

INNOVATIVE WIND GENERATOR ‘SPHERE O-WIND TURBINE’

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The O-Wind spherical wind turbine represents an innovative approach to using wind energy in urban environments, where traditional windmills are less efficient due to frequent changes in the direction of air flows. The main feature of the O-Wind turbine is its ability to capture wind from all directions thanks to its spherical shape. This allows the installation to rotate regardless of where the wind is blowing from without the need for its constant orientation. This technology is especially relevant for densely populated urban areas where traditional wind turbines require a clear wind direction, which makes their installation and operation difficult due to high-rise buildings that create chaotic air flows.

The principle of operation of the O-Wind Turbine is based on the physical principle of Bernoulli, which is used to generate rotation as a result of a pressure difference. The turbine has small openings with wide bells for air inlets and narrow outlets, which allows the airflow to rotate the sphere around its axis and generate electricity (Sfera O-Wind Turbine, 2024). The turbine concept is inspired by NASA’s Tumbleweed project, which was designed to explore Mars using Martian wind vortices. O-Wind adapts this approach for Earth, creating a device that can operate even in minimal wind conditions, including 2 m/s.

The turbine’s design also allows it to be easily installed on roofs, balconies and building facades, making O-Wind accessible to a wide range of consumers, including households and businesses. Wind tunnel tests of the prototype demonstrated the turbine’s ability to generate up to 3W of power. With further development, this technology has the potential to increase power, making it even more efficient in urban environments where average wind speeds are often lower than normal.

This innovative design won the prestigious James Dyson competition where it was recognized as the best among many other projects aimed at developing

environmentally friendly energy (Sferychnyy vitrohenerator O-Wind, 2018). The victory earned the O-Wind team a £30,000 grant for further commercialisation, as well as an additional £300,000 from Lancashire County Council and the Lancashire Innovation Fund in early 2023. The success of the development has also been recognised internationally, underlining the significant potential of this invention in the field of alternative energy.

O-Wind's advantage over traditional windmills and even solar panels lies in its versatility and ability to provide energy continuously. Thanks to its spherical shape and compact design, the turbine can be installed even in small areas, making it an excellent alternative in cities. In the long term, the developers plan to improve the technology to increase its power, which will allow the turbine to match the efficiency of the latest solutions in photovoltaics, such as perovskite and titanium panels.

Other engineers are also developing similar technologies. For example, Ukrainian inventor Oleksiy Onypko is working on silent turbines with a wide range of capacities from 50 to 10,000 watts which can adapt to sudden changes in wind speed and direction. This indicates a growing interest in urban wind turbines that can meet consumers' needs for renewable energy even in adverse conditions of dense development.

Overall, the O-Wind Turbine represents a significant step towards clean energy for urban areas. Its development and implementation can make a significant contribution to the fight against climate change, allowing cities to gradually reduce carbon emissions and rely on sustainable energy sources.

References:

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