

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ БІОРЕСУРСІВ І
ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ
ІНСТИТУТ МЕХАНІКИ ТА АВТОМАТИКИ АПВ НААН
ДЕРЖАВНИЙ БІОТЕХНОЛОГІЧНИЙ УНІВЕРСИТЕТ**



***ЗБІРНИК
ТЕЗ ДОПОВІДЕЙ***

***X Міжнародної науково-технічної конференції з нагоди
116-ї річниці від дня народження
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«КРАМАРОВСЬКІ ЧИТАННЯ»

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1. **Кислотність середовища.** Здебільшого швидкість корозії зростає зі зменшенням рН середовища, оскільки при цьому підвищується розчинність продуктів корозії.

2. **Іонний склад корозійного середовища.** Корозійне середовище може містити йони- активатори, які прискорюють корозію, та йони-інгібітори, які її уповільнюють.

3. **Концентрація розчинів.** При контакті металів з розчинами солей, йони яких не виявляють властивостей активаторів чи інгібіторів корозії, швидкість корозійних процесів залежно від концентрації підкоряється складним законам. Наприклад, якщо Fe перебуває у розчині Na_2SO_4 , то при збільшенні концентрації солі швидкість корозії спочатку зростає, оскільки підвищується електрична провідність середовища, а після досягнення певної концентрації - поступово сповільнюється, оскільки зменшуються електролітична дисоціація солі та розчинність кисню у середовищі.

4. **Кількість кисню.** Кисень є сильним корозійно- активним агентом, однак його вплив на корозійні процеси неоднозначний. Найчастіше збільшення кількості O_2 інтенсифікує корозію більшості металів. Але якщо метал легко піддається пасивації, то при підвищенні концентрації кисню корозія такого металу сповільнюється. Швидкість корозії з кисневою деполяризацією зростає при збільшенні дифузії та розчинності кисню, а також при енергійному перемішуванні.

5. **Температура і тиск.** У випадку корозії з водневою деполяризацією підвищення температури прискорює електродні процеси, тому швидкість корозії зростає. Коли відбувається корозія з кисневою деполяризацією, температура виявляє подвійний вплив. Так, підвищення температури збільшує швидкість електродних процесів, однак одночасно зменшує розчинність кисню. Максимальної швидкості корозія з кисневою деполяризацією досягає в інтервалі $70-80^\circ\text{C}$. Це зумовлюється оптимальним співвідношенням коефіцієнта дифузії кисню та величиною його розчинності у зазначених межах температур.

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WIND ENERGY DEVELOPMENT TRENDS IN UKRAINE

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At the COP26 climate summit in Glasgow, more than 40 countries agreed to phase out coal power over the next 20 years. Ukraine is among them. Decarbonization of the energy sector and reduction of carbon emissions to limit

climate change is the main task of energy workers. It is planned to replace the most "dirty" generation with ecological and renewable types of fuel.

The International Renewable Energy Agency (IRENA) believes that the transformation of the global energy system is aimed at improving energy security and increasing energy availability. Territorial communities, especially in rural areas, have significant prospects for the introduction of renewable energy technologies. So, urgent needs of society, social and environmental benefits, as well as attractive economic opportunities of the energy system.

According to IRENA experts, onshore and offshore wind generation can provide more than one third (35%) of the total demand for electricity by 2050.



Fig. 1. Graph of wind energy growth

According to the Ministry of Energy of Ukraine, the share of heat generation in total electricity production has decreased by 5% since 2016. So, if in 2016 the share of TPP generation in total electricity production was 32.2%, then according to the results of 2020 thermal power plants produced only 27.2%.

According to the International Renewable Energy Agency (IRENA), over two decades, the installed capacity of wind generation in the world has increased almost 75 times - from 7.5 GW in 1997 to about 564 GW by 2018. Today, the capacity of wind power plants is 730 GW and shows optimistic trends in the future. The rapid growth of wind energy is noted in Asia and North America, and such EU countries as Denmark, Spain, Ireland and Germany continue to develop their potential.

According to the State Agency for Energy Efficiency and Energy Saving of Ukraine, in the first half of 2021, the total capacity of RES facilities increased by 278.4 MW. But there are several reasons for the deterioration of the conditions for attracting investments: the adoption of the law on the approval of retrospective initiatives to reduce the "green tariff" and the termination of the preferential tariff for working stations from January 1, 2030, non-fulfillment of the terms of the memorandum regarding the return of debts to "green" generation and prevention of accumulation new ones But the RES sector must continue to develop.

On the territory of Ukraine, one of the founders of cosmonautics, Yuriy Kondratyuk, developed the first wind power plants back in the 1930s. He worked on the project of the Crimean wind power station with a capacity of 12 MW, with a

tower 160 m high and a three-bladed propeller with a diameter of 80 m. In 1937, the construction of the station's foundation began on Mount Ai-Petri in the Crimea. However, in 1938, construction was stopped and the project was never returned to.

The second stage of wind energy development in Ukraine began in 1996. It was this year that the Novoazovska wind farm with a capacity of 50 MW was designed in the village of Bezimenne, Donetsk region. The station became operational after 15 years - in 2011.

In 1997, the first wind farm on the territory of Ukraine - Truskavetska - became operational, and within three years, 134 turbines were operating in Ukraine.

The majority of wind power plants in Ukraine are located on the coasts of the Black and Azov seas, on the territory of the Crimean and Carpathian mountains, in Odesa, Kherson and Mykolaiv regions. According to the Institute of Renewable Energy of the National Academy of Sciences of Ukraine, these regions are the most suitable for the use of wind energy.

At the end of 2012, the capacity of wind power plants in Ukraine amounted to almost 263 MW, and seven years later, Ukraine entered the " Gigawatt club". It unites countries with an installed wind energy capacity exceeding 1,000 MW.

"Green" electricity in Ukraine is generated by 34 wind power plants (including those located on the territory of ORDLO). The largest of them are Botievska , Primorska, Myrnenska , Orlivska , Overyanivska and Novoazovska WPPs. All wind turbines of the first seven, except for Boyivska and Priazovska, were put into operation in 2019.



Fig. 2. Geographical location of the largest wind power plants in Ukraine

Most of the wind power plants being built in Ukraine are mainly large and provide electricity to entire settlements.

But also near large wind turbines use small wind turbines generation capacity up to 10-20 kW.

Their used to provide electricity of small farms. However, the installation of such mini windy stations are isolated and have not become widespread. The reasons for this several:

- term payback such stations makes up about 10 years. It double longer than sunny ones domestic power plants. Difference is explained higher at the price of the

equipment, after all a wind turbine is more difficult engineering solution than sunny station.

- expediency installation wind turbines (it is better to install them where there are no power lines).

Energetic strategy of Ukraine by 2035, adopted in August 2017, is expected increase energy efficiency and use energy from restorative and alternative sources. Implementation measures from prevention and adaptation to change climate is defined as one of priorities development energy industry.

According to the document, by 2025 the share of RES in the energy sector system of Ukraine should be 12%, and by 2035 - at least 25%.

Evaluation report of NEC "Ukrenergo". conformity (sufficiency) of generators capacities in 2020 takes into account current trends in the field energy saving and predicts further growth particles everyone types of RES in the structure production electricity during 10-11 years. So in 2020, it increased twice as compared to the previous year (from 3.5% in 2019 to 7.39% in 2020). In the next three years (2021-2023), the trend is towards growth has to be preserved, though it is predicted that him pace will be much smaller (decrease pace from 16% in 2022 to 2.4 in 2031).

In the future, RES have part replace electricity from coal -fired thermal power plants, which are expected to decrease by 2031 your volumes production of electricity by almost 12%.

Also Report recommends give state support for renewable energy through conducting auctions for the allocation of support quotas exclusively after solution question withdrawal of RES restrictions to ensure operating room security energy systems. And when setting support quotas to oblige investors to install new renewable energy sources energy storage or others species compensating capacities volume of 20% of installed RES capacity.

UVEA expects that in 7 years in Ukraine may to appear market offshore wind energy (wind power plants marine basing). Offshore there is not only wind energy effective a tool decarbonization and build -up energy independence, but also a productive resource for the production of "green" hydrogen and the increase international cooperation. UVEA believes that the first is offshore wind energy project in Ukraine with a capacity of 100 MW is possible to expect already in 2028.