Search For Solutions: Wind Turbines

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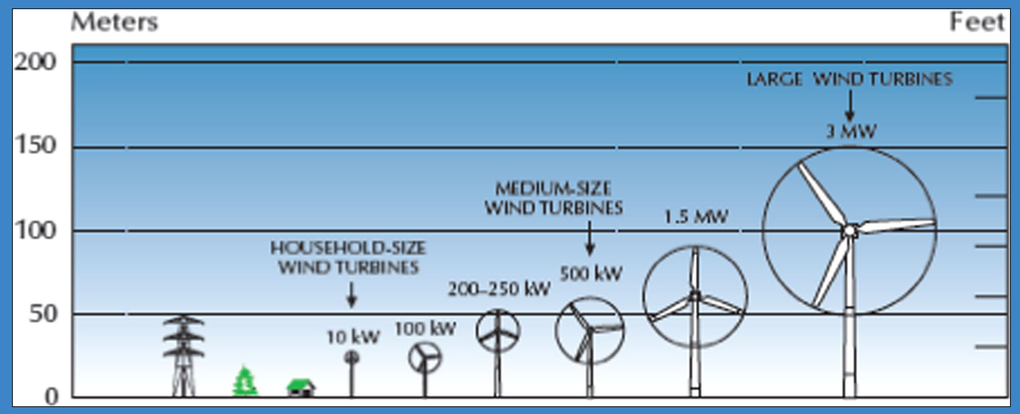
Introduction

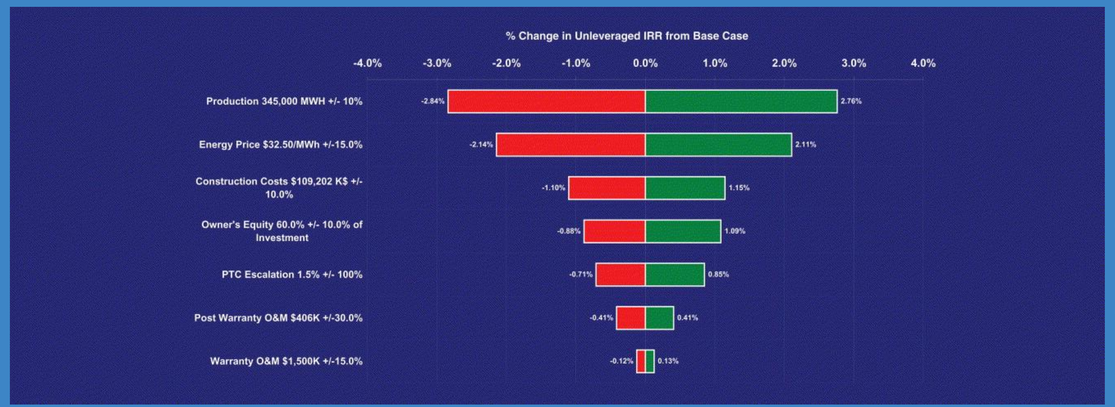
A wind turbine operates on the simple principle of wind turning a rotor that is connected to a generator to produce energy in the form of electricity. However, it is seen that larger wind turbines seem to cause not only noise, but economic issues as well.

REpower's 5MW turbine with LM Glasfiber's 61.5m blade (2)

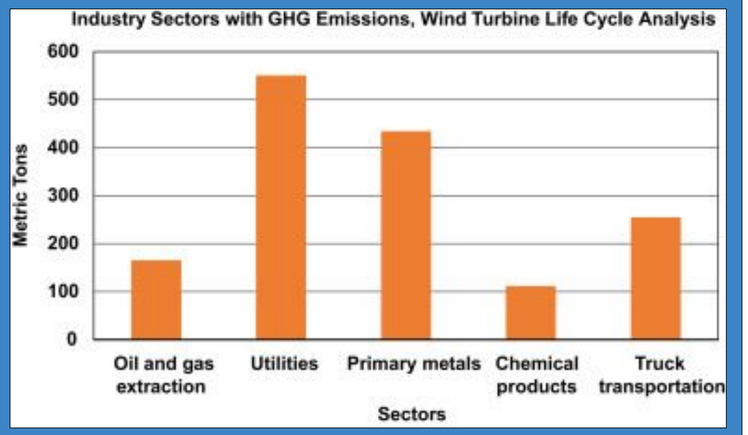
Larger blades on a turbine would seemingly correspond with more power. However, a larger turbine is limited by reliability, as gearboxes are known to be a source of failure and larger ones would produce bigger consequences.[2]

The following figure shows the amount of power each different type of wind turbine produces. It is not always the best to use the largest size wind turbines, it is more about the cost to return on each wind turbine. The larger ones require a much more damaging effect on surrounding climate conditions.[4]

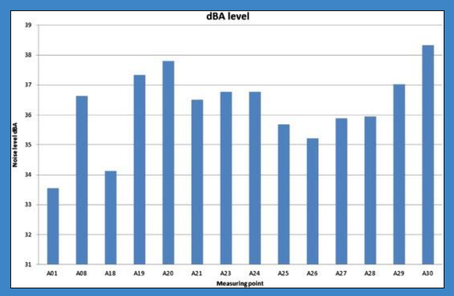




The figure above illustrates a Tornado diagram, demonstrating the different economic parameters and effects of using wind powers.The risk outweighs the reward when it comes to production and energy price,but reward outweighs risk when it comes to construction costs, owner's equity, PTC escalation and warranty O&M. This figure demonstrates that wind power can be very expensive and have some rewards, but wind power may be too expensive unless there is a well thought out plan about whether or not the money spent will equal the money earned.[1]



As shown above, throughout the whole life cycle of a wind turbine, it is not actually greenhouse emissions free. Many toxins and GHG are produced when transporting or producing the actual turbine.[5]



The image above depicts the noise output from 14 different areas in a wind farm in Sweden. The loudest output is less then 40 dBA which is less than the sound of a library.[3]

Bibliography:

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[4] Tummala, A., R.K., Velamati, D.K., Sinha. 2015. A review on small scale wind turbines. *ScienceDirect* **56:** 1351-1371. doi:10.1016/j.rser.2015.12.027

[5] Kumar, I., W.E., Tyner, K.C., Sinha. 2015. Input–output life cycle environmental assessment of greenhouse gas emissions from utility scale wind energy in the United States. *ScienceDirect* **89:** 294-301. doi:10.1016/j.enpol.2015.12.004