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PORT ECONOMY CHANGING FROM A PURELY PROFIT-ORIENTED MODEL TO A SUSTAINABLE GROWTH MODEL

We should talk about the blue economy as the sustainable use of marine resources for economic growth, job creation while preserving the health of the marine ecosystem.

This approach should be implemented with the participation of civil society and the private sector. Such projects exist in Ukraine.

However, achieving balanced development of the three pillars of sustainable development: environmental friendliness, economic efficiency and social orientation is difficult.

The traditional port economy is bound to change, shifting its focus from a purely profit-oriented model to a sustainable growth model.

Renewable energy is an urgent task for traditionally maritime industries: shipping and fishing, as well as tourism and biotechnology, but the issue cannot be limited to them.

The implementation of the circular economy and sustainable development, which are part of the principles of the European course, affects many sectors of the economy in order to compete in international markets after the war, in particular in the EU market with a rapidly growing demand climate-neutral products.

The mission of the Energy Strategy of Ukraine [2] is to ensure access to reliable, renewable energy sources. By 2050, the energy sector should be as close as possible to climate neutrality.

Port companies and their customers are vulnerable to changes in the marine environment, even with increased investment in flood protection or other adaptation measures. This sector can play a central role in coordinated efforts to mitigate (reduce) the impact on the logistics system and coastal communities as a whole.

Ports are industrial and energy hubs. While port authorities themselves have a limited environmental impact, their activities often contribute to increased harmful emissions.

The war in Ukraine has negatively impacted both the environment (pollution from explosives, mining) and the economy, significantly reducing the Ukrainian ports innovative potential. The annual cargo handling volume at all Ukrainian ports for the period 2022 and 2023 decreased by almost 2.5 times

compared to the pre-war period and reached critical levels, although in 2024 it increased by 57% [3].

Such cargo turnover significantly affects the possibility of investing in infrastructure modernization.

For ports, the energy transition represents a three-tiered challenge: promoting the greening of the shipping sector, greening all port operations, and promoting environmental sustainability in the surrounding community.

For many port authorities, port greening has become a strategic decision aimed at ensuring a sustainable future beyond 2050.

Electrification through the modernization or replacement of existing diesel-powered port equipment with electric drives is a cost-effective and energy-efficient measure to reduce port emissions.

Solar energy projects are currently the most actively implemented. For example, the Izmail Sea Trade Port plans to reconstruct its power supply system by installing a solar power plant (SPP) to offset the electricity consumption of administrative and industrial buildings.

The project involves modernizing the power grid and installing solar panels on the enterprise's premises [4].

While hybrid drive systems are not a zero-emission solution, they can deliver significantly lower emissions than equipment powered solely by diesel.

The use of alternative fuels, such as ammonia or methanol, may be a solution, but is currently a less proven technology for port and terminal equipment with less technological maturity.

In the context of military conflict, the handling and storage of hazardous cargo (including ammonia-containing substances) in Ukrainian ports is particularly risky, although terminals in Ukraine handle ammonia and methanol as cargo.

However, the use of these substances as fuel (for engines, generators, and port equipment) is a completely different matter, and there is no data yet on its widespread implementation.

Factors facilitating the decarbonization of port equipment:

– Port administrations and the state support: Law No. 1116-IX "On state support for investment projects with significant investments in Ukraine" directly contributes to the modernization of facilities. (reduction of customs duties and fees);

– Decarbonization: Law No. 8433 (Decarbonization Fund) and other regulations create financial opportunities for "green" modernization, which is relevant for low-cost modernization.

Furthermore:

– Availability of space for electrical infrastructure;

– Increased cargo traffic at our ports will enable the rapid amortization of investments in such projects; technological development will facilitate the

standardization of decarbonization methods and approaches to creating the necessary infrastructure.

According to a report [5], Ukrenergo is beginning construction of infrastructure to connect the first floating power plant with a capacity of ~250 MW in the Odesa region.

Media reports indicate that similar plants (each with a capacity of ~250 MW) are planned for deployment in the ports of Yuzhny, Odesa and Izmail.

Port authorities can bring together stakeholders in the energy transition, aligning decarbonization goals from different perspectives, optimizing spatial planning, and jointly investing in shared infrastructure.

For example, they can collaborate with grid operators, terminal operators, and industrial companies to expand and build new energy transportation networks.

Overall, the role of port authorities can shift from traditional landlord to master planner and proactive developer of projects, energy networks, and business consortiums.

Based on their level of influence, port profile, dependencies, and energy technology development, port authorities can directly act to decarbonize and limit their own energy consumption, while helping to meet changing customer needs.

The energy transition also offers ports opportunities to save costs, maintain market share, and attract new cargo, businesses, and industries. Given the complex and uncertain nature of the energy transition and the diversity of ports, port authorities are encouraged to take on greater responsibility; their actual direct impact on wider greening initiatives is limited to enabling, facilitating and incentivising other economic operators to implement their decarbonisation efforts.

Ukrainian ports are required to comply with general environmental norms and standards, such as emission standards and other requirements governed by general environmental legislation.

Ukrainian seaport legislation includes provisions aimed at environmental protection. For example, port fees include a sanitary fee, but this primarily serves to fund cleanup efforts rather than the creation of new capacity in the context of the blue economy.

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