s Annual Ukrainian Wind Market Overview 2020, World Bank analysis estimated the technical offshore wind potential for Ukraine in the waters of the Black Sea amounts to 250 GW.

Vuglesynteegaz considers 2 sea areas for their project, namely near the city of Ochakov in Mykolaiv region and near the port city of Chornomorsk in Odesa region. The advantages of these two planned sites are the absence of a large number of waterways and suitable coastal infrastructure. According to the experts, both sites have similar characteristics – shallow waters of up to 20 m in depth and high average wind speed of about 8 m/s at a height of 150 m.

**Figure 2.9.1.** Eco-Optima’s green hydrogen transportation scheme to EC countries



Source: Eco-Optima LLC





According to expert's recommendation, the 60 MW WPP will comprise wind turbines with unit capacity of 6 MW or 10 MW.

Local equipment will play an important role in project implementation. According to Vuglesynte-gaz, for developing the Odesa gas field in 2014-2015 Naftogas Group used steel structures for offshore fixed platforms manufactured by the Ukrainian company Chornomornaftogaz. In addition, there are several national manufacturers of modern anti-corrosion systems that fully meet international standards.

The company considers different options for selling electricity, including the conclusion of Corporate PPAs for delivering green electricity directly to consumers. Vuglesynte-gaz also explores the possibility of using the offshore wind for green hydrogen production.

According to the UWEA optimistic forecasts, the first offshore WPP in Ukraine could be commissioned in 2028. From 2028 onwards at least 100 MW of new offshore wind power capacities could be added per year. The first offshore wind power projects are most likely to be implemented for the green hydrogen production, though offshore WPPs may also connect the Ukrainian and European energy systems in the future.

## 2.10. MARKET-BASED MECHANISMS TO PROMOTE WIND POWER IN UKRAINE

According to the provisions of the Law of Ukraine №810-IX, approved in summer 2020, new wind power plants commissioned after 31 December 2022, will no longer be eligible for FiT. On the other hand, improvement and lowered costs of wind technologies contribute to their wide-scale employment under market conditions. This is especially evident in the leading wind power countries.

The further wind power development under market conditions is crucial for the national wind power sector. Favorable conditions for wind power development are undoubtedly dependent on stable and reliable state policy.

As of 31 December 2021, the share of renewables in the country's total electricity supply reached 8.1% (*excluding large HPPs*) in 2021. The Projected electricity balance of the Integrated Power System of Ukraine for 2022 approved in November 2021, provides for increasing the share of renewables in electricity generation up to 9.2% (*excluding large HPPs*), while the share of wind power generation should reach 3,6% in total electricity supply in 2022.

The Energy Strategy of Ukraine till 2035 adopted in 2017, envisages the increase of renewable energy share in the total primary energy supply to 25% by 2035. An even more ambitious target is set by the National Economic Strategy until 2030, which provides for the 25% share of renewable energy in the energy balance of Ukraine by 2030. Last year the Ministry of Energy of Ukraine also initiated drafting the Energy Strategy of Ukraine with a planning time-frame until 2050 and the National Renewable Energy Development Action Plan for the period up to 2030. All these documents provide for the increased electricity generation from RES in Ukraine by 2030.

Therefore, to deliver the aforementioned targets, market-based mechanisms to promote renewables and wind power in particular, are to be urgently introduced in Ukraine.

One of such widespread mechanisms to promote RES is renewable energy auctions or the auctions for the distribution of quotas to support RES projects (*according to the Ukrainian legislation*). The first

such auction should have been held in Ukraine still in 2019, according to the Law of Ukraine “On Making Amendments to Certain Laws of Ukraine Concerning Ensuring Competitive Conditions for Electricity Production from Alternative Energy Sources” No. 2712-VIII from 25 April 2019. And even though the necessary secondary legislation for conducting renewable energy auctions was adopted in 2020-2021, market participants are still waiting for them. As the UWEA experts have repeatedly noted, the conduction of renewable energy auctions would increase competition among investors, resulting in lower electricity prices for consumers, since according to the national legislation, *“the winners of the auction will be determined by the lowest price offer”*.

Feed-in Premium mechanism is highly popular in Europe, where it has already demonstrated its effectiveness. On 26 August 2021 the Ministry of Energy of Ukraine published Draft Law of Ukraine “On Amendments to Certain Laws of Ukraine Regarding Stimulation of Production of Electricity from Alternative Energy Sources under Market Conditions”. This draft Law elaborated to implement FiP / Contracts for Difference mechanism, provides for the possibility for RES producers to optimize their revenues and imbalances in the event of the withdrawal from the balancing group of the Guaranteed Buyer. In particular, the RES producers are entitled:

- to withdraw from the balancing group of the SE Guaranteed Buyer;
- to sell green electricity on the market and receive premiums equal to the difference between the market price and the FiT or auction price.

The Draft Law also provides for the improvement of the RES auction model in line with global best practices.

The UWEA supports the introduction of FiP/Contracts for Difference mechanism in Ukraine to entitle the RES producers to sell their electricity on the market. At the same time, the adherence to the principle of voluntary choice of RES promoting mechanism is a key aspect in supporting the Draft Law. The RES producers should decide for themselves whether to continue delivering their electricity under FiT or switch to the FiP/Contracts mechanism and with-





draw from the balancing group of the Guaranteed Buyer. The draft law was expected to be submitted to the Verkhovna Rada of Ukraine still in 2021. The UWEA addressed the Ministry of Energy of Ukraine with request to finalize the text of the Draft Law, taking into account the amendments submitted by the association, and stressed the urgency of implementing a FiP/Contracts for Difference mechanism in Ukraine.

Corporate PPA could be a full-fledged alternative to state support scheme designed to promote renewables. National legislation does not contain special regulation on Corporate PPA to date. Despite the fact that, according to the Law of Ukraine “On the Electricity Market”, the RES producers are entitled to sell electricity in different market segments (*which could be considered as a prerequisite for implementing Corporate PPA*), some legislative developments are required to provide implementation and effective application of Corporate PPA mechanism in Ukraine.

Corporate PPA mechanism is closely related to the implementation of Guarantees of Origin. Verification of the RES electricity origin will have a special importance for Ukraine since 2026, when the implementation of CBAM by the European Union will take place. According to the study “Research on the impact on the economy of Ukraine from the introduction of CBAM by the European Union” conducted by the Kyiv School of Economics in 2021, the CBAM introduction could lead to serious negative consequences for

Ukrainian exporters and dependent sectors of the economy since export amounting to USD 2.9 bln per year could be under threat. For example, Ukraine will no longer be able to export electricity generated only at TPPs, but will export a “mix consisting of 8% of TPP electric energy and 92% of nuclear and renewable electricity”.

On 24 July 2013, the Cabinet of Ministers of Ukraine approved the Decree № 771 “On Approval of the Procedure for Issuance, Use and Termination of the Guarantees of Origin for Economic Entities that Produce Electricity from Alternative Energy Sources”. According to the above-mentioned Decree, SAEE was designated as a competent body for issuing GOs. However, the Government failed to implement GO mechanism in Ukraine those time. Meanwhile, in late January 2022, the SAEE presented the Roadmap for the introduction of Guarantees of Origin in Ukraine, according to which the launch of GO in Ukraine is scheduled for 2024.

NET Energy Metering is another mechanism to promote RES development, which could assist in deploying distributed generation for small and medium businesses. Since NET Energy Metering operates without any FiT (*ed. surplus of generated electricity is calculated at a fixed market price*), no additional state expenditures are required. Recently, a Working Group on the development and implementation of this mechanism in Ukraine has been established under the SAEE.



## 2.11. WIND POWER DEVELOPMENT FORECAST

Given that the expiration of the green tariff support scheme takes place after 31 December 2021, developers will rush to complete the construction and commission of their wind power plants before the deadline. Accordingly, the UWEA expects that the national wind power sector will set another record for the annual wind power capacity additions after 2019.

The UWEA expects about 1 000 MW of new wind capacity to be commissioned in 2022, including the 60 MW Phase 2 of Dnistrovska WPP in Odesa region, 500 MW Tiligulska WPP in Mykolaiv region, 20 MW E.Wind WPP, 100 MW Phase1 of Kalanchak WPP in Kherson region, and two wind projects with installed capacity of 60 MW and 54,6 MW in Lviv region.

While the current total capacity of wind power projects that have received building permit amounts to nearly 5 000 MW, the construction of the bulk of them is likely to start after 2022. The geographical scope of the planned wind projects is extended to Volyn, Vinnytsya, Ivano-Frankivsk, Poltava, Kirovohrad, Kharkiv and Dnipropetrovsk regions. Zaporizhzhia, Kherson, Mykolaiv and Odesa region will remain the leaders in terms of cumulative installed wind capacity in 2023-2025. It's remarkable, that new wind projects being implemented in Ukraine feature the latest turbine technologies with wind turbine nameplate capacity averages 6 MW and more. Further implementation of new wind power projects will depend on the investment climate in Ukraine, which is directly related to the stable



payments for the green electricity delivered to the power grid, adoption of new laws and regulations to promote further RES development in Ukraine and geopolitical situation linked to the Russian military aggression. The development and adoption of Draft Laws on implementation of Feed-in Premium/Contracts for Difference, Corporate PPAs mechanisms or Net Metering system, the introduction of renewable energy auctions and the development of balancing capacities, energy storage systems, renewable hybrid power plants and offshore wind power plants would ensure further large-scale deployment of the wind power technologies in Ukraine.

It is assumed that electricity generated from wind energy will be much cheaper than electricity generated from fossil fuels, including coal, oil and natural gas. This gives a significant prospect for the wind power sector to become more competitive and economically attractive to new investors.

#### **TILIGULSKA WIND POWER PLANT OF DTEK RENEWABLES**

In 2021, DTEK Renewables launched a grand project for Ukraine and Eastern Europe – 500 MW Tiligul'ska WPP. The scalability of the wind farm will also allow it to increase installed capacity to 565 MW, if required.

Tiligul'ska WPP is located on the bank of the Tiligul estuary in Mykolaiv region and will be one of the first WPPs in the world, where wind turbines of a model V162-6.0 MW manufactured by Vestas will be installed. This model is the largest onshore wind turbine in the Vestas portfolio in terms of rotor size, spanning 162 m from tip to tip. The 6 MW wind turbine, encompassing the of 79 m blades and a hub height of 125 m are suitable for low to medium wind speeds. These innovative wind turbines are ideal for wind power generation in southern Ukraine, and have a 25% performance improvement over previous models.

The first turbine of the Tiligul'ska WPP was installed in the end of 2021. Commissioning of the project is scheduled for the third quarter of 2022. The expected annual green electricity output of 2 bln kWh will reduce CO<sub>2</sub> emissions by approximately 1.6 mln tonnes per year.

*"We are building the energy future of Ukraine. That is why DTEK Renewables continues to invest in clean and affordable energy to provide the development of the national RES sector. Transformation of the Ukrainian energy sector, development of green energy and commissioning of new RES capacities are the most effective tools for achieving climate neutrality and gradual reduction of CO<sub>2</sub> emissions to meet the requirements of the EU Green Deal. The implementation of a Tiligul*

*wind project will be a significant contribution of the company to the decarbonization of the economies of Ukraine and Europe,"* said Maris Kunickis, CEO of DTEK Renewables.

#### **56 MW KAMYANSKA WPP IN ZAPORIZHZHIA REGION**

Ukrainian Wind Group LLC has been implementing the project Kamyanska WPP with installed capacity of 56 MW in Bilmatskyi district, Zaporizhzhia region. The project envisages the installation of 9 wind turbines with unit capacity exceeding 6 MW manufactured by Vestas. Annual electricity output is expected at 196 GWh.

#### **MANAGEMENT COMPANY WIND PARKS OF UKRAINE INCREASES WIND POWER CAPACITY OF MYKOLAIV REGION**

It is noteworthy that despite the many challenges the Management Company Wind Parks of Ukraine faced last year, including worsening investment climate in Ukraine caused by the non-payment to the RES producers for green electricity delivered to the grid, which, the national development company remains committed to deploying wind technologies in Mykolaiv region.







# **DTEK Renewables**

## **Green energy for Ukraine**







In 2021, the Management Company Wind Parks of Ukraine, a manufacturer of licensed wind turbines at the Kramatorsk Heavy Duty Machine Tool Building Plant, installed 2 wind turbines with a capacity of 4.8 MW each at the Wind Park Schaslyvyi and Wind Park Mykolaiv. Commissioning of the turbines is expected in 2022.

In 2022, the company plans to increase the installed capacity of the Wind Park Prychernomorkyi by 14.4 MW, the Wind Park Ochakivskiy – by 4.8 MW, Wind Park Mykolaiv – by 9.6 MW and Wind Park Schaslyvyi – by 14.4 MW. Ukrainian-made WTU wind turbines will be installed at all wind parks of the company.

## SECOND PHASE OF DNISTROVSKA WIND FARM

Elementum Energy Ukraine continues to implement a 100 MW Dnistrovska WPP in Bilhorod-Dnistrovskiy district, Odesa region. 40 MW phase 1 of the project was commissioned in May of 2021. Elementum Energy is currently in the process of constructing the 59.9 MW phase 2 of Dnistrovska WPP, which is scheduled to be commissioned in June of 2022. Phase 2 comprises 11 GE 158 5.3/5.5 MW wind turbines with a hub height of 120.9 m.

## 300 MW WPPS IN ODESA REGION

NOTUS energy is implementing three wind energy projects in the Odesa region with a total capacity of 300 MW. The wind farms will be located near the villages Libental, Roksolany and Ovidiopol. The projects are developed and implemented by an international team based in Germany and Ukraine ensuring compliance with local requirements as well as international standards. All three projects are in the final development stage featuring the latest turbine technology.

## WIND PROJECTS FOR KHERSON REGION

In 2022, new WPPs will be constructed in Kherson region, namely 20 MW WPP Taiwan by E.Wind and the 100 MW phase 1 of Kalanchak WPP by Vindkraft Kalanchak LLC. Both WPPs will comprise wind turbines of the V162-6.2MW model of EnVentus plat-



Power from wind  
for **EVERY**  
**UKRAINIAN**



**VINDKRAFT UKRAINA**





form with unit capacity exceeding 6.2 MW and hub height of 125 m, produced by Vestas. The electricity production by these wind farms will help Ukraine to meet its RES development goals set by the Energy Strategy of Ukraine until 2035, and the National Economic Strategy of Ukraine until 2030. It is worth noting that these WPPs will generate enough electricity to reduce CO<sub>2</sub> emissions by 360,000 tonnes per year.

### **NEW WIND CAPACITIES FOR LVIV AND VOLYN REGIONS**

Greenville Group of Companies has been implementing several wind projects totaling 295 MW in Ukraine, in particular in Lviv and Volyn regions.

The 100 MW wind power plant will be constructed in Yavorivskyi and Lviv districts in Lviv region. Annual electricity generation is expected at 264 GWh, enough for delivering clean electricity to almost 44,000 households.

Construction of the 50 MW wind power plant in Yavorivskyi district envisages installation of 12 wind turbines with unit capacity of up to 5 MW. With annual electricity output at 132 GWh, the farm will supply electricity to nearly 20,000 households.

Company's activities also include active development of a 145 MW wind farm in Volodymyr-Volynskyi district, Volyn region. With annual electricity output of around 480 GWh, the wind farm will supply electricity to nearly 70,000 households. Once fully operational, wind farms by Greenville Group of Companies will reduce CO<sub>2</sub> emissions by nearly 380,000 tonnes annually.

### **15 MW WIND POWER PLANT IN LVIV REGION**

Company Ferozit Wind Energy, a subsidiary of Ferozit Group of Companies, with more than 25 years of experience in Ukraine, has been developing a 15 MW wind project near the village of Pozdymyr in Radekhiv district, Lviv region. It's planned to install 4 wind turbines with unit capacity of up to 4 MW.

### **60 MW SKOLIVSKA WPP IN LVIV REGION**

Atlas Global Energy LLC, a part of Eksim Holding, is implementing an ambitious wind project in the mountainous area in Lviv region. Eksim Holding is a leading player in the energy sector of Turkey and Georgia with 626 MW of total installed RES capacity.

The future 60 MW Skolivska WPP will be located in the territory of Stryi district in Lviv region. The wind farm comprising 14 wind turbines manufactured by Nordex, will generate up to 180 GWh per year. Construction works have been already launched and are scheduled for completion in 2022.

### **MOUNTAIN WIND POWER PLANT**

Company Eco-Optima has been developing a 54.6 MW Skolivska wind farm project, located near the village of Orivskyi in Stryi district. The project site stretches along the Orivsky ridge at an altitude of over 680 m. The two-year wind measurement campaign confirmed an annual mean wind speed of 7.7 m/sec. The company has already started construction works. Within the scope of the Skolivska WPP it is planned to install 10 modern wind turbines manufactured by Nordex. Apart from installation of 6 wind turbines with unit capacity of 5.5 MW and 4 wind turbines with unit capacity of 5.4 MW, the project provides for the construction of a 15.3 km power line. Wind farm commissioning is scheduled for the Q3, 2022.







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## NEW WIND POWER CAPACITIES IN VOLYN REGION

Wind projects being implemented by a company UDPR-Wind will comprise modern wind turbines with unit capacity exceeding 5.7 MW and hub height of over 150 m (*at time being the highest one in Ukraine*) produced by the leading wind manufacturers

In particular, the company's wind project pipeline includes:

- Volyn WPP with installed capacity of 188 MW comprising 33 wind turbines in Lokachynskyi district has been developing by Volyn West Wind LLC. Its first two phases totaling 114 MW are ready for construction, which is scheduled for 2023-2024. The estimated annual output of the Volyn WPP amounts to 700 GWh.
- 120 MW Sukhodolska WPP comprising 20 wind turbines, in Volodymyr-Volynskyi district has been developing by the Sukhodoly West Wind LLC. The wind farm is expected to generate up to 400 GWh of green electricity per year.

## WIND PROJECT PIPELINE FOR ZHYTOMYR REGION

The total wind project pipeline of Wind Solar Energy LLC reaches up 164.14 MW and consists of 7 wind projects in Zhytomyr region. As of the end of 2021, all the required design works have been completed and building permits received. Though a final decision on the model of wind turbine to be used for the projects have not been made yet, the company considers installation of wind turbine models with unit capacity of 5 MW and more.

The projects will be implemented in the following phases:

- The Phase I includes construction of 49.9 MW Lisna-3 WPP (17.85 MW + 14.28 MW + 17.85 MW);
- The Phase II includes construction of such wind power plants as Berdychiv-1 WPP and Berdychiv-2 WPP, each with installed capacity of 28.56 MW located not far from the town of Berdychiv;
- The Phase III includes construction of such wind power plants as Yemilchyn-1 and Yemilchyn-2, each with installed capacity of 28.56 MW located not far from the town of Yemilchyn.





# CHANGES IN WIND LEGISLATION



# 3.1. SUMMARY OF LEGISLATIVE CHANGES IN 2021

## 1. SIMPLIFICATION OF GRID CONNECTION PROCEDURE

### LAW OF UKRAINE “ON AMENDMENTS TO CERTAIN LEGISLATIVE ACTS OF UKRAINE RELATED TO SIMPLIFICATION OF GRID CONNECTION” DATED 15 JULY 2021 (Law No. 1657-IX).

Law No. 1657-IX provides for the following amendments:

- introduction of a single-window system and establishing the unified state web portal for customers and developers of design documentation. With a single-window system, customers and developers of design documentation, DSO and contractors can interact with relevant state and municipal authorities when obtaining necessary permits and approvals, submitting requests etc.;
- a grid connection agreement executed before the entry into force of Law No. 1657-IX remains valid until the expiration of a term specified in such agreement. If there is no expiration term in a grid connection agreement, it is deemed valid until 1 January 2024 (unless the parties agreed otherwise by executing an additional agreement);
- extension of technical conditions for grid connection of facilities producing electricity from wind energy until 31 December 2022 (*provided that pre-PPA with SE Guaranteed Buyer was executed by 31 December 2019*); and
- simplification and specification of the process of establishing land servitudes for placement of linear energy infrastructure objects, as well as development and approval of land management documentation and design documentation for establishing the same.

## 2. CERTIFICATION OF NPC UKRENERGO

### 2.1. LAW OF UKRAINE “ON AMENDING CERTAIN LEGISLATIVE ACTS OF UKRAINE ON CERTIFICATION OF TRANSMISSION SYSTEM OPERATOR” DATED 15 APRIL 2021 (Law No. 1396-IX).

On 15 April 2021, Ukrainian Parliament adopted Law of Ukraine “On Amending Certain Legislative Acts of Ukraine on Certification of Transmission System Operator”. Law No. 1396-IX was adopted to unify Ukrainian legislation with EU legislation, in particular to implement the provisions of Directive

2009/72/EC of the European Parliament and of the Council of 13 July 2009 on common rules for the internal market in electricity.

The majority of changes provided in Law No. 1396-IX concerns the amendments to Law of Ukraine “On Electricity Market” No. 2019-VIII dated 13 April 2017, namely:

- TSO should be an exclusive owner of the transmission system or a business entity whose 100% of the corporate rights belong to the state or state-owned business entity and which has the right of economic management of facilities for performing electricity transmission activities;
- TSO certification is performed according to the ISO model, i.e., TSO should be a separate and independent entity. The ISO model assumes that the TSO uses property that ensures the integrity of the IPS of Ukraine and dispatch (*operational and technological*) management of the main and interstate electricity networks. In this case, the said property remains the property of the state; and
- Law No. 1396-IX also defines the functions and obligations of TSO in connection with its certification according to the ISO model (*e.g., providing access and control of access to the transmission system; operation, maintenance and development of the transmission system, etc.*).

### 2.2. RESOLUTION “ON THE FINAL DECISION ON CERTIFICATION OF TRANSMISSION SYSTEM OPERATOR” NO. 2589 DATED 17 DECEMBER 2021 (Resolution No. 2589)

On 17 December 2021, NEURC adopted a final decision on certification of NPC Ukrenergo as TSO.

## 3. GREEN BONDS IN UKRAINE

### 3.1. UPDATED VERSION OF THE LAW OF UKRAINE “ON CAPITAL MARKETS AND THE ORGANIZED COMMODITY MARKETS” (Law No. 3480-IV)

On 1 July 2021, the Law No. 3480-IV came into force. Among the innovations of the law is the introduction of green bonds as a type of securities.



According to Law No. 3480-IV, green bonds are a type of bonds whose prospectus provides for using borrowed funds exclusively to finance an environmental project or its stage. These include projects in renewable energy, energy efficiency, minimization of waste production, utilization and processing, introduction of an environmentally friendly transport, organic farming, conservation of flora and fauna, reduction of emissions into the environment etc.

As a result of adopting Law No. 3480-IV, on 3 November 2021, NPC Ukrenergo issued five-year green and sustainability-linked Eurobonds for the amount of USD 825 mln.

**3.2. CMU RESOLUTION “ON PROVIDING A STATE GUARANTEE FOR THE OBLIGATIONS OF THE PRIVATE JOINT-STOCK COMPANY “NATIONAL POWER COMPANY “UKRENERGO” IN 2021” NO. 1049 DATED 11 OCTOBER 2021**  
(Resolution No. 1049)

By adopting Resolution No. 1049, CMU agreed to provide a state guarantee for emission and placement of NPC Ukrenergo bonds on international stock markets.

With the funds raised from the emission and placement of bonds, NPC Ukrenergo repaid its debt to SE Guaranteed Buyer, while the latter settled with the RES producers for green electricity purchased in 2020.

**4. ADOPTION OF LAW OF UKRAINE “ON ENERGY EFFICIENCY” NO. 1818-IX DATED 21 OCTOBER 2021**

(Law No. 1818-IX)

On 21 October 2021, Ukrainian Parliament adopted Law of Ukraine “On Energy Efficiency” regarding energy efficiency in the production, transportation, transmission, distribution, supply and consumption of energy. Law No. 1818-IX entered into force on 13 November 2021.

According to Law No. 1818-IX, energy efficiency is the quantitative ratio between work, services, goods or energy at the outlet and energy consumed at the inlet.

Law No. 1818-IX provides for the following:

- establishment of the National Energy Efficiency Action Plan and the National Energy Efficiency Monitoring System, which will identify and control all energy efficiency measures in the production, transportation, transmission, distribution and consumption of energy with deadlines for their implementation;
- introduction of energy management systems in state and municipal authorities and business entities that want to receive state aid to implement energy efficiency measures and establish structural units responsible for energy management;
- obligation of large business entities to perform energy audits every four years, starting from the date of the first energy audit;
- obligation for energy suppliers to upgrade their networks and equipment based on their energy efficiency potential assessment.

## **5. AMENDMENTS TO THE PROCEDURE FOR CONDUCTING AUCTIONS FOR THE SALE OF ELECTRICITY UNDER BILATERAL AGREEMENTS**

### **5.1. CMU RESOLUTION “ON AMENDING CMU RESOLUTIONS DATED 5 JUNE 2019 NO. 483 AND 499” NO. 182 DATED 3 MARCH 2021 (Resolution No. 182)**

Resolution № 182 within sub-clause 23 of clause 3 of the Procedure for Conducting Electronic Auctions for the Sale of Electricity Under Bilateral Agreements, approved by Resolution № 499, determines a new sales schedule under the terms of bilateral agreements BASE, OFFPEAK and PEAK. In addition, it amends sub-clause 25 of clause 13 of the above-mentioned Procedure, which determines the deadlines for withdrawing the application for organizing and conducting various types of auctions.

Resolution No. 182 also amends sub-clause 1 of clause 12 of Procedure for Selection of Organizers of Electronic Auctions for the Sale of Electricity Under Bilateral Agreements, approved by Resolution No. 499, which applies to bankrupt entities that are not allowed to participate in the auction. This sub-clause does not apply to business entities terminating their business activities due to changes in the form of the relevant business entities according to the Law of Ukraine “On Commodity Exchanges”.

### **5.2. CMU RESOLUTION “ON AMENDMENTS TO THE PROCEDURE FOR CONDUCTING ELECTRONIC AUCTIONS FOR THE SALE OF ELECTRICITY UNDER BILATERAL AGREEMENTS” NO. 791 DATED 28 JULY 2021 (Resolution No. 791)**

Resolution No. 791 provides for amendments to Resolution No. 499, namely, to supplement it with a new section regarding the procedure for holding a special session on the sale of lot packages under bilateral agreements.

### **5.3. CMU RESOLUTION “ON AMENDMENTS TO THE PROCEDURE FOR CONDUCTING ELECTRONIC AUCTIONS FOR THE SALE OF ELECTRICITY UNDER BILATERAL AGREEMENTS” NO. 983 DATED 22 SEPTEMBER 2021 (Resolution No. 983)**

Resolution No. 983 provides for the following entities to carry out electronic auctions for the sale of electricity under bilateral agreements:

- electricity producers – state enterprises and business entities established by the state or owned by the state for at least 50%;
- other electricity producers (*apart from producers that have FiT and producers that acquired state support as a result of the auction*) – until 1 April 2022; and

- other electricity market participants intending to sell electricity according to the conditions of electronic auctions.

Resolution No. 983 also provides that starting from September 2021 until 1 April 2022 energy producers can sell electricity under bilateral PPAs only, if such PPAs were executed as a result of electronic auctions.

## **6. AMENDMENTS TO REGULATION ON IMPOSING SPECIAL OBLIGATIONS ON ELECTRICITY MARKET PARTICIPANTS TO ENSURE PUBLIC INTERESTS IN THE FUNCTIONING OF THE ELECTRICITY MARKET**

### **6.1. CMU RESOLUTION “ON AMENDING CMU RESOLUTIONS NO. 483 AND NO. 499 FROM 5 JUNE 2019” (Resolution No. 182)**

Resolution No. 182 cancelled sub-clause 3 of clause 10 of the Regulation on Imposing Special Obligations on Electricity Market Participants to Ensure Public Interest in the Functioning of the Electricity Market, approved by the CMU Resolution No. 483 dated 5 June 2019. The above sub-clause provided for the obligation of SE NNEGE Energoatom to sell to SE Guaranteed Buyer of up to five percent of the monthly forecast volume of electricity supply at nuclear power plants under bilateral agreements at special sessions of electronic auctions.

### **6.2. CMU RESOLUTION “ON AMENDMENTS TO CMU RESOLUTIONS NO. 483 DATED 5 JUNE 2019 AND NO. 439 DATED 28 APRIL 2021” NO. 659 DATED 29 JUNE 2021 (Resolution No. 659)**

CMU Resolution No. 659 dated 29 June 2021 extended for one month the term allotted to universal service providers, SE NNEGC Energoatom, SE Guaranteed Buyer, PJSC Ukrhydroenergo for concluding contracts with household consumers for the provision of services to ensure the availability of electricity, and also set a deadline for the Regulation “On Imposing Special Obligations on Electricity Market Participants to Ensure Public Interest in the Functioning of the Electricity Market”, approved by CMU Resolution No. 483 dated 5 June 2019.

Subsequently, this time frame was extended by CMU Resolution No. 767 dated 28 July 2021 and CMU Resolution No. 859 dated 11 August 2021.



## 7. CHANGE OF OWNER OF NPC UKRENERGO AND JSC MAHISTRALNI HAZOPROVODY UKRAINY

(Order No 833-P)

According to CMU Order No. 833-p on Certain Matters Regarding Management of State-Owned Facilities dated 28 July 2021, the authority to manage corporate rights of Ukrenergo and JSC Mahistralni Hazoprovyd Ukrainy passed from Ministry of Finance of Ukraine to Ministry of Energy of Ukraine. Accordingly, the state, represented by Ministry of Energy of Ukraine, became the owner of 100% shares of NPC Ukrenergo and JSC Mahistralni Hazoprovyd Ukrainy.

Also, according to this Order, Ministry of Energy of Ukraine was designated as the authorized body for managing the gas transmission system, which is not subject to privatization.

## 8. APPROVAL OF THE ENERGY SECURITY STRATEGY

On 4 August 2021, the Cabinet of Ministers issued Order No. 907-p, which approved the Energy Security Strategy of Ukraine (*hereinafter – the “Strategy”*). The Strategy was developed by Ministry of Energy of Ukraine and adopted on the basis of the decision by the National Security and Defence Council of Ukraine “On National Security Strategy of Ukraine”, approved by Presidential Decree No. 392/2020 dated 14 September 2020.

The Strategy is a framework document for strategic planning in the energy sector. It was developed for the period up to 2025. The Strategy outlines the main threats to Ukraine’s energy security, the principles of energy security and future energy scenarios for Ukraine. It also set the strategic goals and objectives.

According to the Strategy, there are 29 threats to Ukraine’s energy security, among others:

- cyber threats to key infrastructure facilities in the energy sector;
- the impact on the energy sector of certain political groups, which has led to the monopolization of energy markets and reduced transparent competition;
- blocking the supply of necessary resources and equipment for the energy needs of Ukraine;
- the ongoing armed aggression of the Russian Federation against Ukraine; and
- wear and tear of energy infrastructure facilities.

The Strategy outlines three pathways for the future energy development in Ukraine:

- “Business as usual” scenario (*maintaining current trends and the state of affairs*);
- “Unfriendly influence” scenario (*lack of systemic*

*changes in energy policy in combination with the escalation of aggression by the Russian Federation*); and

- “Positive transformation” scenario (*positive changes in the energy sector as a result of the Strategy implementation*).

## 9. AMENDMENTS TO THE PROCEDURE FOR CONDUCTING A TENDER FOR THE CONSTRUCTION OF GENERATING CAPACITY AND IMPLEMENTATION OF DEMAND MANAGEMENT MEASURES

(Resolution No. 1041)

On 6 October 2021, CMU adopted a Resolution “On Amendments to the Procedure for Conducting a Tender for the Construction of Generating Capacity and Implementation of Demand Management Measures” No 1041.

The main change introduced by the Resolution No. 1041 is the calculation of the amount of collateral to be provided by NPC Ukrenergo to anyone wishing to participate in the tender for the construction of generating capacity and the implementation of demand management measures. Previously, the amount of this guarantee was the hryvnia equivalent of EUR 10,000 for each megawatt of generating capacity declared by the bidder in its tender. However, starting from 6 October 2021, the “initial” fixed amount of EUR 100,000 and an additional EUR 1,000 per 1 MW of the declared capacity of the participant was established.

## 10. AMENDMENTS TO THE TRANSMISSION SYSTEM CODE

### 10.1. NEURC RESOLUTION “ON APPROVAL OF AMENDMENTS TO THE TRANSMISSION SYSTEM CODE” NO. 333 DATED 3 MARCH 2021

(Resolution No. 333)

Resolution No. 333 provides for the following amendments to the Transmission System Code:

- changes to the technical requirements for the restoration of the transmission system regarding participation of generating units in the autonomous mode and technical requirements for electrical facilities of distribution system or energy consumption in terms of automatic load shedding, low voltage disconnection and reconnection;
- autonomous mode is defined by independent operation of all or part of the electrical network, which is isolated due to disconnection from the IPS, having at least one generating unit or high voltage DC system that supplies power to this network and regulates frequency and voltage;
- amendments to the procedure for providing or receiving emergency assistance to ensure the operational safety of the power system, namely the determination that in case of pre-emergency,

emergency or system emergency mode and depletion of frequency and power control reserves in IPS of Ukraine or transmission system of adjacent TSO, the TSO may use emergency assistance from adjacent TSOs on the basis of agreements concluded both directly with these adjacent TSOs and with other business entities authorized to sign such agreements in accordance with the current regulations of neighbouring countries.

#### **10.2. NEURC RESOLUTION “ON APPROVAL OF AMENDMENTS TO THE TRANSMISSION SYSTEM CODE” NO. 1546 DATED 16 SEPTEMBER 2021 (Resolution No. 1546)**

Resolution No. 1546 provides for the following amendments to the Transmission System Code:

- establishing requirements for the connection of energy storage systems to the electrical networks of the internal electricity supply of transmission system users;
- use of energy storage systems to provide ancillary services to the TSO;
- settlement of technical requirements required for this type of equipment;
- setting requirements for system testing and operation of energy storage systems; and
- establishing the procedure for the exchange of information between TSOs and transmission system users using energy storage systems.

#### **10.3. NEURC RESOLUTION “ON APPROVAL OF AMENDMENTS TO THE TRANSMISSION SYSTEM CODE” NO. 1680 DATED 29 SEPTEMBER 2021 (Resolution No. 1680)**

Amendments set out in Resolution No. 1680 are aimed at bringing the terminology of the Transmission System Code in line with the Law of Ukraine “On the Electricity Market” and the Law of Ukraine “On the National Commission for State Regulation of Energy and Utilities”, in particular to avoid ambiguity of the terms “operational instruction” and “operational order”.

For that purpose, Resolution No. 1680 defines the following two terms:

- operational instruction – an instruction of operational personnel within their powers to perform specific actions to manage the technological modes of operation of the IPS of Ukraine and/or change the operational status of dispatching facilities; and
- operational order – a written order of the heads of all levels of the organizational structure of the dispatch (*operational and technological*) management of IPS, provided to ensure operational safety, to change the modes of IPS of Ukraine and the operational status of dispatching facilities or make changes to operational documentation.

Resolution No.1680 also provides for the amendments as follows:

- determination of the procedure for NPC UKR-ENERGO to provide a report on the implementation of the plan for the development of the transmission system to the NEURC;
- clarification of the procedure for forming plans for the development of transmission and distribution systems in order to synchronize them;
- introduction of technical requirements for establishing the information technology systems of IPS of Ukraine dispatch management; and
- introduction of technical requirements for the construction of communication channels for the exchange of technological information between the TSO and users of the transmission or distribution systems.

#### **10.4. NEURC RESOLUTION “ON APPROVAL OF AMENDMENTS TO THE TRANSMISSION SYSTEM CODE” NO. 2027 DATED 10 OCTOBER 2021 (“Resolution No. 2027”)**

Resolution No. 2027 provides for the amendments to annexes to the Transmission System Code, namely:

- standard agreement for the provision of dispatch (*operational and technological*) management services; and
- standard agreement for the provision of electricity transmission services

### **11. AMENDMENTS TO THE DISTRIBUTION SYSTEMS CODE (Resolution No. 717)**

On 28 April 2021, NEURC adopted the Resolution “On Amendments to the Distribution Systems Code” No. 717 aimed at simplification of the grid connection procedure for electricity users.

Among amendments provided by Resolution No. 717:

- introduction of public agreements on standard and non-standard grid connection, which should be published on the official websites of DSOs;
- introduction of a simplified procedure for concluding public contracts for connection to electricity networks: such an agreement is considered concluded from the date of submission by grid connection customer of a properly executed application for grid connection, indicating its acceptance of the public offer;
- reduction of the number of supporting documents to be submitted with the application for grid connection;
- DSO's obligation to publish on its website and regularly update the information on provision of grid connection services, as well as maintain an electronic register of technical conditions for grid connection and publish the information on the issued technical conditions;

- change in the procedure for notifying the customer of the completion of grid connection works: DSO provides the customer with a notification on the provision of grid connection services regarding external power supply. Such notification is the basis for concluding agreements (*or amending existing agreements*) by the customer in accordance with the requirements established in the electricity market;
- change of procedure for electrification of the territory for complex construction with individual housing construction (*except multi-apartment residential buildings*): electrification of such territory should be performed by DSO at the expense of the tariff for electricity distribution by inclusion to the DSO investment program no later than two years after approval of design specifications and estimates and after the municipal bodies complete certain actions aimed at allocating land plots that are subject to complex construction.

## 12. REPAYMENT OF NPC UKRENERGO'S DEBT

On 5 November 2021, NEURC by its Resolution No. 1997 approved the signing of an agreement on measures to ensure the fulfilment of NPC Ukrenergo's obligations under the Agreement dated 5 November 2021 No. 13110-05 / 485 on repayment of NPC Ukrenergo's debt to the state for guaranteed obligations concluded between Ministry Finance of Ukraine and NPC Ukrenergo.

## 13. ESTABLISHMENT OF AN ALGORITHM FOR TRANSFERRING FUNDS RECEIVED BY A WHOLESALE ELECTRICITY SUPPLIER

(Resolution No. 640)

On 14 April 2021, NEURC adopted the resolution "On establishment of an algorithm for transferring funds received by a wholesale electricity supplier" No. 640.

The algorithm specified in Resolution No. 640 provides for the following:

1. First, the wholesale supplier compensates the RES producers with the funds proportionally to the amount of debt for electricity incurred before 1 July 2019 until the full repayment of debt for electricity.
2. Then, the wholesale supplier compensates other electricity producers, apart from SE Zuvivska Experimental Teplocental, LLC Istek and NPC Ukrenergo proportionally to the amount of debt for electricity and services for the dispatch management of the UES of Ukraine and the transmission of electricity through the main and interstate electricity networks.

Funds are transferred on the 15th day of the month or on the banking day preceding the 15th day (*if the 15th is a day off*), as well as on the last banking day of the month.

Also, the wholesale supplier undertakes to report to the NEURC on a monthly basis on the status of debt for electricity incurred before 1 July 2019.

## 14. ESTABLISHMENT OF A SPECIAL FUND TO COVER SE GUARANTEED BUYER'S ARBITRATION EXPENSES

(Resolution No. 850)

On 14 April 2021, NEURC adopted the resolution "On Approval of the Contribution Amount for Establishment of Special Fund to Cover SE Guaranteed Buyer's Arbitration Expenses for IV Quarter of 2020".

Resolution No. 850 provides that the contribution amount for the establishment of special fund to cover SE Guaranteed Buyer's arbitration expenses for IV quarter of 2020 is 1% of the net income of the contributors' payer from the activity of electricity generation per generating unit. Such a fee will be paid only for the production of electricity for which SE Guaranteed Buyer has entered into a relevant PPA under FiT or PPA with an entity that has acquired the right to support as a result of the auction.

## 15. AMENDMENTS TO CERTAIN NEURC RESOLUTIONS

### 15.1. AMENDMENTS TO NEURC RESOLUTION NO. 428 DATED 14 JUNE 2018

(Resolution No. 935)

On 9 June 2021, NEURC adopted Resolution No. 935 providing for amendments to NEURC Resolution "On Approval of the Procedure for Control Over Licensees Performing Activity in the Spheres of Energy and Utility Services, the Legislation in the Corresponding Spheres and License Conditions" No. 428 dated 14 June 2018.

Resolution No. 935 envisages that during scheduled or unscheduled inspections in 2019 (*during which a full-scale electricity market was implemented*), the analysis of TSO activities is carried out for the whole year by types of electricity transmission activities and dispatch (*operational and technological*) management. In this regard, the new version of the Resolution No. 428 outlines the procedure for monitoring compliance with licensees operating in the fields of energy and utilities, legislation in relevant areas and licensing conditions in the new version.



**15.2. AMENDMENTS TO NEURC RESOLUTION NO. 307 DATED 14 MARCH 2018 AND NEURC RESOLUTION NO. 641 DATED 26 APRIL 2019**  
(Resolution No. 1682)

On 29 September 2021, NEURC adopted Resolution No. 1682 providing for amendments to NEURC Resolution “On Approval of Market Rules” No. 307 dated 14 March 2018 (*hereinafter – “Market Rules”*) and NEURC Resolution “On Approval of Procedure for Purchasing Electricity from Alternative Energy Sources by Guaranteed Buyer” No. 641 dated 26 April 2019 (*hereinafter – “RES Electricity Purchase Procedure”*).

Resolution No. 1682 provides for the following amendments to the Market Rules:

- for electricity producers that are included in the balancing group of the SE Guaranteed Buyer, the agreement on settlement of liability for imbalances is suspended only for generating units for which a FiT is established or for which the winner of the auction has acquired the right to support;
- SE Guaranteed Buyer is financially liable to the TSO for electricity imbalances of electricity producers included in its balancing group, only for generating units for which a FiT is established or for which the winner of the auction has acquired the right to support.

Similar changes have been made to the RES Electricity Purchase Procedure.

**16. AMENDMENTS TO THE PROCEDURE FOR ESTABLISHING, REVISING AND TERMINATING THE FEED-IN TARIFF**

**16.1. NEURC RESOLUTION “ON AMENDMENTS TO THE PROCEDURE FOR ESTABLISHING, REVISING AND TERMINATING THE FEED-IN TARIFF FOR ELECTRICITY FOR BUSINESS ENTITIES, ENERGY USERS, INCLUDING ENERGY COOPERATIVES AND PRIVATE HOUSEHOLDS OWNING ALTERNATIVE ENERGY GENERATING FACILITIES” NO. 1457 DATED 1 SEPTEMBER 2021**  
(Resolution No. 1457)

On 1 September 2021, NEURC adopted Resolution No. 1457 providing for amendments the Procedure for Establishing, Revising and Terminating the Feed-In Tariff for Electricity for Business Entities, Energy Users, including Energy Cooperatives and Private Households owning Alternative Energy Generating Facilities.

Resolution No. 1457 envisages that in case technical conditions for grid connection of the electricity facility or its construction stage (*start-up complex*), producing electricity from RES (*except blast furnace and coke oven gas, and using hydropower produced*

*only by micro, mini and small hydropower plants*) are invalid on the day of registration of the application for establishing / reviewing the FiT, such application shall be supported by a copy of the act on provision of grid connection services or a copy of the notification on provision of grid connection services for the electricity facility or its construction stage (*start-up complex*), issued during the period of validity of the technical conditions for grid connection.

**16.2. NEURC RESOLUTION “ON AMENDMENTS TO THE PROCEDURE FOR ESTABLISHING, REVISING AND TERMINATING THE FEED-IN TARIFF FOR ELECTRICITY FOR BUSINESS ENTITIES, ENERGY USERS, INCLUDING ENERGY COOPERATIVES AND PRIVATE HOUSEHOLDS OWNING ALTERNATIVE ENERGY GENERATING FACILITIES” NO. 138 DATED 3 FEBRUARY 2021**  
(Resolution No. 138)

On 3 February 2021, NEURC adopted Resolution No. 138 providing for amendments the Procedure for establishing, revising and terminating the FiT for electricity for business entities, energy users, including energy cooperatives and private households owning alternative energy generating facilities.

Resolution No. 138 provides for the following:

- The procedure on establishment, review and termination of FiT is applicable to RES facilities commissioned from 1 January 2020 that are not obliged to participate in auctions and with a total capacity not more than 1 MW (*for SPPs*) and 5 MW (*for WPPs*).
- When submitting an application for establishment and review of FiT, it is necessary to provide not only a copy of technical conditions for grid connection, but also a copy of grid connection agreement.
- Technical and economic indicators of electricity facility specified in the documents provided to SE Guaranteed Buyer for execution of PPA cannot be different at the time of submitting an application for establishment and review of FiT. These indicators include the increasing the value of the maximum design (*forecast*) load including the existing permitted capacity of the RES facility and the division of the RES facility into stages and/or start-up complexes with a capacity not exceeding 1 MW – for power plants producing electricity energy from solar energy, and 5 MW – for electricity facilities that produce electricity from wind energy, provided that there is a pre-PPA for such a RES facility.
- If after reconstruction, technical re-equipment or overhaul of the RES facility (*construction stage (start-up complex)*) with established FiT, the total installed capacity of such RES facility is reduced, FiT is established according to the provisions of Articles 9-1 and 9-4 of the Law of Ukraine “On Alternative Energy Sources”, but at the level of no more than the current FiT.

## **17. AMENDMENTS TO THE METHODOLOGY (PROCEDURE) OF FORMING THE PAYMENT FOR THE GRID CONNECTION TO TRANSMISSION SYSTEM AND DISTRIBUTION SYSTEM**

On 6 October 2021, NEURC approved Resolution No. 1700 “On Approval of Amendments to the Methodology (Procedure) of Forming the Payment for the Grid Connection to Transmission System and Distribution System”. The purpose of the changes is to simplify the process of obtaining the grid connection services.

The said resolution improves the procedure of calculating payment for standard and non-standard grid connections, the procedure of calculating the funds’ optimization rate by TSO, the procedure of reporting by DSO and TSO to NEURC, as well as establishes the control and responsibility for failure to submit such report on the provision of grid connection services in order to monitor the quality of grid connection services.

## **18. AMENDMENTS TO THE PROCEDURE FOR THE PURCHASING ELECTRICITY FROM ALTERNATIVE ENERGY SOURCES BY SE GUARANTEED BUYER**

On 1 December 2021, NEURC approved a resolution “On Amending the Procedure for Purchasing Electricity from Alternative Energy Sources by SE Guaranteed Buyer” No. 2453, which amended and adjusted the terms for the submitting the schedules on release and consumption of electricity, as well as other information from RES producers to SE Guaranteed Buyer.

Among the legislation updates:

- The time required for electricity sellers to provide SE Guaranteed Buyer with the updated schedules on release and consumption of electricity has been changed from two hours 45 minutes to 55 minutes until the “closure of the intraday market”.
- Until 10:30 am the day before the trade, TSO, when anticipating the instructions for the unloading of RES producers, shall provide SE Guaranteed Buyer with information on the hourly permissible power limits that RES producers can carry and which are equivalent to the hourly amount of electricity release, cumulatively for all RES generating units of producers, which are included to the balance group of SE Guaranteed Buyer, on each trade zone according to the established form. TSP publishes the information on the hourly permissible power limits on its website.

## **19. APPROVAL OF THE ASSESSMENT REPORT ON COMPLIANCE (SUFFICIENCY) OF GENERATING FACILITIES FOR SATISFYING THE FORECAST DEMAND ON ELECTRICITY AND PROVIDING NECESSARY RESERVE IN 2020**

(“Resolution No. 975”)

On 16 June 2021, NEURC approved a resolution “On Approval of the Report on Compliance Assessment (Sufficiency) of the Generating Facilities for Satisfying the Forecast Demand on Electricity and Providing Necessary Reserve in 2020” No. 975.

Resolution No. 975 provides for the approval of the Report on Compliance Assessment (Sufficiency) of the Generating Facilities for Satisfying the Forecast Demand on Electricity and Providing Necessary Reserve in 2020 (*hereinafter – the “Report”*), as well as the actions to be performed by NPC Ukrenergo to implement this Report, including as follows:

- NPC Ukrenergo undertakes to publish the Report on its official website for public access.
- NPC Ukrenergo shall submit a paper and electronic version of the Report to the Ministry of Energy of Ukraine.
- Until 15 September 2021, NPC Ukrenergo should consult with NEURC on improvement of Methodology of Assessment of Compliance Assessment (Sufficiency) of the Generating Facilities, long-term scenarios of demand and supply development in the IPS, most likely (*basic*) scenario for the next 10 years, accepted assumptions and selected modelling conditions for preparation of the corresponding Report in 2021.

## **20. NPC UKRENERGO HAS BEEN WARNED OF FURTHER PREVENTION OF ITS NON-COMPLIANCE WITH THE REQUIREMENTS OF REGULATIONS ON THE FUNCTIONING OF THE ELECTRICITY MARKET AND VIOLATION OF LICENSE TERMS**

(“Resolution No. 1052”)

On 25 June 2021, NEURC approved a resolution “On Warnings of NPC Ukrenergo Regarding Further Prevention of its Non-compliance with the Requirements of Regulations on the Functioning of the Electricity Market, Violation of License Terms for the Electricity Transmission, and the Implementation of State Regulation Measures” No. 1052 (*with further amendments made by the NEURC Resolution No. 1711 dated 6 October 2021*).

The Resolution No. 1052 was approved as a result of a scheduled inspection of Ukrenergo. NEURC found out that NPC Ukrenergo violated a number of License Terms requirements on conducting the business activity for supplying electrical energy to the consumer,

Law of Ukraine “On the Electricity Market”, Instructions for filling out reporting forms, Market rules and other regulations of the NEURC. Among the violations of NPC Ukrenergo: failure to conclude agreements required to operate in the electricity market, unsettled electricity imbalances, non-implementation of the investment program approved by the NEURC, violation of the requirements of the instructions on filling in the annual reports, non-issuance of EIC codes, etc.

By approving the Resolution No. 1052, NEURC has warned Ukrenergo against further violations, and also obliged to:

- provide NEURC with duly completed reports for previous years;
- refund in full the participants of electricity market who have paid NPC Ukrenergo’s invoices for the charge of non-compliance with the provision of balancing services, issued in December 2019;
- provide duly certified copies of supporting documents (*conclusions*) of the relevant body of state executive power on the absence of the need to obtain certificates (*declarations*) on the commissioning of completed facilities, the list of which is determined by the Resolution of NEURC No. 1052.

## 21. ESTABLISHING A TARIFF FOR ELECTRICITY TRANSMISSION SERVICES OF NPC UKRENERGO FOR 2022

On 1 December 2021, NEURC approved a resolution “On Establishing a Tariff for Electricity Transmission Services of NPC “Ukrenergo” for 2022” No. 2454.

Thus, the NEURC set the tariff for electricity transmission services at UAH 345.64 / MWh (*excluding VAT*).

## 22. AMENDMENTS TO THE TAX CODE OF UKRAINE

(“Law No. 1914-IX”)

On 30 November 2021, Ukrainian Parliament adopted a Law of Ukraine No. 1914-IX “On Amendments to the Tax Code of Ukraine and Certain Legislative Acts of Ukraine on Ensuring Balance of Budget Revenues”, also known as Draft Law No. 5600

As a result, from 2022 electricity producers at FiT (*hereinafter* – “RES Producers”) will have the right to determine the income tax liability subject to certain features defined by Article 58 of subsection 4 of the Final Provisions of the Tax Code of Ukraine.

In fact, this means that in case of non-payment for electricity deliveries by an off-taker (*primarily SE Guaranteed Buyer*) until the end of the reporting period, for tax purposes the income for such electrici-

ty and the cost of its production will be determined based on a cash method, i.e., will be related to the time of actual payment for electricity sold. Technically, this will be achieved by adjusting (*increasing and decreasing*) the pre-tax financial result. Thus, the RES producer will not have to pay income tax on unpaid electricity. In turn, this will support the liquidity of RES producers, who have significant outstanding receivables, but at the same time incur operating costs, repay loans etc.

While discussing the draft Law on Amendments to the Tax Code, some MPs proposed to introduce an excise tax of 3.2% for the sale of green electricity. The UWEA greatly criticised it; finally, the above-mentioned proposal was rejected by the Parliament.

## 23. ADOPTION OF THE LAW ON THE STATE BUDGET OF UKRAINE FOR 2022

(Law No. 1928-IX)

On 2 December 2021, Ukrainian Parliament adopted the Law of Ukraine “On the State Budget of Ukraine for 2022” No. 1928-IX, which entered into force on 1 January 2022.

According to paragraph 10 of clause 3 of the Final Provisions of this law, in 2022, part 3 of Article 8 of the Law of Ukraine “On Alternative Energy Sources” was suspended. It means that CMU could no longer allocate funds from the state budget for the financial support of the SE Guaranteed Buyer to pay for electricity produced from RES in the amount of not less than 20% of the forecast output of marketable electricity products from RES for the respective year.

This provision was a key reason for the NEURC to reject increasing the tariff for electricity transmission services proposed by the NPC Ukrenergo and supported by the UWEA.

## 24. LAND AND CONSTRUCTION

### 24.1. IMPROVING THE UNIFIED STATE ELECTRONIC SYSTEM IN THE CONSTRUCTION SECTOR

(“Resolution No. 681”)

On 23 June 2021, CMU approved a resolution “Some Issues of Ensuring the Functioning of the Unified State Electronic System in the Construction Sector” No. 681, which approved the Procedure for maintaining the Unified State Electronic System in the Construction Sector (*hereinafter* – “USESCS”), aimed at improving the functioning of the USESCS.

Upon the establishment of the USESCS, individuals and legal entities can receive construction services in electronic form through web-portal Diia, without personal visits to authorized bodies, which simplifies the process of obtaining relevant services



and reduces bureaucratization and corruption risks. For instance, the developers of renewable energy projects with the help of USESCS can receive the following services:

- obtaining urban planning conditions and building restrictions;
- submitting a notification on commencement of construction works;
- obtaining a permit for construction work;
- registering the commissioning completion declaration;
- obtaining a commissioning completion certificate; and
- assigning the property address.

USESCS also contains the documents and information, provided by the Law of Ukraine “On Energy Efficiency of Buildings” No. 2118-VIII dated 22 June 2017 for energy audit and control of energy efficiency of buildings, including:

- specialists in energy efficiency audit of buildings;
- energy certificates, their extracts, information about their independent monitoring;
- agreements on certification of energy efficiency of buildings; and
- reports on the results of inspection of engineering systems of the building.

#### 24.2. CHANGE OF RULES OF LAND USE FOR ALLOCATION OF LINEAR OBJECTS OF ENERGY INFRASTRUCTURE

(“Law No.1423-IX”)

On 27 May 2021, the Law of Ukraine “On Amendments to Certain Legislative Acts of Ukraine on Improving the Management and Deregulation System in the Sphere of Land Relations” No. 1423-IX entered into force.

Law No. 1423-IX supplemented Article 76 of the Land Code of Ukraine with clause 4, stipulating that for the placement of linear energy infrastructure facilities, it is not required to change the purpose of the land on which such facilities are located. The linear energy infrastructure facilities can be located on any category of land.

Also, it supplemented Article 101 of the Land Code of Ukraine and defined that in case of transfer of the title to the energy facility or electricity transmission facility, for installation of which the easement rights are established, the land easement rights pass to the new owner of such facility on the same terms as were established for the original easement holder. Thus, the state registration of the land easement rights will take place on the basis of documents certifying the transfer of the title to the energy facility or electricity transmission facility for which the easement rights are established. In this case, the will of the landowner (*land user*) and amendments to the agreement on the establishment of land easement are not required.

## 3.1. THE KEY LEGISLATIVE ACTS, EXPECTED TO BE APPROVED IN 2022



### 1. DRAFT LAW OF UKRAINE “ON STATE ENVIRONMENTAL CONTROL” NO. 3091

On 15 July 2021, Ukrainian Parliament adopted the Draft Law of Ukraine “On State Environmental Control” No. 3091.

The purpose of the Draft Law is to create a clear and straightforward procedure for guaranteeing implementation of the Articles 13, 16, 50, 66 of the Constitution of Ukraine, achieving sustainable development and implementing the provisions of the Agreement between Ukraine and the EU on strengthening the function of state control over the environment.

Currently, the Draft Law provides for the following changes:

- introduction of a new concept of “state environmental control”;
- establishment of a single body of state environmental control and reforming the system of bodies and procedures of state environmental control;
- creation of an automated system “Environmental Inspector” – a unified automated system for

collecting, accumulating, and systematizing information on state environmental control measures, designed to ensure transparency of environmental control measures, generalize and publish information on state environmental control measures, coordinate the work of its bodies, study effectiveness and legality of state environmental control measures; and

- expanding measures of state environmental control and improving the procedure for planning the implementation of state environmental control.

### 2. DRAFT LAW OF UKRAINE “ON AMENDMENTS TO CERTAIN LAWS OF UKRAINE ON PREVENTION OF CRUELTY TO ANIMALS AND IMPLEMENTATION OF INTERNATIONAL OBLIGATIONS FOR THE PROTECTION OF WILD ANIMALS” NO. 5342

On 2 June 2021, the Committee on Environmental Policy and Nature Management recommended Ukrainian Parliament to adopt the Draft Law of Ukraine “On Amendments to Certain Laws of Ukraine

on Prevention of Cruelty to Animals and Implementation of International Obligations of the Protection of Wild Animals” No. 5342.

The Draft Law envisages that in order to avoid the birds and bats mortality caused by the wind power plants’ operation, from 1 January 2024 onwards wind farms which are not equipped with special devices that prevents the death of birds and bats should be stopped and shutdown.

Special devices include:

- radar systems that slow down or stop the movement of the blades of wind turbines in the event of approaching birds; and
- ultrasonic deterrent systems that prevent the approach of bats to wind power plants.

The technical regulations of the above equipment will be approved by the CMU. The Draft Law also proposes to ban the placement of wind farms on the birds’ migration routes.

### **3. DRAFT LAW OF UKRAINE “ON AMENDMENTS TO THE TAX CODE OF UKRAINE ON STABILIZATION OF SETTLEMENTS ON THE ELECTRICITY MARKET” NO. 5399**

On 12 July 2021, the Budget Committee received the Draft Law of Ukraine “On Amendments to the Tax Code of Ukraine on Stabilization of Settlements on the Electricity Market” No. 5399. It envisages reducing the monetary liability for income tax payable by electricity producers at FiT (*hereinafter* – “RES producers”) due to the extension of usage of the cash method in terms of unpaid electricity until 1 January 2026.

In other words, RES producers will pay income tax only for the amount of electricity purchased, and not on the amount of electricity released to the network, as is currently the case. In this regard, the Draft Law proposes the following procedure for calculating income tax: corporate income tax for the quarter × payment coefficient for sold electricity at FiT for the quarter = income tax by the cash method.

Accordingly, the payment coefficient for the sold electricity is calculated as follows: the amount of payment received for electricity sold in the quarter at FiT: the total cost of electricity sold by the producer at FiT.

The Draft Law also proposes to extend the mechanism of applying the cash method to calculate value added tax required for payment by electricity market participants under clause 44 of Section XX of the Final Provisions of the Tax Code of Ukraine until 1 January 2026.

### **4. DRAFT LAW OF UKRAINE “ON AMENDMENTS TO THE LAW OF UKRAINE “ON ENVIRONMENTAL IMPACT ASSESSMENT” REGARDING THE IMPROVEMENT OF THE PROCEDURE OF ENVIRONMENTAL IMPACT ASSESSMENT” NO. 5766**

On 1 December 2021, the Committee on Environmental Policy and Nature Management recommended Ukrainian Parliament adopting the Draft Law of Ukraine “On Amendments to the Law of Ukraine “On Environmental Impact Assessment” Regarding the Improvement of the Procedure of Environmental Impact Assessment” No. 5766.

The draft law envisages:

- application of electronic document management rules to the procedure for obtaining an EIA report;
- introduction of a preliminary analysis of the EIA report – a transitional stage at which Ministry of Environment or the Department of Ecology of the Regional State Administration communicates with the EIA entities regarding the necessity to provide additional information to the EIA report;
- introduction of requirements to notification on the necessity to provide additional information for EIA report and to the procedure of consideration by the business entity of the notification on the necessity to provide additional information for the EIA report;
- establishment of the grounds for a refusal to issue an opinion on the EIA and procedures and of the right to re-submit EIA report by the EIA entity in case of elimination of the grounds for the previous refusal; and
- introduction of requirements to the form and content of the decision on the refusal to issue an EIA opinion.

### **5. DRAFT LAW OF UKRAINE “ON AMENDMENTS TO THE CERTAIN LEGISLATIVE ACTS OF UKRAINE ON THE STIMULATING THE PRODUCTION OF ELECTRICITY FROM ALTERNATIVE ENERGY SOURCES ON A MARKET BASIS”**

On 28 August 2021, Ministry of Energy of Ukraine published the Draft Law of Ukraine “On Amendments to the Certain Legislative Acts of Ukraine on the Stimulating the Production of Electricity from Alternative Energy Sources on a Market Basis” to provide RES producers with the right to sell electricity on the market independently.

The draft law provides for opportunities to switch from the Feed-in tariff system to Feed-in Premium.

The Feed-in Premium model will provide RES producers with compensation from SE Guaranteed Buyer in the amount of the difference between the auction sale price or FiT and the market price of elec-



tricity. The market price will not be less than the day-ahead market price.

By amending the Laws of Ukraine “On the Electricity Market”, “On Alternative Energy Sources”, “On Lease of State and Municipal Property”, it is planned to increase the accuracy of anticipation of the DSO electricity release due to full responsibility for imbalances of RES producers, as well as reduce imbalances of SE Guaranteed Buyer on the market.

#### **6. DRAFT LAW OF UKRAINE “ON AMENDMENTS TO THE CERTAIN LEGISLATIVE ACTS OF UKRAINE ON THE DEVELOPMENT OF THE ENERGY STORAGE SYSTEMS” NO. 5436-Д**

On 16 November 2021, Ukrainian Parliament adopted the Draft Law of Ukraine “On Amendments to the Certain Legislative Acts of Ukraine on the Development of the Energy Storage Systems” No. 5436-Д.

According to the Draft Law, energy storage means the activities for the extraction of electricity from the IPS or from the own power plants, its storage, including its conversion using physical, chemical and other processes into another form of energy in which it could be stored, and further conversion into electricity for further deliveries to the transmission system or distribution system or the power plant network or consumer network.

Energy storage systems aim to optimize electricity production. The Draft Law introduces a new player in the energy market, namely the energy storage system operator. It will perform energy storage activities to sell or provide balancing services.

As a general rule, energy storage activities will be subject to licensing if the value of the installed capacity of ESS exceeds the limit set in the relevant license terms. Thus, an electricity producer will have the right to use ESS without a license if the capacity of electricity supply does not exceed the installed capacity of power plants of such producer, and consumers, for instance, if they do not supply electricity previously accumulated in the ESS to the relevant market.

However, neither DSO nor TSO has a right to own, manage or operate ESS, except the cases, when ESS owned by DSO or TSO is fully integrated network components with the permission of the NEURC to use them or if specific requirements are fulfilled.

The Draft Law also addresses FiT system. There are no special features of the feed-in tariff establishment for ESS users, as the ESS operation will be carried out on a market basis. Installation of ESS by electricity producers at FiT or who have become el-

igible for support as a result of the auction is not a basis for reviewing the provided FiT or auction price for the fulfilment of the list of requirements established by Draft Law No. 5436-Д.

#### **7. DRAFT LAW OF UKRAINE “ON AMENDMENTS TO THE CERTAIN LEGISLATIVE ACTS OF UKRAINE ON THE REGULATION OF SECURITY OF ELECTRICITY AND NATURAL GAS SUPPLY”**

On 20 December 2021, Ministry of Energy of Ukraine published on its website the finalized Draft Law “On Amendments to the Certain Legislative Acts of Ukraine on the Regulation of Security of Electricity and Natural Gas Supply”.

The Draft Law aims to amend the Law of Ukraine “On the Electricity Market” and the Law of Ukraine “On the Natural Gas Market” in terms of regulation of the monitoring of the electricity supply security, energy supervision of the natural gas market to ensure reliable and efficient operation of IPS.

The purpose of the Draft Law is to ensure uninterrupted and secure supply of electricity and natural gas to consumers by strengthening the control and influence of the state on compliance with regulations in relevant spheres by participants of the electricity and natural gas markets (*except for household consumers and consumers not included in a special group of consumers*).

#### **8. DRAFT LAW OF UKRAINE “ON AMENDMENTS TO THE LAW OF UKRAINE “ON THE ELECTRICITY MARKET” REGARDING THE INTRODUCTION OF AN INTERIM ADMINISTRATION IN THE EVENT OF A THREAT TO THE SECURITY OF ELECTRICITY SUPPLY”**

On 1 December 2021, Ministry of Energy of Ukraine published the Draft Law “On Amendments to the Law of Ukraine “On the Electricity Market” Regarding the Introduction of an Interim Administration in the Event of a Threat to the Security of Electricity Supply”.

According to the Draft Law, it is proposed to introduce interim administrations to:

- business entities operating in the energy sector in case of violation of the supply security, the criteria/types of which are specified in the Rules on security of electricity supply; and
- participants of the electricity market-natural monopoly entities in case of violation by them of licensing requirements of economic activity of such entities.

Accordingly, the Draft Law expands the list of violations in the electricity market, supplementing it with violations of security rules of electricity supply and non-submission, late submission or submission of knowingly inaccurate information required by the Ministry of Energy of Ukraine to monitor security of electricity supply, causing administrative liability in the form of:

- warning on the necessity to address violations;
- fine;
- suspension of the license; and
- revocation of the license.

Such interim administrations will be introduced by the decision of the CMU for a period not exceeding 6 months with the possibility of its extension. In this case, the powers of all management bodies of the electricity market participant will be transferred to the interim administrator, and all assets and/or corporate rights of electricity market participants that violated the rules on security of electricity supply will be transferred to state enterprises, institutions, organizations or state joint-stock companies.

## **9. DRAFT LAW OF UKRAINE “ON AMENDMENTS TO CERTAIN LAWS OF UKRAINE ON PREVENTION OF ABUSE IN WHOLESALE ENERGY MARKET” NO. 5322**

On 1 April 2021, Ukrainian Parliament received the Draft Law of Ukraine “On Amendments to Certain Laws of Ukraine on Prevention of Abuse in Wholesale Energy Market” No. 5322.

The Draft Law is developed to implement EU Regulation No. 1227/2011 of 25 October 2011 on wholesale energy market integrity and transparency (REMIT).

The Draft Law provides for the following:

- prevention of abuse by participants of wholesale energy market; and
- establishment of liability for participants for energy market manipulations, as well as for trading on the basis of insider information.

## **10. CMU DRAFT RESOLUTION “ON AMENDMENTS TO CERTAIN CMU RESOLUTIONS ON IMPROVEMENT OF COMPETITIVE CONDITIONS FOR STIMULATING PRODUCTION OF ELECTRICITY FROM ALTERNATIVE ENERGY SOURCES”**

On 14 May 2021, Ministry of Energy of Ukraine published the Draft Resolution “On Amendments to Certain CMU Resolutions on Improvement of Competitive Conditions for Stimulating Production of Electricity from Alternative Energy Sources”.

The Draft Resolution aims at improving the procedure of conducting the auctions for the allocation of quotas to support renewable energy. Such improvements will facilitate the transition to a new model of supporting renewable energy that is more market competitive, as well as adherence to competitive principles in the case of providing support to RES producers. The Draft Resolution also ensures that the interests of both the state and electricity consumers to be treated equally.

The Draft Resolution also proposes the following updates:

- an expanded list of types of auctions conducted through the electronic trading system;
- a separate procedure for conducting the auctions of buildings and other capital structures, the roofs and/or facades of which are offered for auction with buildings;
- supplemented list of information to be provided during the announcement of the conduction the auction; and
- clarified requirements to banks that can provide bank guarantees for participation in the auction.

## **11. DRAFT RESOLUTION OF NEURC “ON APPROVAL OF METHODOLOGY ON ESTABLISHMENT OF MARGINAL PRICES ON THE DAY-AHEAD MARKET, INTRADAY MARKET AND BALANCING MARKET AND AMENDMENTS TO CERTAIN NEURC RESOLUTIONS”**

The methodology provided by the Draft Resolution of NEURC is necessary to establish the marginal price i.e., temporary minimum and/or maximum price limits on the day-ahead market, intraday market and balancing market for each trading area with appropriate justification in case of significant price fluctuations.

The Draft Resolution specifies the following initiatives on the day-ahead market, intraday market and balancing market:

- procedure for determining significant price fluctuations;
- procedure for setting marginal prices (*temporary minimum and/or maximum price limits*); and
- level of marginal prices (*temporary minimum and/or maximum price limits*).





# IV UWEA'S ACTIVITIES

Photo by Konstantin Brizhnichenko



Whereas in 2020, the activities of the RES sector were restricted to online format due to the COVID-19 pandemic, in the second half of 2021 the events were conducted both in online and offline formats. It worth noting that after long-term isolation, in 2021 the national and international RES market stakeholders were increasingly striven to meet live not only in Ukraine but also abroad.

The UWEA's representatives participated in both national and international events. Thus, they took part in the Presidential Forum "Ukraine 30", All-Ukrainian Energy Forum, VI Business & Legal Energy Forum and represented the Ukrainian wind market in Denmark, the United Arab Emirates, the United Kingdom, Austria, Poland, Turkey, and Romania.

Against a background of unpredictability of legislation (*some legislative initiatives risked hampering wind development*), spreading fakes and false information in the national media, the Ukrainian Wind Energy Association continued to advocate the Ukrainian wind power market both at the national and international levels. Moreover, last year the UWEA expanded the scope of its activity and improved its organisational structure.

In 2021 the UWEA successfully held the **two-day Annual International Conference 2021**, dedicated to the transition from the FiT to market conditions, which was attended by 33 international and national speakers and more than 500 participants from 25 countries.

In 2021 the UWEA formed its **Legal Committee** comprising representatives from 12 law firms and counselors from three wind power companies – DTEK Renewables, UDP Renewables, and Elementum Energy (*all of them are UWEA's member companies*). The UWEA Legal Committee's activity aims at enhancing RES legislation and addressing pressing problems in the wind power sector of Ukraine.

In order to pursue a fair and transparent policy on wind energy development, interact with public authorities openly, cooperate with each other on equal terms, adhere to the principles of confidentiality, information security, and occupational safety, protect the environment and comply with all business and ethical standards, the UWEA's Board adopted the **UWEA's Code of Business Conduct and Ethics** in 2021. The Code enshrines respect for human rights and business partners.

Similarly, with a view to ensuring the rational use of natural resources and reducing the impact of economic activities on the environment, in December 2021, the participants of the UWEA's General Assembly approved the **UWEA's Policy for Sustainable Development**.



This year the UWEA began to actively explore the prospects for offshore wind power development as well as the role of wind energy for "green" hydrogen production in Ukraine. Under its new activities relating to the offshore wind capacity-building in Ukraine, the UWEA together with its trustworthy partners published the White Paper "Offshore Wind Power and "Green" Hydrogen: Harvesting Ukraine's New Power Capacities", advocated the inclusion of offshore wind and "green" hydrogen into the National Renewable Energy Development Action Plan until 2030, presented the potential and benefits of offshore wind power at national and international conferences and events including meetings with the state authorities and the UWEA's Member Companies. The UWEA cooperated with the World Bank, the Danish-Ukrainian and German-Ukrainian Energy Partnerships and visited Turkey, where it signed the **Protocol on Initiating Black Sea Offshore Wind Energy Federation** with Turkish Offshore Wind Energy Association. The Federation is set to encourage and support the cooperation in the field of offshore wind power development among the offshore wind energy associations of the Black Sea Region. The expected founding members of the Federation include offshore wind energy associations from Turkey, Bulgaria, Georgia and Romania.

Like in previous years, much attention was paid to capacity building. Thus, in May 2021 Galyna Shmidt, a Member of the UWEA Board and co-author of a book for children "Sekrety Vitru" (*Secrets of the Wind*) presented this first Ukrainian book on wind power at 2021 International Book Arsenal Festival in Kyiv, where she also talked with kids about the environment, their green habits, renewable energy sources and, of course, about wind energy.

The UWEA member companies were also active in disseminating the book among local communities' schools. **Vindkraft Kalanchak LLC** congratulated schoolchildren of the Skadovsk and Kakhovka districts of Kherson region with the beginning of the 2021 school year. **Eurocape Ukraine I LLC** presented



the books to local schools in Zaporizhzhia region. The MC Wind Parks of Ukraine, DTEK Renewables LLC and WindFarm LLC showed similar activities in Mykolaiv, Zaporizhzhia and Donetsk regions of Ukraine, while Elementum Energy Ukraine LLC conducted a creative project competition “Kids for Clean Planet: Secrets of Wind” and awarded winners with valuable prizes.

The UWEA also expanded the scope of its information activity. In addition to its **weekly newsletters**, *(there were 49 newsletters issued in 2021)*, the UWEA initiated a weekly **Global Wind Energy News** on the latest updates in the global wind energy market.

During the year, the Association closely cooperated with national energy industry bodies. The UWEA representatives were members of Public Councils at the Ministry of Energy of Ukraine, the NEURC, and SAE. The measures taken in support of the national wind development and wind market players included **20 letters by the UWEA addressed different state authorities, 18 joint letters with other national RES industry associations**. The UWEA also participated in more than **20 workshops** with representatives of the Ministry of Energy of Ukraine, NEURC, SE Guaranteed Buyer, and the SAE; expressed the position of the market at **12 press conferences, round tables and expert discussions**; presented the

Ukrainian wind sector at **31 national and 9 international wind industry events**. The UWEA publicly expressed the position of wind investors in more than **15 interviews and 17 articles**.

As a result, the UWEA was enriched by new Member Companies and Partners. **16 new companies** joined the Association: Elementum Energy, Energy, Everlegal, TotalEren, Discovery, GoldWind, WindAero, Envision, LLC Communication, and Construction Company, Electroservice, Electroservice-Yug LLC, LLC Vitry Khmelnychchyn, Nazali, EDS, UFB Engineering, and BOTC Training.

In order to expand the partnership aimed at developing sustainable power sector in Ukraine a number of Memorandums on Partnership and Cooperation were concluded by the UWEA, in particular with IFA “Clean Energy – Healthy Environment”, Professional Association of Ecologists of Ukraine, National University of Kyiv Polytechnic Institute, Turkish Offshore Wind Energy Association, Creditwest Bank, Institute of International Relations, International Platform Enloop, and Ukrainian Bar Association.

**Andriy Konechenkov**, Chairman of the UWEA Board and Vice President of the World Wind Energy Association, entered the list of TOP men who drive environmental policy in Ukraine, initiated by national industry media Ecopolitika.



THE UWEA SECRETARIAT EXPRESSES ITS SINCERE GRATITUDE TO ALL ITS MEMBERS AND PARTNERS FOR THEIR SUPPORT, FRUITFUL WORK, AND PROFESSIONALISM.



## 4.1. HIGHLIGHTS OF THE YEAR

### **TWO-DAY UWEA'S ANNUAL INTERNATIONAL EVENT BROUGHT TOGETHER ONLINE LEADING INTERNATIONAL ORGANIZATIONS, MARKET PLAYERS, AND DEVELOPERS OF UKRAINE**

On April 20-21, 2021, the Ukrainian Wind Energy Association successfully held a large-scale International Conference “Wind power sector of Ukraine: transition from “green” tariff to market conditions”. The event was organized by the UWEA in partnership with WindEurope and with the support of the Ministry of Energy of Ukraine and the State Agency on Energy Efficiency and Energy Saving of Ukraine. Vestas Northern & Central Europe became the General Sponsor of the Conference. Information support of the conference was provided by member companies and permanent partners of the UWEA, namely: UDP Renewables, Professional Association of Ecologists of Ukraine, Turkish-Ukrainian Industrialists and Businessmen Union, a platform for investment in renewable energy GetMarket, Energoreforma, Elektrovesti, and ExproConsulting. Due to the quarantine restrictions, this year UWEA's Event was held online; the conference studio operated in the heart of Kyiv, in Independence Square.

More than 500 participants from 25 countries participated in the Event, namely from Ukraine, Germany, South Africa, Austria, Hungary, Denmark, India, Bulgaria, Turkey, Spain, Chile, Sweden, France, Qatar, Greece, Georgia, the United Kingdom, Uzbekistan, the Czech Republic, Slovakia, Serbia, Belarus, Latvia, the Netherlands, and Montenegro.

The two-day conference gathered together representatives from public authorities including the Ministry of Energy of Ukraine, the Ministry of Reintegration of Temporarily Occupied Territories of Ukraine, the State Agency on Energy Efficiency and Energy Saving of Ukraine, the NEURC, Members of Parliament, representatives from leading international organizations such as International Energy Agency, BloombergNEF, Wood Mackenzie, and electricity market players including NPC Ukrenergo, SE Guaranteed Buyer, wind turbine manufacturers and wind power generators to explore market-based instruments for wind development effective in EC and exchange their views and ideas for further development of the Ukrainian wind power sector after 2022.

The Conference was opened by Ole Mikkelsen, the Ambassador Extraordinary and Plenipotentiary of the Kingdom of Denmark to Ukraine, Georgia, and Armenia.

In his opening speech Nils de Baar, President of Vestas Northern & Central Europe, pointed out: “I am really happy that Ukraine is back on track on the energy transition. It overcame the period of uncertainty to reach the retroactive changes in the renewable energy program and the COVID-19 restrictions. There is already 1.3 GW wind capacity installed, more than a half are Vestas turbines.”

Giles Dixon, CEO of WindEurope, presented the economic and environmental benefits of wind energy:

20-21 APRIL 2021 | 10:00 – 13:00 (EET), online

### Annual UWEA's Event 2021

## WIND POWER SECTOR OF UKRAINE: TRANSITION FROM “GREEN” TARIFF TO MARKET CONDITIONS



International Partner:



General Sponsor:







*“Wind industry contributes EUR 37 bln to EU GDP. Each new turbine generates on average EUR 10 mln economic activity”.*

The representatives of the International Energy Agency, BloombergNEF and WoodMackenzie outlined the global trends in the development of renewable energy sources and provided an expert assessment of Ukraine’s investment attractiveness.

With heightened attention, the conference’s participants listened to the presentations from wind turbine manufacturers that had been operating in the Ukrainian market for many years, namely Vestas, GE, Nordex Acciona, and MC Wind Parks of Ukraine. The manufacturers’ representatives presented their recent innovative solutions in wind technologies, while wind energy companies exchanged their visions and proposals for further industry development. The UWEA annual event 2021 also included presentation of a pilot project for the production of green hydrogen from wind energy in Ukraine and White Paper on the Development of Offshore Wind Energy in Ukraine.

<http://uwea.com.ua/en/news/entry/dvuhdnevnaya-mezhdunarodnaya-konferenciya-uvea-sobrala-onlajn-veduschie-me/>

## UWEA ANNUAL GENERAL ASSEMBLY

UWEA Annual General Assembly was successfully held on 7 December 2021. The representatives of the UWEA member companies gathered together to review the current status of the wind power market and the UWEA’s activities over the past year. 64 representatives of the UWEA member companies and respective partners participated in the event, including members of the UWEA Board, newly established UWEA Legal Committee and UWEA Secretariat.

In his opening presentation, Andriy Konechenkov, Chairman of the UWEA Board, who chaired the meeting, highlighted key challenges of the passing year, summarized the achievements of Ukraine’s wind power sector and the main outcomes of 2021 UWEA’s activities.

This year’s UWEA General Assembly was marked by a number of important decisions to strengthen

the UWEA’s role in the RES market of Ukraine. Thus, the participants unanimously adopted the **Sustainability Policy of the UWEA** to consolidate sustainable practices in the association’s corporate culture and approved the **UWEA’s Annual Action Plan for 2022** to address the key challenges facing the national wind industry.

**Andriy Konechenkov** was unanimously elected as a Chairman of the UWEA Board for the next 5-year period in accordance with the Charter. **Andriy Nemchenko** from Syvashenergoprom LLC, **Loic Lermينياux** from Guris and **Iryna Mazur** from EuroCape Ukraine 1 were elected to the UWEA’s Audit Commission for a 5-year period, while **Anatoliy Vlasenko** from Vindkraft Kalanchak LLC, **Maris Kunickis** from DTEK Renewables and **Yuriy Petrushko** from Alternatyvna enerhetyka Halychyny LLC were elected to the UWEA’s Supervisory Board.

Finally, the participants of the meeting approved the current UWEA Board, as follows: **Andriy Konechenkov**, PU “UWEA”; **Galyna Shmidt**, UWEA-K LLC; **Maryna Hritsyshyna**, LF Sayenko Kharenko; **Zinovii Kozitskiy**, Eco-Optima LLC; **Viktoria Syromiatova**, Total Eren; **Vlad Kazak**, Emergy; **Anton Mishyn**, DTEK Renewables; **Mykhailo Chulkov**, EuroCape Ukraine I; **Alexander Podprugin**, Elementum Energy Ukraine; **Andriy Sergienko**, MC Wind Parks of Ukraine LLC; **Ruslan Souchuk**, Vindkraft Ukraine LLC; **Yuriy Zhabskyy**, WindFarm LLC; **Loic Lermينياux**, Guris; **Mykola Savchuk**, Gresa Group LLC; **Sergiy Yevtushenko**, UDP Renewables.

<http://uwea.com.ua/en/news/entry/uvea-podvela-itogi-godovoj-deyatelnosti/>



## 4.2. PARTICIPATION IN LEGISLATIVE PROCESS AND COOPERATION WITH STATE AUTHORITIES

For the whole year, the UWEA experts participated in drafting legislation to improve the functioning of both Ukraine's energy market and, in particular, the national renewable energy market. The UWEA provided its comments and proposals to such draft laws of Ukraine as "On the State Budget of Ukraine for 2021" No 5041, "On the Emerald Network" No 4461, "On Amendments to Certain Laws of Ukraine on the Prevention of Cruelty to Animals and the Implementation of International Commitments on the Wildlife Protection" No 5342, "On Amendments to Certain Laws of Ukraine on the Development of Energy Storage Systems" No 5436-д "On Amendments to Certain Laws of Ukraine on Stimulating the Production of Electricity from Alternative Energy Sources on a Market Conditions", "On Amendments to the Tax Code of Ukraine and Certain Laws of Ukraine on Ensuring Balance of Budget Revenues" No 5600, "On Amendments to the Law of Ukraine "On Electricity Market" on the Introduction of an Interim Administration in case of Threat of Security of Electricity Supply".

The UWEA commented also the draft resolutions of the Cabinet of Ministers of Ukraine, namely: "On Approvement of the Second Nationally Determined Contribution of Ukraine", "On Amendments to some Resolutions of the Cabinet of Ministers of Ukraine on Improving Competitive Conditions for Stimulating Electricity Production from Alternative Energy Sources", "On Approvement of Eligibility Assessment Criteria of the State Aid to Business Entities on Environmental Protection".

The UWEA team repeatedly provided its proposals to the NEURC's Draft Resolution "On Setting the Tariff for Electricity Transmission Services by NPC Ukrenergo for 2022" and the Transmission Code of Ukraine. Finally, the UWEA contributed to the National Action Plan for RES by 2030 and the Strategy of Low-Carbon Development of Ukraine by 2050.

### ROUND TABLE HEADED BY THE PRIME MINISTER OF UKRAINE

On February 4, 2021, Prime Minister of Ukraine Denys Shmyhal chaired a round table discussion on the National Economic Strategy 2030 titled "Energy

Sector Development, Mining and Effective Environmental Protection". Representatives of the Government, businesses, economic experts, and analysts took part in the event.

*"Ukraine is now at the crossroads between regulated and market energy sector. This applies to both the electricity market and the gas market. But our Government will definitely move towards the formation of full-fledged market relations. This is our path to the European Union, the introduction of fair tariffs and transparent rules of the game in the energy sector,"* said the Prime Minister.

During the round table, priority vectors of energy development, plans for the implementation of the European Green Deal initiative in Ukraine were presented. Denys Shmyhal named the integration of Ukraine's energy sector with the European energy system as another priority for the Government team. First of all, it concerns the integration of the United Energy System of Ukraine into the ENTSO-E, which is to take place in 2023.

### MEETING WITH THE MINISTER OF ENERGY OF UKRAINE

On February 18, 2021, the UWEA's member companies had a meeting with Yuriy Vitrenko, Acting Minister of Energy of Ukraine at that time. The UWEA's delegation included Andriy Konechenkov, Chairman of the UWEA Board, and representatives from such wind companies as UDP Renewables, GÜRIŞ, Vindkraft Ukraine, DTEK Renewables, Yuzhne Enerdzhi LLC, EuroCape Ukraine I, Elementum Energy, MC Wind Parks of Ukraine LLC and NBT.

The meeting participants discussed the current state of the national wind power market and focused on its further development and possible solutions to the crises caused by indebtedness and lack of a clear strategy for further wind energy development in Ukraine.

Andriy Konechenkov underlined the UWEA's readiness to facilitate the development of the Road Map for Wind Power Development in Ukraine.





*"I think that it is our responsibility to develop this Road Map with the maximum involvement of all parties: market participants, investors, stakeholders, and consumers, both industrial and household. It is supposed to be a real document for sustainable development of the whole industry," the Acting Minister of Ukraine agreed.*

<http://uwea.com.ua/en/news/entry/investory-v-vie-vstretilis-s-i.o.-ministra-energetiki-ukrainy/>

### STUDY TRIP OF MEMBERS OF THE PARLIAMENT TO RES FACILITIES

Three RES industry associations in Ukraine, namely the UWEA, the UARE and the EUEA, as parties to the Memorandum of Cooperation and Partnership with Inter-Factional Deputy Association "Clean Energy – Healthy Environment", organized a study trip to the renewable energy facilities located in Odesa region for members of parliament on 22 May 2021. The trip was aimed at presenting wind and solar generation technologies in operation, establishing a direct dialogue between the RES investors and the Ukrainian legislators to provide cooperative effort to resolve the RES market crisis and stimulate further green energy transition of Ukraine. 9 MPs, led by Oleksiy Honcharenko, head of the IFA "Clean Energy – Healthy Environment", took part in the study trip.

During the visit issues related to the current situation on the Ukrainian RES market were highlighted by the RES investors' representatives, including such UWEA Member Companies as Elementum Energy, UDP Renewables, Vindkraft Kalanchak, MC Wind



Parks of Ukraine, WindFarm, MCL Group. Investors also paid attention to the irrationality and frequency of systematic curtailments of RES generation, applied by NPC Ukrenergo in the spring of 2021.

In his presentation on the current status and forecasted development of the Ukrainian wind energy sector under a gradual transition from "green" tariff to market conditions Andriy Konechenkov, Chairman of the UWEA Board, pointed out: *"One of the core priorities for the Ukrainian Wind Energy Association is to sustain comprehensive cooperation with the public authorities, especially with legislators. Our task is to provide constructive dialogue between the RES investors and MPs to elaborate a clear road map for the "green" transition of Ukraine."*

The MPs have visited two RES facilities, in particular, the solar power plant of TIUCanada with the capacity of 13 MW and the I Phase of the Dnistrovsk wind park of Elementum Energy with the capacity of 40 MW. The last one was commissioned in early May 2021.

<http://uwea.com.ua/en/news/entry/ot-solnca-k-vetru-oznakomitelnaya-poezdka-nardepov-na-obekty-s-vie-vmeste-s/>

### HEAD OF UWEA ANALYTICAL DEPARTMENT WAS ELECTED TO THE PUBLIC COUNCIL UNDER THE SAEE

Kateryna Knysh, Head of UWEA Analytical Department, took part in the first meeting of the Public Council at the SAEE, aimed at ensuring public participation in drawing up and implementing State policy on energy efficiency under the current legislation of Ukraine. The Public Council consists of 14 public representatives.

The Public Council key priorities for 2021 included submission the proposals to the Cabinet of Ministers of Ukraine on expanding the powers of the SAEE, the development of legislation on green hydrogen technology, offshore wind energy, energy efficiency, and decarbonization as well as on alternative RES support schemes.





## ROUND TABLE TALKS BETWEEN RES INVESTORS AND STATE AUTHORITIES

On the Global Wind Day, June 15, 2021, the RES investors discussed key issues of current Ukraine's renewable energy sector with the Minister of Energy of Ukraine, People's Deputies of Ukraine – members of the IFA "Clean Energy – Healthy Environment" and the Chairman of the Board of NPC Ukrenergo. The representatives from the Embassies of Denmark, Spain, the United Kingdom, Norway, and Lithuania also participated in the discussion.

In particular, the parties of the round table raised the status of implementation of the most critical issues of the Memorandum of Understanding between the Government and RES investors signed on June 10, 2020. In particular, the RES investors warned the Minister of Energy and MPs of Ukraine that in case of failure to resolve the crisis in the RES market, the state would lose forever its investment attractiveness as foreign and national investors would find it unprofitable to invest in a country with high (country) risks.

<http://uwea.com.ua/en/news/entry/vstrecha-investorov-v-vie-s-organami-gosudarstvennoj-vlasti-za-kruglym-stol/>

On the following day, Herman Haluschenko, the Minister of Energy of Ukraine had a meeting with the RES industry associations' representatives. Andriy Konechenkov, Chairman of the UWEA, Members of



the UWEA Board, and representatives of the UWEA Member Companies representing wind electricity generators took part in the meeting.

Scope of issues discussed during the meeting included problem of indebtedness in the RES market and possible ways of its resolution, implementation and support quotas for RES auctions in Ukraine. Herman Haluschenko informed on the mechanisms to solve the mentioned problems being developed by the Ministry of Energy, in particular, the issuance of green Eurobonds by NPC Ukrenergo to cover previous debts.

Special emphasis was placed on proposal on introducing excise tax on the RES electricity. RES investors called on the Ministry of Energy to withdraw this provision from the Draft Law No 5600.

[http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?jsessionid=479A9728AB33C-6C1E46D582196151252.app1?art\\_id=245548817@cat\\_id=244895180](http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?jsessionid=479A9728AB33C-6C1E46D582196151252.app1?art_id=245548817@cat_id=244895180)

## SPECIAL MEETING ON 800 MW WIND FARM PLANNED FOR CONSTRUCTION IN DONETSK REGION

On June 16, 2021, the Ministry for Reintegration of the Temporarily Occupied Territories held a special meeting devoted to 800 MW wind farm by WindFarm LLC planned for construction in Donetsk region. The meeting was attended by Andriy Konechenkov, Chairman of the UWEA Board, and Yuriy Zhabskyy, Member of the UWEA Board, Director of WindFarm LLC.

According to the Ministry, "the Concept of economic development of Donetsk and Luhansk regions approved by CMU Resolution №1660-r from December 23, 2020, provides for attracting investment for the development of alternative energy sources, including construction of wind and solar power plants in Donetsk and Luhansk regions. The Ministry of Reintegration actively works to implement these objectives..."

## MEETINGS WITH DERECTOR OF SE GUARANTEED BUYER

During the year, the UWEA representatives had a number of meetings with the SE Guaranteed Buyer on key problems of the renewable energy market including, reimbursement by the State of debts owing to green electricity producers, electricity imbalances and potential introduction of excise tax on RES electricity.

<http://uwea.com.ua/en/news/entry/predstaviteli-uvea-vstretilis-s-direktorom-gp-garantirovannaya-pokupatel/>

On 22 December 2021, Andriy Konechenkov, Chairman of the UWEA Board, together with Chairmen of other RES industry associations – the EUEA, the UARE, the ASEU had a meeting with Andriy Pylypenko, newly appointed Acting Director of the SE Guaranteed Buyer to discuss mutually beneficial professional cooperation to achieve the best performance of the SE Guaranteed Buyer, stable and timely payments to the RES producers for green electricity and provide national RES market stability.

## ONLINE DISCUSSION BY IFA “CLEAN ENERGY – HEALTHY ENVIRONMENT”

On July 16, 2021, IFA “Clean Energy – Healthy Environment” held the online discussion: “Environmental provisions of the Draft Law No 5600: legal aspects”. Participants and speakers of the discussion included people’s deputies – members of the IFA “Clean Energy – Healthy Environment”, counselors from law firms active in the energy sector, chairmen of the RES industry associations, experts and economists, representatives of the Ukrainian Ecological Academy of Sciences and the Institute of Market and Economic Research. The UWEA was represented by Andriy Konechenkov, Chairman of the UWEA Board.

In his commentary, Andriy Konechenkov stated that: *“The Draft Law No 5600 violates the Government’s commitments under the signed Memorandum of Understanding with RES investors and this is the key problem of this document.”*

## ONLINE MEETINGS WITH NPC UKRENERGO

On July 22, 2021 the national TSO NPC Ukrenergo hosted an online-meeting “Elaboration of scenarios on prospects of economy and energy development of Ukraine and related issues: medium and long-term vision and further steps”. Representatives of state authorities and direct players of Ukraine’s electricity market, including the UWEA, attended the online event.

The meeting was of a consultative nature, as representatives of the national RES sector provided their comments and recommendations for the elaboration of the “Report on compliance assessment (sufficiency) of generating facilities” annually prepared by NPC Ukrenergo.

On behalf of the UWEA, Andriy Konechenkov, Chairman of the UWEA Board, highlighted key gaps of all previous reports and noted *“I am deeply convinced that wind energy has excellent prospects and potential in Ukraine, as about 5,000 MW of wind energy projects have already received a construction permit.”*

In August 2021, as part of the series of Working Group’s meetings devoted to elaboration of scenarios on prospects of economy and energy development of Ukraine, NPC Ukrenergo conducted a round table “The perspectives of the renewable energy development” devoted to the elaboration of the Report on compliance assessment (sufficiency) of generating facilities”. The representatives from the Ministry of Energy of Ukraine, NEURC, and RES industry associations, including the UWEA, participated in the discussion.

Andriy Konechenkov, Chairman of the UWEA Board stressed the importance of involving relative industry associations in the elaboration process of the Report on compliance assessment (sufficiency) of generating facilities and proposed to provide the NPC Ukrenergo with data on the projected wind power additions for the next two years, based on the survey of the wind power market stakeholders, performed by the UWEA.

## THE WORKING GROUP ON LOW CARBON DEVELOPMENT

On 24 September, the Ministry of Environmental Protection and Natural Resources of Ukraine held the expert discussion among representatives of the Working Group on Low Carbon Development regarding the provisions of the Draft Law “On the basic principles (strategy) of low-carbon development of Ukraine”. Participants included representatives from state authorities and civil society. On behalf of the UWEA, the meeting was attended by Andriy Konechenkov, Chairman of the UWEA Board.

During the discussion, the experts rose the key question: how detailed the Draft Law should be and whether the document should include, in particular, sectoral objectives.

Zoryana Kozak, an expert and author of the Draft Law: *“Climate change issues has never been a subject area of the Ukrainian law. In addition, there is no law to provide a framework, goals, and mechanisms for climate regulation in Ukraine. Climate regulation is cross-sectoral in nature, and so far, this cross-sectoral nature has not been reflected in national legislation. Such legislative gaps can be addressed through the adoption of a separate law to establish the government policy and increase the political importance of the climate change issues.”*

## **PUBLIC HEARINGS ON THE ELECTRICITY TRANSMISSION TARIFF FOR 2022**

During the year, the UWEA participated in a number of public hearings on the electricity transmission tariff and the tariff for dispatch services (*operational and technological*) where its representatives used to criticise the proposed level of tariffs due to their insufficiency to cover all the expenditures.

At its public meeting held on 1 December 2021, the NEURC adopted the Resolution “On Setting the Tariff for Electricity Transmission Services by NPC Ukrenergo for 2022”. According to the adopted Resolution, tariff for electricity transmission services by NPC Ukrenergo was set at the level of UAH 345,64 per MWh.

The tariff rate proposed by the NEURC did not include 20% of projected volumes of “green” electricity generation in 2022, which amounts to UAH 10,82 bln. The NEURC claimed that such costs should be covered by State budget in line with Law 810-IX “On Alternative Energy Sources”, while the UWEA representatives used to stress that neither the Law “On the State Budget of Ukraine for 2021”, nor draft Law “On the State Budget of Ukraine for 2022” (*which was under consideration by the Parliament of Ukraine at that time*) provided for compensating the above-mentioned costs from the State Budget, which lead to the debt accumulation to the RES producers in 2021.

On 2 December 2021, the Verkhovna Rada of Ukraine approved Law “On State Budget of Ukraine for 2022”, which did not provide for the allocation in the State Budget for payment to the RES producers of the 20% of the value of projected volumes of “green” electricity generation. The UWEA appealed to the NEURC to increase the tariff rate for electricity transmission services by NPC Ukrenergo for 2022.

## **THE WORKING GROUP ON THE ELABORATION OF THE NATIONAL RENEWABLE ENERGY DEVELOPMENT ACTION PLAN UNTIL 2030**

On 7 October 2021, a Working Group on the elaboration of the National Renewable Energy Development Action Plan until 2030 at the SAEE held its meeting chaired by Valeriy Bezus, Head of the SAEE. The representatives from the Ministry of Energy of Ukraine, the Ministry of Infrastructure of Ukraine, the NEURC, NPC Ukrenergo and RES industry associations participated in the discussion. The UWEA was represented by Kateryna Knysh, Head of UWEA Analytical Department and Member of the Public Council of the SAEE.

Valeriy Bezus pointed: *“The establishment of specific development targets for each type of RES generation and for each energy and economy sector should be the priority for all parties involved in the elaboration process of the Action Plan.”*

In turn, Kateryna Knysh reminded the need for Ukraine to meet its international commitments on the decarbonization of the economy, including “green” hydrogen technologies development. She also noted the UWEA’s forecast on the wind power market development until 2025 and stressed the urgent need for balancing capacities, ESS and hybrid renewable power plants. Improvement of regulatory basis is needed with regard to distributed generation and implementation of Corporate PPA in the country. Special attention was paid to the development of offshore wind power in Ukraine.



## 4.3. INTERNATIONAL WIND EVENTS

### 4TH RENPOWER UKRAINE INVESTORS FORUM 2021

For two days – January 27-28, 2021, Ukraine hosted the 4th Edition of the RENPOWER Ukraine Investors Forum organized by Euroconvention Global in partnership with RES industry associations of Ukraine including the UWEA.

Speakers and participants discussed the expectations from the first RES auctions planned in Ukraine for 2021, technological opportunities for Ukraine under the EU Green Deal, future of “green” hydrogen and energy storage development in Ukraine. Much attention was paid to the issues related to the financial crisis in the renewable energy sector and possible solutions to it.

Andriy Konechenkov: “The success of further renewable energy development depends directly on the Government’s strategic policy. The paradox of our time is that the Government, on the one hand, declares the necessity of the “green” energy transition but on the other hand, Ukraine still has no Road Map for RES development”.

<http://uwea.com.ua/en/news/entry/renpower-ukraine-investors-forum-2021/>

### SECOND ALL-UKRAINIAN FORUM “UKRAINE 30”

On February 8, 2021, Volodymyr Zelensky, President of Ukraine, launched a large public dialogue



to mark the 30th Anniversary of Ukraine’s independence, consisting of 30 large-scale weekly forums on vital issues for the country. All-Ukrainian Forum “Ukraine 30. Payment” dedicated to the issues related to utility tariffs and the energy independence of Ukraine was successfully held on 16 February 2021.

The Forum participants included representatives of the Cabinet of Ministers of Ukraine, the Ministry of Energy of Ukraine, SAEE, MPs, representatives of international organizations, including the World Bank, public figures and experts in the energy field.

Speaking at the session “Renewable energy: the future industry”, Andriy Konechenkov presented the current state of renewables’ development in Ukraine



and highlighted future industry trends and tendencies: “Given this imbalance and other factors that scale up existing and create new market challenges, Government and the RES investors should consolidate their efforts and find a profitable solution not only to resolve the current crisis but also to promote the further growth of renewables in Ukraine.”

<http://uwea.com.ua/en/news/entry/uvea-prinyala-uchastie-vo-vtorom-vseukrainskom-forume-ukraina-30.-platezhka/>

## XXII INTERNATIONAL SCIENTIFIC AND PRACTICAL ONLINE CONFERENCE “RENEWABLE ENERGY AND ENERGY EFFICIENCY OF THE XXI CENTURY”

On the 30th anniversary of the Independence of Ukraine, the Institute of Renewable Energy of the NAS of Ukraine held its XXII International scientific and practical online conference “Renewable Energy and Energy Efficiency of the XXI century”. The participants of the event included scientists, government officials, educational institutions and businesses, investors, and foreign partners.

In his forecast for the Ukrainian wind power development under market conditions, Andriy Konechenkov, Chairman of the UWEA Board, pointed out: “Nowadays, various market RES support schemes have been successfully introduced in the European Union, they stimulate the large-scale development of green generation and establish attractive conditions for the RES investors. Wind energy technology is at the forefront of this process”.

In addition to the above-mentioned presentation, a special article “Possible ways for wind development in Ukraine under market conditions” by Andriy Konechenkov, Chairman of the UWEA Board, and Kateryna Knysh, Head of the UWEA Analytical Department, was published in the scientific journal “Renewable Energy” issued by the Institute of Renewable Energy of NAS of Ukraine.

## CISOLAR 2021

On July 6, 2021, Kyiv hosted CISOLAR 2021, the 10th solar energy conference and trade show of Central and Eastern Europe organized by IB Centre with sponsorship from the UWEA Member Companies – EDS and KNESS. The UWEA was an information partner of the event.

The first day of the conference was devoted to the green transition as an inevitable process for Ukraine. Participants discussed the major trends in global energy development, the ways of decarbonizing the energy sector, new energy technological drivers, and industry infrastructure projects.



Conference session “The Main Trends to Determine the Vector of Energy Development in 2021-2022” gained much interest among participants. In his presentation Andriy Konechenkov focused on the challenges the Ukrainian RES market faced and which had already halted RES development in the country.

<http://uwea.com.ua/en/news/entry/uvea-prinyala-uchastie-v-ezhegodnoj-konferencii-cisolar-2021/>

## 12<sup>TH</sup> ADAM SMITH UKRAINIAN ENERGY FORUM

On July 14-16, 2021, the 12th Adam Smith Ukrainian Energy Forum was held in Kyiv. This year’s forum was focused on the progress made by the government in establishing domestic energy independence, developing a fully-fledged domestic market for gas, electricity and renewables, and integrating Ukraine into the European energy market.

The Ukrainian Energy Forum brought together more than 80 speakers from different spheres, in particular representatives of the public authorities, international financial and business organizations, foreign embassies to Ukraine, and energy market players.







Denys Shmyhal, Prime Minister of Ukraine, in his welcome speech noted that the decarbonization of the economy and energy sector was the main global trend.

Herman Haluschenko, the Minister of Energy of Ukraine, highlighted three priorities for the Ministry of Energy activity, namely, energy security, integration of the energy markets, and development of the Ukrainian energy sector in conformity with the European Green Deal.

On the second day – Electricity Focus Day – participants discussed the electricity power market reform, integration in the European energy market, and further RES development in Ukraine. Representatives from wind power sector made their presentations at a dedicated session on unlocking onshore and offshore wind potentials in Ukraine chaired by Andriy Konechenkov, Chairman of the UWEA Board.

<http://uwea.com.ua/en/news/entry/uwea-prinyala-uchastie-v-12-m-mezhdunarodnom-ukrainskom-energeticheskom-for/>

## ENERGY WEEK BLACK SEA 2021

On 28 September 2021, Kateryna Knysh, Head of the UWEA Analytical Department, spoke at the international conference “Energy Week Black Sea 2021”, which was held in hybrid (*online and offline*) format in Bucharest, Romania.

Kateryna stressed effectiveness of offshore wind power for promoting international cooperation. As an example of international cooperation, she mentioned the Protocol on Initiating Black Sea Offshore Wind Energy Federation signed between the UWEA and Turkish Offshore Wind Energy Associations in

September 2021 and invited the relevant wind energy associations from Romania, Bulgaria, and Georgia to join this initiative.

*“According to our optimistic predictions, the first offshore wind farms in Ukraine could be commissioned in 2028, and from 2029 onwards at least 100 MW of new offshore capacities could be added per year. Most*





probably, the first offshore wind projects will be implemented for the production of “green” hydrogen, but in the future, offshore wind farms could also act as inter-connectors between Ukraine and the European energy system,” said Kateryna.

<http://uwea.com.ua/en/news/entry/uvea-prinyala-uchastie-v-energy-week-black-sea-2021/>

## EXPO 2020

Early October Andriy Konechenkov, Chairman of the UWEA Board, and Galyna Shmidt, Head of the UWEA International Department and Member of the UWEA Board, visited EXPO 2020 in Dubai, UAE, as part of the official delegation of Ukraine.

The main topics of EXPO 2020 included sustainable development, circular economy, reduction of carbon emissions, conservation of biodiversity. In total, 191 countries took part in EXPO 2020.

Andriy Konechenkov, Chairman of the UWEA Board, also participated in the Ukraine – United Arab Emirates Business Forum. On 5 October 2021, he spoke at a panel discussion “Perspectives for Ukrainian Renewable Energy Sector” held in the framework of the Climate and Biodiversity Week.

## ECONOMIC MISSION OF UKRAINE TO KONIN

From 12 to 15 October 2021, Kateryna Knysh, Head of the UWEA Analytical Department, participated in the economic mission of Ukraine to the city of Konin, Poland. The event was organized as part of the project “Building and Promoting the Brand: The Greater Poland Energy Valley” and co-financed by the European Regional Development Fund.

The main goal of the Mission was to demonstrate the economic attractiveness of the region of Eastern Wielkopolska for the implementation of Polish-Ukrainian projects. As part of the two-day mission, Piotr Korytkowski, Mayor of Konin, presented the city’s RES development potential, the role of Eastern Wielkopolska in the Greater Poland Energy Valley, and potential energy investment projects. The Ukrainian delegation also visited Mzgok Sp. z o.o, an electricity and heat supplier, and met with Polish investors and industrial companies.

## 14<sup>TH</sup> EIF WORLD ENERGY CONGRESS AND EXPO

Galyna Shmidt, Member of the UWEA Board, took part in the 14th EIF World Energy Congress and Expo held with the support of the Ministry of Energy and Natural Resources of Turkey on 13-15 October 2021 in Antalya, Turkey.

In her presentation “Perspectives for Wind Energy Sector Development in Ukraine under Market Con-



ditions”, Galyna Shmidt described the current status of the wind power market of Ukraine and provided five-year projections for the industry. She also drew attention to the legislative proposals to be adopted to ensure further Ukrainian RES market expansion under market conditions and emphasized the advantages of offshore wind power and “green” hydrogen technologies for the country.

## SEF 2021 DIGITAL

On 27 October 2021, Kateryna Knysh, Head of the UWEA Analytical Department, participated in SEF 2021 DIGITAL – the premier trade show of business communities in sustainable energy.

The event was organized by IB Centre in partnership with the UWEA. The SEF Forum brought together leading innovators in the sphere of balanced energy, solution providers, equipment manufacturers, EPCs, and service companies.

During the panel discussion “Renewable Energy and New Energy Tech Regulatory Policy and Targets in CEE Countries”, Kateryna Knysh presented the updated agenda of the wind power sector of Ukraine including perspective RES initiatives and directions for wind power expansion, in particular – offshore wind energy and “green” hydrogen production.

## ELECTRIC CITY 2021 IN COPENHAGEN

WindEurope’s Annual Event “Electric City”, Europe’s biggest wind energy conference, was successfully held in Copenhagen, Denmark on 23-25 November 2021. Members of the UWEA Secretariat and





representatives of the UWEA member companies participated in the event.

The Conference was opened by His Majesty Fredrik André Henrik Christian, Crown Prince of Denmark. Special attention of the participants was paid to the key issues including permitting, auctions, and the growing role of wind power in transforming sectors such as transport and heavy industry. Stoffel Vandoorne, the vice-champion of Formula E 2020, a driver of a racing electric car sponsored by Vestas, was a special guest to the event.

Electric City 2021 presented exhibits by more than 400 industry companies. A special part of the exhibition was devoted to scientific posters, which were selected on a competitive basis. The poster prepared by representatives of the UWEA member companies – Marina Hritsyshyna, Sayenko Kharenko, and Olexandr Charun, Wind Farm LLC – was among selected ones.

<http://uwea.com.ua/en/news/entry/sekretariat-uwea-posetil-electric-city-2021-v-kopengagene/>





## 4.4. PARTICIPATION IN NATIONAL RENEWABLE ENERGY SECTOR EVENTS AND PRESS CONFERENCES



### AN URGENT BRIEFING BY RES INDUSTRY ASSOCIATIONS ON THE CRITICAL SITUATION IN THE ENERGY MARKET

On 6 January 2021, a non-governmental think tank Razumkov Center held an urgent briefing on the critical situation in Ukraine's energy market. Liudmyla Buimister and Oleksiy Honcharenko, the MPs, Carl Sturen, Co-Chair of the Energy Committee of the European Business Association, Magnus Johansen, General Manager of the Norwegian NBT in Ukraine and the Chairmen of three RES industry associations of Ukraine including Andriy Konechenkov, Chairman of the UWEA Board, expressed their expert views on the current situation.

It worth nothing that the same day, the market expected the NEURC's decision on the state guarantees to NPC Ukrenergo for obtaining loans from international and national financial institutions to repay debts to the SE Guaranteed Buyer and, accordingly, to the RES producers. The previous day, the NEURC published an Explanation on its website, according to which the Regulator was going to prohibit the use of such loans for repaying debts to the RES producers. Therefore, the key representatives of the national RES market immediately gathered at the Razumkov Center to prevent the Regulator from such illegal decision. According to the RES industry association, "such decision will cross out the possibility of European-Ukrainian integration and sustainable development of renewables in Ukraine".

### THE UKRAINIAN BAR ASSOCIATION DISCUSSED THE IMPLEMENTATION OF THE MEMORANDUM'S PROVISIONS WITH RES MARKET STAKEHOLDERS

The Ukrainian Bar Association's Committee on Energy, Oil, and Gas discussed the implementation of the

MoU between the Government of Ukraine and the RES investors and further steps to fulfill its provisions at their meeting conducted on 26 January 2021.

Maryna Hritsyshyna presented the main provisions of the MoU: "I would like to draw your attention to the fact that our situation is unique for EU countries. There have been cases of "green" tariff cuts in some EU countries. These tariff rate reductions were made retroactively by the decisions of the Governments without conducting any preliminary negotiations or reaching any agreements with RES investors. Meanwhile, in Ukraine, a consensus was reached between the Government and the RES producers on "green" tariff cuts and the Memorandum reflected the agreements reached".

### MEMORANDUM OF UNDERSTANDING: ONE YEAR LATER

On June 9, 2021, one year after the signing of the MoU, the RES industry associations and investors together with MPs from the IFA "Clean Energy – Healthy Environment", met at the Interfax-Ukraine news agency to summarize the Memorandum's implementation progress. Speakers of the press conference included: the direct signatories to the Memorandum of Understanding, heads of RES industry associations, MPs, namely Liudmyla Buimister, Oleksiy Kucherenko and Oleksiy Honcharenko (*online*) and Carl Sturen, Managing Director, Vindkraft Ukraine.

The press conference resulted in signing the joint letter addressed to Dmytro Razumkov, Head of the Verkhovna Rada of Ukraine, (*with copies to the Minis-*







ter of Finance of Ukraine, Minister of Energy of Ukraine, and the Heads of the Parliament's Committee on Finance, Taxation and Customs Policy, Committee on Energy, Housing and Utilities Services and Committee on Budget and Economic Development) by all leading RES industry associations – the UWEA, EUEA, and UARE.

In their letter, the associations described all risks from adopting a Draft Law №5600 on the application of excise tax on RES electricity, which was registered by the Cabinet of Ministers of Ukraine with the Verkhovna Rada on June 2, 2021.

## THE II CONFERENCE ON THE ENERGY LAW HELD BY THE UKRAINIAN BAR ASSOCIATION

Andriy Konechenkov, Chairman of the UWEA Board, was among the speakers of the II Conference on Energy Law, organized by the Ukrainian Bar Association. Within the session “Renewable Energy Generation”, Andriy Konechenkov focused on the current status of the national wind power sector, new wind projects, and further wind development in Ukraine.

*“We explore European experience on the development of the wind power sector under market conditions. By 2030, when the green tariff expires in Ukraine, it is necessary to determine the further directions for development. One of the possible alternatives is to*

*develop national manufacture based on licensing technologies and a premium for producing wind equipment locally. The second alternative, the most expected by the RES producers, is auctions with an adequate annual quota for each type of “green” generation. And the third alternative could be exploration of new promising markets, such as offshore wind power market and “green” hydrogen market,” Andriy Konechenkov said.*

## ONLINE MEETINGS OF THE NATIONAL ASSOCIATIONS – MEMBERS OF WIND EUROPE

The UWEA Secretariat took an active part in the meetings of the national associations – members of WindEurope conducted over the year. Thus, on 21 June 2021, Kateryna Knysh, Head of the UWEA Analytical Department, took part in the National Associations’ online meeting devoted to the key trends in the development of their national wind power sectors.

Kateryna Knysh paid due attention to the recent legislative initiatives which could negatively impact the further development of the wind industry and focused, in particular, on the threats and consequences of potential adoption of such draft laws as Draft Law №4461 “On the Territories of the Emerald Network”, Draft Law “On Amendments to Certain Laws of Ukraine on the Prevention of Cruelty to Animals and the Implementation of International Commitments on the Wildlife Protection” and Draft Law No 5600 on introducing excise tax on the RES electricity. Kateryna Knysh stated the UWEA’s readiness to take part in elaborating common environmental rules within the framework of WindEurope.

## ROUND TABLE AT THE CENTER FOR ECONOMIC RECOVERY

A comprehensive study on the role of renewable energy sources in determining the NDC2 was presented by the Center for Economic Recovery at the Round table “The Role of Renewables in the Green Deal”. People’s Deputies of Ukraine – members of the IFA “Clean Energy – Healthy Environment” and the Chairmen of RES industry associations, including the European Business Association, took part in the event. The UWEA was represented by Andriy Konechenkov, Chairman of the UWEA Board.

The participants discussed the role of renewables in the improvement of the national economy, the regulatory policy required for green energy development, and potential solutions for financial crises in the RES market as well as the sector’s further perspectives.

Andriy Konechenkov, Chairman of the UWEA Board: *“The experience gained in developing any strategies in Ukraine demonstrates that the authors of such documents used to shift the focus from social benefits to individual privileges. Basically, the texts of such docu-*





ments should describe how much it will cost to achieve the goal and how much the state will ultimately gain financially. Therefore, in order to make our Strategy as much as effective, the entire economics of the process should be provided, namely how the development of renewables and the reduction of greenhouse gas emissions will affect the life expectancy of the population, its social benefits and well-being.”

### VISIT TO THE WIND POWER FACILITIES IN KHERSON REGION

The UWEA Secretariat members participated in the III scientific and practical conference “Improvement of the Electricity Market and the Integration of Ukraine’s IPS into European Network of Transmission System Operators for Electricity (ENTSO-E)” held in Nova Kakhovka, Kherson region on 7-9 September 2021. The III conference was organized by the Scientific and Technical Union of Power Engineers and Electricians of Ukraine in cooperation with the Ministry of Energy of Ukraine, NPC Ukrenergo, Ukrhydroenerho, the UWEA, Lviv Polytechnic National University, Vinnytsia National Technical University, and Khmelnytskyi National University.

Within the event, leading energy experts discussed the current status of the power market, the benefits of integration of the IPS of Ukraine into the European power system ENTSO-E and the security of electricity supply in Ukraine.



To familiarize the conference participants (most of whom were representatives from hydropower companies) with the wind technologies, the UWEA organised a study trip to 163 MW Myrnska wind farm located in the south of the Kherson region and operated by a wind power company Vindkraft Kalanchak LLC.

<http://uwea.com.ua/en/news/entry/rabochij-vizit-sekretariata-uvea-na-vetroenergeticheskie-obekty-v-hersonsko/>



### PRESS CONFERENCE “GREEN TASKS FOR THE PARLIAMENT”

On 16 September 2021, the Global 100% Renewable Energy Platform held a press conference “Green Tasks for the Parliament” at the Media Centre of the Interfax-Ukraine News Agency.

During the press conference, heads of the RES industry associations, which are Founding Members of the Global100%RE Ukraine, voiced the list of legislative acts being crucial for the achievement of carbon neutrality and stable RES development in Ukraine.



According to Oleksandr Dombrovskiy, Chairman of the Global100%RE Ukraine, “there are great numbers of Draft Laws, which adaptation is important for the RES development and natural resource management reform, still awaiting consideration by the Parliament. In addition, the consideration of some of them has been postponed for several years.”

“Considering the fact that the EU constantly increases its targets on greenhouse gas emissions reduction and wind power generation, the Ukrainian energy policy should be in line with the leading EU countries’ policies. The main “green” task for the Parliament is to prevent the politicization of the RES issue in Ukraine, support their development, and be a reliable investment partner in the international arena. The adoption of the above-mentioned Draft Laws, including the elaboration of the National Strategy on “green” hydrogen production using wind and solar energies, will attract great investments into our economy,” Andriy Konechenkov said.

<http://uwea.com.ua/en/news/entry/press-konferenciya-zelenye-zadachi-dlya-parlamenta/>

#### **ROUND TABLE “GREEN ENERGY TRANSITION OF UKRAINE AS A PART OF CLIMATE ACTION”**

On 28 September 2021, the Renewable Energy Agency hosted a round table “Green Energy Transition of Ukraine as a Part of Climate Action”.

The event was organised within the framework of the project “Promoting Ukraine’s transition to green energy” being supported by the European Union, the International Renaissance Foundation, the Global 100% RE Ukraine Platform and the International Management Institute of Ukraine. Participants included representatives from the Ministry of Energy of Ukraine, the EBRD, the UWEA and other RES industry associations.

The event was aimed at discussing opportunities, problems, and challenges of green energy transition improving networking among all stakeholders: national and local authorities, local communities, business representatives, and experts to establish a basis for the further RES development in Ukraine.

Andriy Konechenkov, Chairman of the UWEA Board, presented key challenges and prospects for the wind power market of Ukraine. He also highlighted the required legislative proposals to ensure the further development of the wind power market, in particular by stimulating the production of RES electricity under market conditions through introducing in Ukraine such mechanisms as Contracts for Difference, Corporate PPA, Net Billing system, ESS, hybrid renewable power plants, offshore wind power and green hydrogen technologies.



#### **THE EXPERT TALKS “PECULIARITIES OF “GREEN” ENERGY TRANSITION AND THE ROLE OF METALLURGY”**

On 29 September 2021, Andriy Konechenkov, Chairman of the UWEA Board, took part in the expert talks “Peculiarities of Green Energy Transition and the Role of Metallurgy”, which was held by the GMK center, while Centre for Economy Recovery acted as the information partner.

The event was attended by the representatives of the leading Ukrainian industrial companies, think tanks, consulting companies, and business associations.

During the discussion, the experts rose issues related to the energy transition of key economic sectors of Ukraine, in particular, construction and real estate, transport, heavy industry, and mechanical engineering. They also discussed the necessity of industrial policy development caused by the inevitability of green energy transition.



#### **FORUM “UKRAINE’S INTEGRATION INTO ENTSO-E: ON THE CUSP OF ENERGY INDEPENDENCE”**

Andriy Konechenkov, Chairman of the UWEA Board, participated in the Forum “Ukraine’s Integration into ENTSO-E: on the Cusp of Energy Independence”, organized by NPC Ukrenergo on 11 October 2021 within the framework of the Ukraine-EU Summit.



The event attended by representatives of the Cabinet of Ministers of Ukraine, NEURC, ENTSO-E, international organizations, RES industry, associations, MPs, investors, and experts was devoted to synchronization of the IPS of Ukraine with ENTSO-E power grid scheduled for 2023. Forum's delegates discussed the Ukrainian energy system's readiness for integration into ENTSO-E, its further development, and its place in the European energy sector after synchronization.

*"In our view, joining Europe's energy system is a very practical step. Our colleagues from the World Bank estimate that the economic benefits of Ukraine's IPS synchronization with ENTSO-E amount to USD 1.5 bln annually. The future synchronization of the IPS of Ukraine with ENTSO-E is expected to significantly increase its sustainability, overall technological level of operation and security of energy supply,"* Denys Shmyhal, Prime Minister of Ukraine, said, *"Ukraine is going to offer European partners to launch a high-level strategic energy dialogue with the involvement of the EU Member States."*

Herman Haluschenko, Minister of Energy of Ukraine mentioned: *"Ukraine has already completed most of the technological steps necessary for synchronization, but nevertheless there are some unresolved regulatory issues."*

#### **NATIONAL ECO-BUSINESS FORUM "GREEN ECONOMY: HOW TO DELIVER BALANCE"**

On 21 October 2021, Andriy Konechenkov, Chairman of the UWEA Board made a presentation at the National Eco-Business Forum "Green Economy: How to Deliver Balance", organised by the Professional Association of Environmentalists of Ukraine and the National Centre for Sustainable Development in partnership with UNDP under the UN Recovery and Peacebuilding Programme funded by the governments of Denmark, Sweden and Switzerland.

Current environmental trends, status and prospects for the eco-transformation and revitalization of coal-mining regions, implementation of current regional and national eco-strategies were key discussion issues at the National Eco-Business Forum.

#### **FURTHER RES INTEGRATION INTO THE POWER SYSTEM OF UKRAINE: CHALLENGES AND PERSPECTIVES**

The UWEA and the ASEU successfully held an on-line forum "Further RES Integration into the Power System of Ukraine: Challenges and Perspectives". The event was organized with the support of the Global 100% RE Ukraine Platform under the EU Sustainable Energy Week with the participation of the EU Delegation to Ukraine. The Forum was attended by the key RES policymakers, including representatives from the Ministry of Energy of Ukraine, NPC Ukrenergo, green banks, RES industry associations, and producers.

The participants of the event discussed key issues related to the further RES development in Ukraine, in particular decarbonization of the economy, RES integration into the IPS of Ukraine, green energy transition, implementation of new RES support schemes, development of distributed generation through implementation of Net Billing system, perspectives of energy storage development and the current status of Ukraine's integration into ENTSO-E.

#### **VI BUSINESS & LEGAL ENERGY FORUM**

VI Business & Legal Energy Forum held on 17 November 2021, was focused on the energy security of Ukraine, the functioning of the electricity market, and the resolution of energy disputes.

Andriy Konechenkov, Chairman of the UWEA Board, spoke at the thematic session "Functioning of the electricity market", during which the experts discussed, in particular, the issues of liability for imbalances, electricity market competition, and implementation of new RES support schemes in Ukraine.

*"The UWEA has been participating in the Business and Legal Energy Forum for the third year in a row. The main advantage of the Forum is the opportunity to professionally discuss a number of vital issues related to the development of energy among the legal community. As always, considerable attention is paid to the RES development,"* noted Andriy Konechenkov.

## 4.5. WIND WEBINARS 2021

### COMPENSATION OF IMBALANCES BY RES PRODUCERS IN THE ELECTRICITY MARKET OF UKRAINE AND ASPECTS OF LEAVING THE GUARANTEED BUYER BALANCING GROUP

The joint webinar of the UWEA, Asters Law Firm, and the Institute of Electrodynamics of the National Academy of Sciences of Ukraine devoted to the issues of imbalances by the RES producers and possibility of leaving the balancing group of SE Guaranteed Buyer and the impact of renewable electricity on the DAM functioning and pricing processes in other segments of the electricity market of Ukraine was conducted on 11 February 2021.

Marta Halabala, the Senior Associate at Asters, highlighted the legal aspects of imbalances, the structure of the balancing system, and the latest thematic changes in the legislation.

### PROMOTING ENERGY SECURITY AND SUSTAINABLE DEVELOPMENT OF LOCAL COMMUNITIES IN DNIPROPETROVSK REGION

Andriy Konechenkov, Chairman of the UWEA Board, participated in the webinar conducted within the project "Promoting energy security and sustainable development of local communities in Ukraine" sponsored by Press, Education and Culture Department of the US Embassy in Ukraine.

Andriy Konechenkov presented the contribution of wind energy to the development of local communities: *"The economic and social benefits of wind energy are unquestionable and both global and European experiences prove it. The further sustainable development of wind power in Ukraine should be governed by the National Energy Strategy of Ukraine and predictable legislation, primarily aimed at supporting local communities. Wind power is the path to peace and our today's clean environment!"*

### DISCUSSION ON OFFSHORE WIND ON GLOBAL WIND DAY

Symbolically, on 15 June, Global Wind Day, the UWEA and the Turkish Offshore Wind Energy Association conducted their joint webinar dedicated to the perspectives for offshore wind development in the Black Sea region.

The experts from both countries covered a wide a range of topics, from identifying the role and sta-

tus of offshore wind power worldwide to uncovering national offshore wind energy potential and national legislation.

Participants also discussed possibilities of establishing local manufacture of offshore wind turbine components.

Murat Durak, Chairman of the Turkish Offshore Wind Energy Association: *"Manufacture of offshore wind turbines and foundations, shipping, and appropriate infrastructure capacities should be local as much as possible. Lots of EU countries today have a clear vision for the development of offshore wind, so Ukraine and Turkey, as countries of the Black Sea region, should follow the leading countries and set their national targets for offshore wind."*

*"Offshore wind in combination with "green" hydrogen are the most attractive solution for greening, modernizing and balancing modern Ukraine's power system,"* Kateryna Knysh, Head of the UWEA Analytical department, summarized.

<http://uwea.com.ua/en/news/entry/mezhdunarodnyj-vebinar-offshornye-ves-v-chernom-more-ukraina-i-turciya/>

### INTERNATIONAL WEBINAR "CORPORATE RENEWABLE PPA: EU'S EXPERIENCE AND UKRAINE'S PERSPECTIVES"

On 13 September 2021, the UWEA jointly with Sayenko Kharenko, its Member Company hosted the international webinar devoted to the prospects of implementation of corporate renewable PPAs in Ukraine. The event was supported by the German-Ukrainian Chamber of Industry and Commerce.

During the webinar, high-level experts from the EU and Ukraine presented the experience of corporate PPAs' application in the EU, Poland, Germany. Such issues as financing corporate PPAs, legislative initiatives of the Ministry of Energy of Ukraine and required amendments to the RES legislation in Ukraine, specifics of electricity pricing under corporate PPAs and required amendments to Ukrainian legislation were discussed by the participants.

Hannah Hunt, Impact Director, RE-Source, the European platform for corporate PPAs, provided the European corporate PPA market overview with both procurement and policy trends, presented examples of different types of corporate PPAs concluded by the European companies.

Olga Yeriomina, Associate Director, Senior Banker, Energy EMEA, Sustainable Infrastructure Group, EBRD, spoke about RES project financing based on corporate PPAs. In particular, Olga Yeriomina noted: *“Concluding a long-term contract, for at least 15 years, and having a reliable corporate buyer are necessary for obtaining such financing.”*

Summing up the discussion, Maryna Hritsyshyna, Head of Energy Practice, Counsel at Sayenko Kharenko and Member of the UWEA Board, noted the main barriers for corporate PPAs to be implemented in Ukraine.

<http://uwea.com.ua/en/news/entry/mezhdunarodnyj-vebinar-korporativnye-rra-dlya-vie-opyt-es-i-perspektivy-dly/>

### GLOBAL PROSPECTS FOR THE DEVELOPMENT OF THE HYDROGEN ECONOMY

Kateryna Knysh, Head of the UWEA Analytical Department, spoke at the webinar “Global Prospects for the Development of the Hydrogen Economy” hosted by the Ukrainian Hydrogen Council under support of United Nations Industrial Development Organization, Center for International Programs and Global Environment Facility. In her presentation, Kateryna Knysh described the role of onshore and offshore wind technologies for “green” hydrogen production and stressed that *“green hydrogen is important for Ukraine not only in terms of national energy independence but also in terms of grid balancing, as it can act as an effective type of energy storage.”*

#### 4.5.1. SERIES OF THE UWEA'S WEBINARS

Like last year, in 2021 the UWEA held a series of webinars on both theoretical and practical aspects of national wind power development. Wind project management during construction and operation of a wind farm was the theme of the first webinar conducted by the UWEA in 2021. Within the webinar successfully held on April 2, 2021, the UWEA Member Company Bureau Veritas Ukraine presented its activity including certification, inspection, auditing, testing, training and wind project management.

<http://uwea.com.ua/en/news/entry/uvea-provela-pervyj-vebinar-iz-serii-vebinarov-2021-goda-posvyaschennyh-vet/>

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The second in a series of the UWEA webinars was successfully held on April 12. The webinar looked at how to conclude wind turbine supply contracts.

The webinar speakers drew the participants' attention to the special conditions of wind turbine supply contracts and explained the difference between wind turbine supply contracts and EPC contracts. Specificities of onshore and offshore contract obligations were also covered by Maryna Hritsyshyna.

<http://uwea.com.ua/en/news/entry/uvea-provela-vtoroj-vebinar-iz-serii-vebinarov-uvea-2021-goda-posvyaschenny/>

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Webinar “Construction & Maintenance of Wind Farm Infrastructure” took place on July 20. The representatives from companies with expertise in designing, installing and commissioning different power facilities such as Electroservice Yug LLC, Communication and Construction Company and EDS Holding discussed different phases of wind project implementation from its construction and maintenance to reconstruction. The speakers also outlined challenges facing wind project developers and building companies during construction works.

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The webinar “System Monitoring and Maintenance of Wind Turbines – Path to Efficient Electricity Generation” was devoted to practical service cases in the wind power sector of Ukraine. According to the speakers, *“timely scheduled inspections and maintenance of a WTG increases its technical availability, maximizes electricity generation and minimizes the risk of equipment faults which, in turn, leads to a reduction in generation outputs and negative financial consequences. The maintenance of wind turbines is an integral and necessary part of their operation lifetime.”* Representatives of such leading national and international wind energy companies as MC Wind Parks of Ukraine, WindAero and Nordex Acciona shared their experience in wind turbine maintenance in Ukraine.



## 4.6. AWARDS

The All-Ukrainian Forum “Leadership and Eco-Transformation-2021” was held by the Professional Association of Ecologists of Ukraine on December 16 to identify green economy stakeholders who implemented green and environmentally friendly technologies in Ukraine. Each year companies known for their environmentally friendly products as well as for using clean power sources are awarded Eco-Oscars as leaders of state-of-art energy programs and eco-innovation projects and startups.

The list of award-winning leaders in 2021 included two UWEA member companies – Eurocape Ukraine I LLC and DTEK Renewables for their significant contribution to the national environment during their business activities.

Thus, Eurocape Ukraine I LLC, a company that successfully commissioned 98 MW wind power plant in Zaporizhzhya region, was awarded for its responsible approach to Environmental Impact Assessment procedure. The company managed to mitigate all potential risks for local biodiversity associated with operation of its wind power plant.

In turn, a company from DTEK Renewables, namely DTEK Tiligul'ska WPP in partnership with Tiligul Regional Landscape Park implemented a unique eco-project “Bird Islands” aimed at preserving Ukraine’s biodiversity. The company constructed 1,500 m<sup>2</sup> of artificial islands for nesting rare aquatic bird species.





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**Vestas**



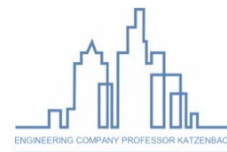
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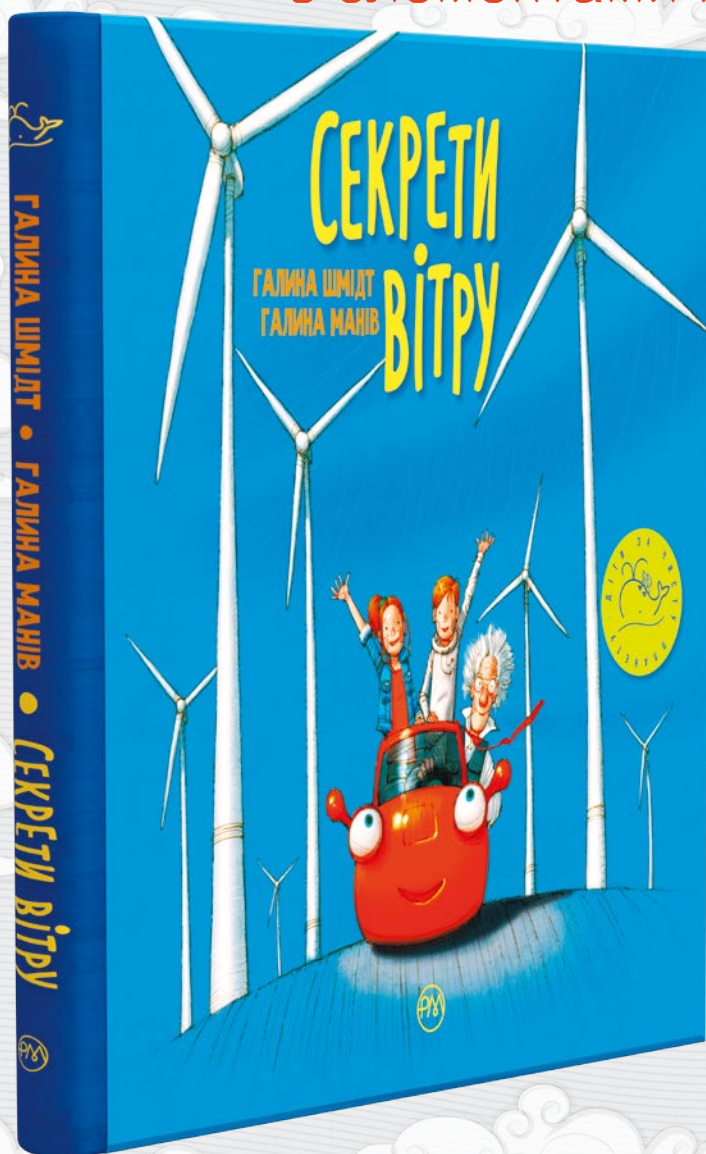






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*Today, MCL is a group of companies with more than 30 professionals in the field of environmental protection, ecology, sustainable development and design. The company focuses on the processes and technologies that related to the efficient use of natural resources and responsible attitude to the environment.*

## EIA

Environmental impact assessment for wind farms, 330 kW OHL and changes in the purpose of agricultural land, taking into account any recommendations and comments from the communities. We perform EIA procedures for wind farms, which will be located near the NPAs, the Emerald Networks, we study the effects of noise and the effect of flickering shadows using modern software.

## Monitoring

Environmental surveys and post-project monitoring for wind farms in accordance with the recommendations of the Scottish Natural Heritage Fund. We use recognized methods of stationary and mobile surveys and the best sets of equipment for audio, photo and video recording. We conducted year-round monitoring studies for four WF projects, which will involve IFC funds, as well as more than 50 expedition trips.

## ESIA

We conduct environmental surveys and consult with all stakeholders who may be affected by wind farms. Together with European partners specializing in the study of flora and fauna and impacts on the social environment, we provide surveys services and assessing social and environmental impacts according to IFC standards.

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