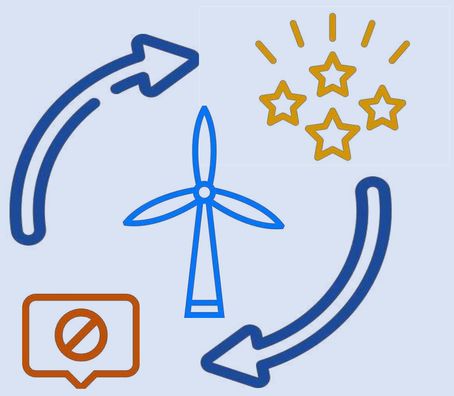
Creating Opportunities:



Turning Market Constraints into Offshore Wind Maintenance Opportunities

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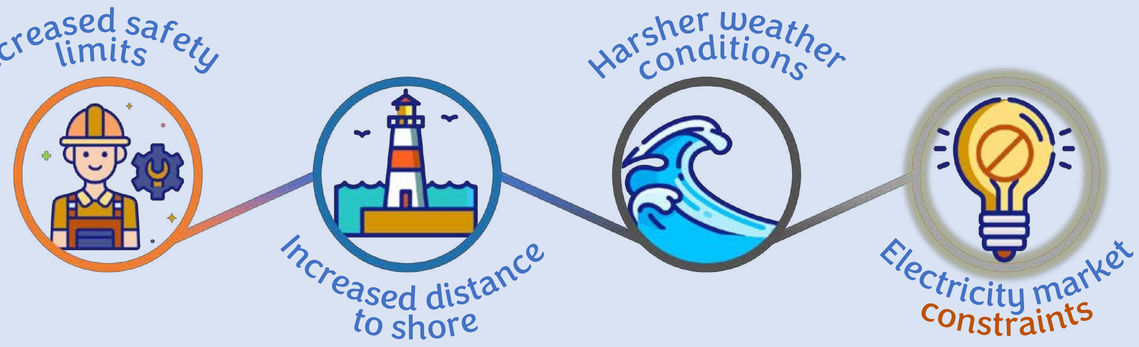
Offshore wind is a key component in the fight against ***climate change***

In recent years, technology has ***improved significantly***, making it more efficient and cost-effective.

This has led to increased investment and development around the world.

HOWEVER... Offshore Wind is now facing a new set of challenges [1].

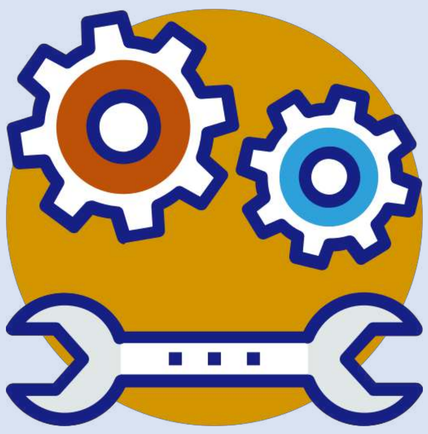


This work examines how a market **constraint** can become a **maintenance opportunity**

Operation and Maintenance

(O&M) can account for up to **30%** of the total cost of energy [2].

Making it a key area for cost reduction!



One of the main key performance indicators (KPIs) in offshore wind is

ACCESSIBILITY

This is a measure of how often the site can be safely accessed. This then has a significant impact on financial metrics such as Operational Expenditure (OpEx) and **Lost Revenue**

Lost Revenue is an opportunity cost.

This is determined by "downtime" (DT) which is the amount of time a turbine is not operating

For scheduled maintenance activities (planned), the turbine must be completely shut down for repair – resulting in significant downtime and **Lost Revenue**

Market CONSTRAINTS

Recent years have seen trends of **negative pricing** in the electricity wholesale market across Europe [3] and the US [4].

At present, it is reported that offshore wind **curtailment** within Europe is limited to **5%** annually [5]. However due to increased deployment, this is also expected to rise!

This is an **increasing threat** for sites as they enter post-subsidy operation

Maintenance OPPORTUNITY

proposed framework views curtailment and negative pricing periods as "opportunities" to perform maintenance: planned annual service or proactive preventive tasks.

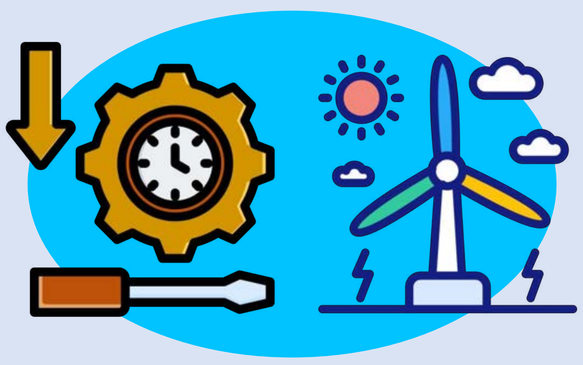
Curtailment and negative pricing periods introduce the concept of **"free downtime"** as the asset would already be in-operational during these times

Utilising↓DOWNTIME to increase↑UPTIME

Performing scheduled maintenance and proactive activities during forced outages has the benefit of

Sharing of **lost revenue** between market enforced downtime and scheduled maintenance downtime

Leading to **reduction** in the cost of scheduled maintenance



Proactively maintaining turbines during market enforced downtime

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Higher probability of **high performance** during **high revenue** market conditions

References

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