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Poland's offshore milestone as a new area of cooperation with Japan

by Paweł Wiącek

Introduction - Poland enters the offshore wind era

On 10 July 2026, the Baltic Power offshore wind farm began supplying electricity to the Polish power grid. This is a completely new source of energy in Poland. Once construction is completed this fall, the total installed capacity will be approximately 1.2 GW – broadly comparable to that of a single large nuclear reactor. The project is expected to generate enough electricity to supply around 1.5 million households annually. Looking ahead, Poland aims to install 5.9 GW of offshore wind capacity by 2030 under the updated National Energy and Climate Plan (KPEiK) [1]. Meanwhile, Japan's operational offshore wind capacity recently surpassed 500 MW with the commissioning of the 220 MW Kitakyushu Hibikinada Offshore Wind Farm in March 2026, the country's largest project of its kind. Japan also targets 10 GW of offshore wind capacity by 2030 [2]. How can these parallel developments be translated into closer Polish-Japanese cooperation?

Onshore Constraints and Offshore Potential

Poland has made substantial progress in expanding renewable energy in recent years, particularly in photovoltaics (PV). However, between 2016 and 2023, the "10H Act" (the Act of 20 May 2016 on Investments in Wind Power Plants) significantly limited the development of onshore wind energy in Poland. This regulation mandated a minimum distance between wind turbines and residential buildings equal to ten times the total height of the turbine [3]. Current designs, typically over 150 metres tall, combined with Poland's highly dispersed settlement [4], resulted in large buffer zones that severely limited the growth of wind energy. It has been estimated that only 0.06% of the land was available for wind farms under the 10H rule, whereas reducing the distance to 700 and 500 meters would increase this area to 2.6% and 4.8%, respectively [5]. As a partial response, the distance requirement was revised to 700 meters, while additional environmental restrictions continue to apply. By contrast, Japan does not prescribe a uniform nationwide minimum distance rule for land-based wind turbines. Instead, local governments issue guidelines for wind power development, taking into account environmental considerations such as noise and other site-specific factors [6, 7]. The more significant obstacle, however, is geographical rather than regulatory. As noted by the Ministry of Economy, Trade and Industry (METI), the main limiting factor is the country's mountainous terrain that restricts the land available for onshore wind farm development [8].

Despite their different origins, these constraints have increased interest in offshore wind energy in both countries, where many of the obstacles affecting onshore projects do not apply. According to PSEW (Polskie Stowarzyszenie Energetyki Wiatrowej), the Polish sector of the Baltic Sea could accommodate around 33 GW of offshore wind capacity [9]. Estimates of Japan's offshore wind potential vary, yet recently adopted legislation has significantly expanded the areas available for offshore wind development. In June 2025, the National Diet passed the so-called "EEZ law" (Act on the Development of Marine Renewable Energy Power Generation Facilities), allowing offshore wind projects to be constructed beyond the country's territorial waters [10]. While some areas within Japan's exclusive economic zone remain challenging for development because of fishing activities or deep waters requiring floating wind technology, this legislation extends the legal framework for offshore wind projects to an area of more than 4 million km^2.

Beyond increasing the space available for development, offshore wind farms benefit from stronger and more consistent winds. As the power available in the wind increases with the cube of wind speed, even modest increases in wind speed translate into substantially higher electricity generation. These conditions, combined with larger rotor diameters and higher hub heights, enable offshore wind farms to generate electricity more consistently than other renewable energy sources. This is reflected in their higher capacity factors, representing the ratio of actual electricity generation to the theoretical maximum over a given period, typically one year. According to the IEA (International Energy Agency), offshore wind typically achieves capacity factors of 29-52%, compared with 23-43% for onshore wind and up to 21% for solar PV [11]. Taken together, these factors explain why offshore wind is among the most productive clean energy technologies.

Energy security as a shared concern

Such characteristics are particularly relevant for Japan, where limited domestic energy resources and continued dependence on imported fossil fuels have increased the importance of expanding reliable domestic electricity generation. The IEA reports that net energy imports accounted for over 87% of Japan's total energy supply in 2024 [12]. In this context, offshore wind serves not only as a decarbonisation technology but also as a means of reducing exposure to geopolitical disruptions affecting global energy supply chains. Recent events, including Russia's invasion of Ukraine and instability affecting energy transport through the Strait of Hormuz, have exposed the vulnerabilities of energy strategies that rely heavily on imported fossil fuels. Meanwhile, Poland's concept of energy security increasingly extends beyond energy supply to include the protection of critical offshore infrastructure. Incidents such as the sabotage of the Nord Stream pipelines, damage to undersea cables, and persistent GPS jamming over the Baltic Sea have highlighted the need to strengthen the monitoring and protection of offshore energy infrastructure. The evolving security environment in the East China Sea may also require Japan to place greater emphasis on the protection and resilience of offshore energy infrastructure. Alongside geopolitical challenges, recent studies have examined the resilience of offshore wind turbines to earthquakes and typhoons, two natural hazards characteristic for Japan. According to one analysis, although strong earthquake shaking might lead to steel buckling, it would probably not affect the overall structural capacity of the tower. As the research evaluated a particularly robust design of floating wind turbine, these findings may not apply to commercially optimized towers. Seismic loading should therefore be considered in the design of floating offshore wind turbines in vulnerable regions [13]. Turning to typhoons, the passage of tropical cyclones is accompanied by extreme wind and wave loads, which may result in blade damage, tower collapse and foundation failure. Studies suggest that improving structural design and material selection can enhance resistance under such conditions. In addition, intelligent operation and maintenance systems, combined with early warning capabilities, can reduce costs and improve efficiency [14]. Despite the absence of typhoons in the Baltic Sea, offshore wind infrastructure must still be designed to withstand severe storms and extreme weather conditions. Japan's experience in enhancing the resilience of offshore wind infrastructure may also provide valuable insights for the Baltic region.

Offshore Wind as a Platform for International Cooperation

Offshore wind projects are typically international investments that require the cooperation of many different companies from a variety of sectors, such as manufacturing, port infrastructure and grid integration. A good example of this model is the Polish Baltic Power project. The project was launched in January 2021, when Orlen and Northland Power (Canada) formed a joint venture. In October 2022, the Danish company Vestas announced plans to build a new factory in Szczecin to produce nacelles, which led to the installation of the first 15 MW turbines in the Baltic Sea about three years later. At the same time, Japan is actively seeking international partners to support the development of its wind energy sector. This was demonstrated in 2025, when Vestas and Nippon Steel Corporation signed a memorandum of understanding (MoU) to strengthen cooperation in the wind power sector [15]. Could similar industrial partnerships emerge between Polish and Japanese companies? Although direct participation in the Baltic Power project appears limited, companies belonging to Japanese industrial groups are already involved in other offshore wind projects in Poland. For example, Hitachi Energy, part of Hitachi Ltd., has secured a contract to provide the AC grid connection and power quality solutions for the MFW Bałtyk II and MFW Bałtyk III offshore wind farms [16]. Looking beyond the industrial sector, Expo 2025 in Osaka, has also created new opportunities for cooperation. During the event, Gdynia Maritime University (GMU) and the Faculty of Maritime Studies at Kobe University signed an agreement on collaboration in marine research and education, including students and researchers exchange [17]. The partnership is particularly interesting as GMU offers specialised education in offshore wind energy. All these developments suggest that cooperation may gradually extend beyond individual commercial projects, evolving into broader industrial and academic partnerships.

Conclusions and recommendations

Although Poland and Japan are interested in offshore wind in response to different national challenges, both view it as a strategic means of expanding reliable domestic low-carbon electricity generation and have adopted ambitious plans for offshore wind development. As a relatively young but rapidly developing industry in both countries, offshore wind offers considerable scope for knowledge exchange and long-term industrial cooperation. The experience accumulated by each country is also complementary. Poland is developing expertise in protecting critical infrastructure and strengthening energy security in response to hybrid threats, whereas Japan has extensive experience in enhancing infrastructure resilience against natural hazards. Policymakers should therefore consider incorporating offshore wind into the existing framework of Polish-Japanese energy cooperation, alongside LNG, hydrogen and civil nuclear energy, through dedicated bilateral dialogue and formal cooperation mechanisms.

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