

Just how green is wind power?

March 30 2015, by Andreas Binner



Wind power may have a positive image, but setting up offshore wind farms is complicated and energy-intensive. Because Siemens promises its customers and the authorities a high degree of transparency for the environmental performance of its giant turbines, it has reviewed the actual benefit of green power for the environment.

Siemens has published a detailed ecological review of its [wind turbines](#). The key question is how long it takes a wind farm to generate the volume of energy that it consumes during its lifetime, for example for manufacture, installation and disposal. As expected the calculations show that land-based [wind farms](#) pay off faster than their more powerful counterparts on the open sea. But both showed outstanding results – regardless if onshore or offshore. The study looked at two [offshore wind farms](#), each comprising 80 turbines, and two onshore wind projects with 20 turbines each.

Offshore wind farms are particularly good at saving CO₂

A wind farm with 80 turbines produces 53 million megawatt hours of electricity during its intended 25-year service life. It emits seven grams of CO₂ per kilowatt hour (g/kWh). In comparison, energy from fossil sources burdens the climate with an average of 865 g/kWh, meaning that the wind farm saves a total of 45 million tonnes of CO₂ during its entire service life. Absorbing the same amount of greenhouse gases would require 1,286 square kilometers of forest in Central Europe, or about half the area of the German state of Saarland.

Land-based wind farms are ahead when it comes to amortization, or in other words how long it takes a wind farm to produce the volume of energy that it consumes over its entire lifecycle. For an onshore facility, assuming an average wind speed of 8.5 meters per second, the amortization period is only 4.5 to 5.5 months. This figure also takes materials, production, construction, operation, maintenance, dismantling and recycling into account. Offshore wind farms, on the other hand, take a little longer – between 9.5 and 10.5 months – to offset their energy requirements. The study therefore shows that even though wind farms are supposedly energy-intensive to set up, they make up for their energy consumption within just a few months – out of a total expected service life of up to 25 years.



During its expected service life, an offshore wind farm will save 45,000,000 tonnes of CO₂ emissions. To absorb that much in 25 years would otherwise require 1,286 km² of forest.

Provided by Siemens

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