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Wind Web Tutorial

OFFSHORE WIND

- Why don't we put all the wind turbines out to sea?
- How big will they look from shore?
- Where will offshore wind farms be built? How far out to sea will they be, and how deep?
- What if there's a storm at sea?
- Will they interfere with shipping?
- Will they disturb the seabed and cause coastal erosion?
- Will they interfere with fishing?
- Will they affect marine life?

Why don't we put all the wind turbines out to sea?

Wind turbines can be sited offshore, where the wind blows harder and larger turbines can be installed. Many offshore wind farms are being proposed and developed today in densely populated Europe, where there is limited space on land and relatively large offshore areas with shallow water.

However, the urgent need to respond to climate change means that we will need to use as many renewable resources as we can, as quickly as possible, and that means both onshore and offshore wind. Also, the U.S. has very large onshore areas that are suitable for wind development, and not so much suitable offshore area.

Furthermore, since many people like the look of wind turbines, it should not be assumed that it would be more desirable to put all wind turbines far offshore. Onshore wind farms can provide significant economic development in the form of tax revenue to hard-pressed rural communities and rent payments to farmers. Onshore wind farms can therefore make a significant contribution to reducing and reversing the decline of rural communities that we have seen in the Plains States over the last several decades.

Where will offshore wind farms be built? How far out to sea will they be, and how deep?

One of the largest offshore areas in the U.S. with shallow water is off Cape Cod, where a major wind farm has been proposed. Much of the rest of the U.S. coastline has at least some potential for wind development, but typically, turbine foundation costs increase rapidly with increasing water depth and wave height. The cost of connecting with utility power lines also increases rapidly as the distance from shore increases.

Still, there are advantages to siting wind farms further offshore. Wind speeds tend to be higher and the wind is steadier. This means that turbines built further offshore should capture more wind energy. Many hope that the technical challenges will be overcome and that in the future offshore wind farms will be built much further offshore, perhaps even on floating platforms at sea.

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Will they interfere with shipping?

Developers intentionally site wind turbines outside of established shipping lanes, thereby avoiding conflicts with routine traffic. Should a ship inadvertently go off course, its radar will readily detect the wind turbines, which are excellent radar reflectors. Wind turbines are also equipped with warning devices to alert ships in foul weather. The U.S. Coast Guard authorizes wind turbine locations for navigational concerns and determines the markings, lights, and fog signals needed

Will they interfere with fishing?

Given the relatively small area of seabed that is required there is no evidence to suggest that total fish catch will decline as a result of wind farm developments; if

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anything the opposite is true. Fish stocks have been in decline for many years due to overfishing. Many environmental groups believe that wind farms will provide welcome sanctuary for fish spawning as well as refuge from intensive fisheries activity.

The wind industry is working actively with the fishing industry to ensure, as the oil and gas industry has done before it, that the fishing industry is not disadvantaged by the growth of offshore wind farms.

How big will they look from shore?

Obviously, this depends on the size of the turbines, how close they are to the shore, and weather conditions. Most offshore wind farms are barely visible from shore.

What if there's a storm at sea?

As with onshore turbines, offshore turbines are warranted and tested to withstand extreme wind conditions. In the event of severe weather, the blades turn out of the wind and will slow down for safety reasons when wind speeds reach 50 miles per hour and above.

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Will they disturb the seabed and cause coastal erosion?

Any proposed wind farm project will involve a full investigation of wave and coastal processes prior to construction. However, the turbine structures and distance offshore are such that it is very unlikely they would significantly affect the seabed or wave patterns. There is no evidence from the Danish experience with offshore wind farms of any detrimental effects on coastal processes.

The coastal erosion effects of higher sea levels and more extreme weather patterns due to global warming are already scientifically recognized, and far outweigh the potential effects of offshore wind farms.

Will they affect marine life?

There are three significant stages of a wind farm from the point of view of marine life: construction, operation and decommissioning. Construction and decommissioning have the potential to generate the most amount of disturbance, and the wind industry, as well as several marine conservation groups, is currently investigating these impacts on marine life.

However, it is important that such impacts be considered in the context of other marine activities such as fishing, shipping, oil and gas extraction, etc. Also, it should be noted that the duration of the construction and decommissioning will be about 6 months only. For the 20-year operational period there are no known impacts on marine life.

It has been suggested that the noise from wind turbines will travel underwater and could disturb sea life. But studies carried out on the impact of noise from existing offshore turbines note that the noise is very low frequency, and many species are actually unable to hear it.

As with any other local impact issues, these concerns will be addressed while a wind farm project is going through the permitting process.

More reading:
Offshore Wind: The Environmental Implications
Horns Reef Offshore Wind Farm: Environmental Issues
AWEA Fact Sheet: Offshore Wind Energy

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