Perspective
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Coastal Floating Wind Resonance Mitigating the Impact: Major Progress

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Perspective

In the last ten years, wind energy production has increased dramatically. According to the Global Wind Energy Council (GWEC), global wind turbine installations in 2020 exceeded 90 GW, an increase of 53% over 2019. This has increased total installed wind capacity to 743 GW, a 14% increase over the previous year. Furthermore, due to the stronger and more consistent wind in the marine area, additional wind turbines are being placed farther from the beaches. Larger wind turbines with higher ratings and larger blades have become top priority choices for efficiently exploiting wind resources. Wind turbine structures will become more flexible as they grow in size, causing vibration difficulties. Vibrations on various wind turbine components will induce fatigue and have a negative impact on system performance. Wind turbine vibrations can be reduced using structural vibration control techniques that have been successfully employed in civil constructions such as high-rise buildings. The four types of structural control approaches are: (1) passive (2) active (3) hybrid and (4) semi-active control. To reduce vibrations, these regulating approaches can be employed in many elements of wind turbines, such as blades, towers, and platforms. Reduced vibrations in wind turbine blades, towers, and platforms will extend the fatigue life of the wind turbines while also enhancing energy efficiency.

The purpose of this Research Topic is to collect contributions to wind turbine structural vibration control advancements. For this Research Topic, prospective authors are asked to submit high-quality original contributions and reviews.

The following aspects of the current Research Topic will be covered, but not limited to

• Passive, active, and semi-active controlling techniques

• Novel blade vibration control techniques

• Recent implementations and applications of controllers in reducing responses of fixed-bottom and floating offshore wind turbines.

Wind power capacity increases as you move further offshore. The extraction of wind energy from an offshore deep-water wind resource improves the generation of power from renewable resources. Another challenge in wind turbine modelling is mounting the turbine on an unstable platform. Because of the complicated dynamics and control of these platforms, there is a need to introduce platforms that are more successful at capturing this energy. This study focuses on the historical changes and advancements in the design of several types of offshore floating wind turbine platforms that are required to harvest energy from offshore winds. The relative benefits and drawbacks of various platform types in terms of design issues are examined.

Offshore floating wind turbines will be crucial in exploiting the huge offshore wind resource. The evolution and growth of many historical periods. Offshore floating platforms of various types are highlighted. The floating platform is of the mooring kind. In comparison to other floating type platforms, this platform is known as the tension leg platform (TLP) is more supple in sway but stiff in rotational modes that are opposite in the spar and Platforms that are semi-submersible. In order to achieve stability, the semisubmersible form uses both buoyancy and ballast. The semi-submersible variant is more adaptable and less expensive. It's also simple to create, which is why it's the preferred choice when mounting many monitors. Combining turbines the advantages and disadvantages of several types of floaters are examined. The Due to the numerous degrees of freedom provided by the multi-wind-turbine platform's dynamics the wind turbines that will be added.

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