

Wind Energy Fact Sheet

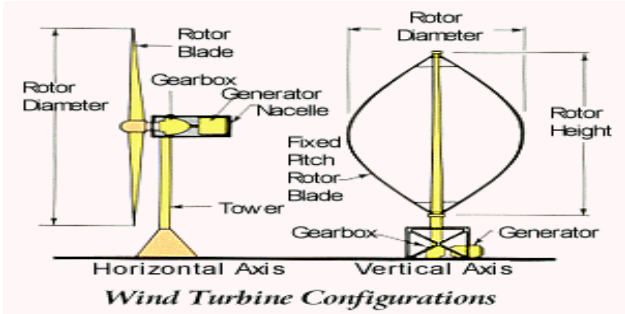
Basics

Horizontal Axis Wind Turbine

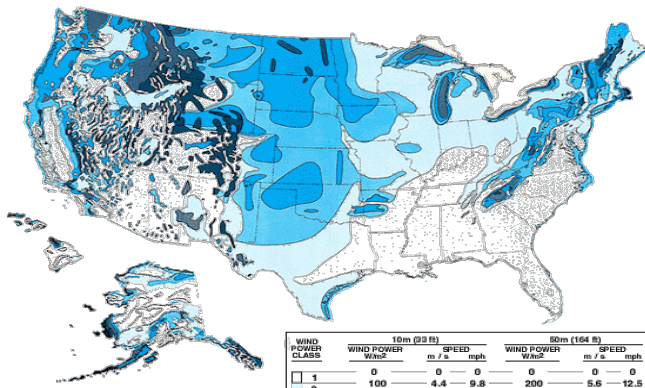
- Directional wind uses airfoils to rotate a horizontal axis shaft
- Generator receives power from shaft and transforms mechanical power into electrical power.
- Consists of 5 main parts: Rotor blades, gear box, generator, Nacelle, and tower.
- Most commonly installed is 1.5 and 2 MW

Vertical Axis Wind Turbine

- Vertical shaft is rotates to generate power.
- Two main types: an Impulse turbine uses airfoil to create lift and rotate, while a Reaction turbine catches wind and uses drag to rotate turbine



Wind Capacity in US



WIND POWER CLASS	10m (33 ft)		50m (164 ft)	
	WIND POWER W/m ²	SPEED m/s - mph	WIND POWER W/m ²	SPEED m/s - mph
1	0	0 - 0	0	0 - 0
2	100	4.4 - 9.8	200	5.6 - 12.5
3	150	5.1 - 11.5	300	6.4 - 14.3
4	200	5.8 - 12.5	400	7.0 - 15.7
5	250	6.0 - 13.4	500	7.5 - 16.8
6	300	6.4 - 14.3	600	8.0 - 17.9
7	400	7.0 - 15.7	800	8.8 - 19.7
	1000	9.4 - 21.1	2000	11.9 - 26.6

RIDGE CREST ESTIMATES (LOCAL RELIEF > 1000 FT)

Effects

Noise complaints

- Turbine creates 45 dba at operation.
- Low compared to city traffic noise of 90 dba and talking at 60 dba

Environmental

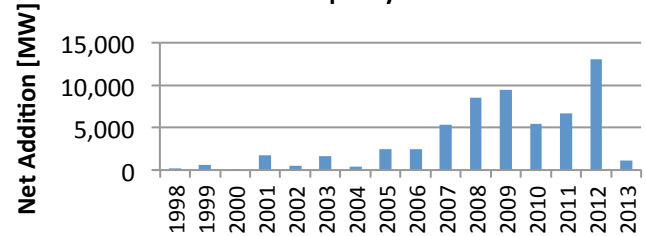
- Carbon dioxide is released during manufacturing and maintenance procedures
- No carbon dioxide or other greenhouse gases are emitted during operation
- Turbines kill 20,000 to 37,000 birds a year in the U.S.
- 90 million birds die from buildings and 130 million die by power lines each year

Policy in US

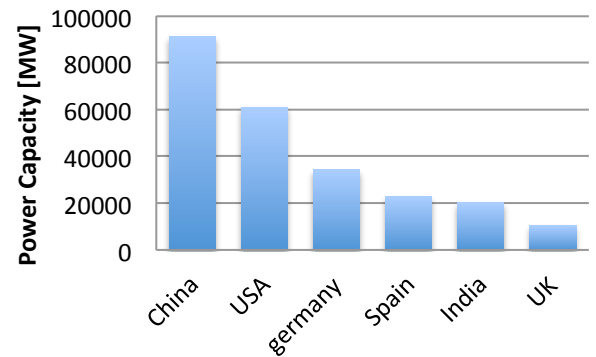
Production Tax Credit [PTC]

- Companies that generate electricity from wind are eligible for federal tax credit
- The tax credit is 2.3-cent per kWh for the first 10 years of operation
- From 2007- 2012, U.S. wind capacity installation almost triple
- The tax credit lapsing stalled installation in 2013, see figure below

Wind Power Capacity Installed



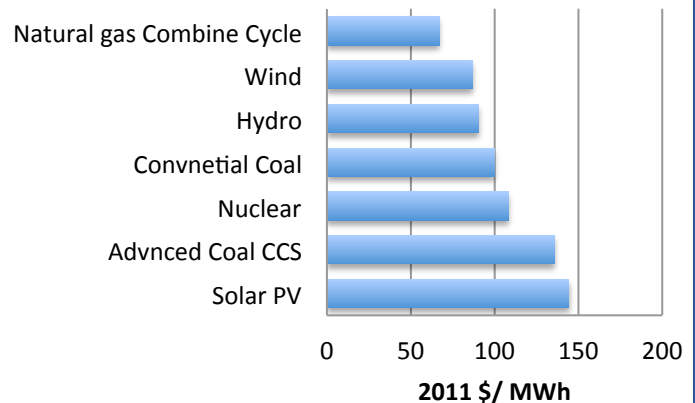
Cumulative Wind Power Capacity by Country [2013]



Levelized Cost of Wind

- The cost of generating electricity from wind has fallen by more than 40 percent over the past three years

Levelized Cost for Energy Production Sources



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Basics

"Energy and Kids." *Energy and Kids*. N.p., n.d. Web. 13 Apr. 2014.

"Wind Turbines." *Wind Turbines*. Wind Measurement International, n.d. Web. 13 Apr. 2014.

Wind Capacity in US

"Wind Turbines." *Tribal Energy Program*. N.p., n.d. Web. 13 Apr. 2014.

Effects

"Energy and Kids." *Energy and Kids*. N.p., n.d. Web. 13 Apr. 2014.

"Wind Turbines." *Wind Turbines*. Wind Measurement International, n.d. Web. 13 Apr. 2014.

Policy in US

Policy

Federal Production Tax Credit for Wind Energy." *Federal Production Tax Credit for Wind Energy*. N.p., n.d. Web. 11 Apr. 2014.

"Production Tax Credit for Renewable Energy." *Union of Concerned Scientists*. N.p., n.d. Web. 13 Apr. 2014

Installation data

"2013 Wind Energy Installations Stall In US, Surge In China." *CleanTechnica*. N.p., n.d. Web. 13 Apr. 2014.

Used to acquire 2013 installation

"Data Center - Climate, Energy, and Transportation | EPI." *Data Center - Climate, Energy, and Transportation | EPI*. N.p., n.d. Web. 11 Apr. 2014.

Cumulative Wind Power Capacity Data

"Global Statistics." *GWEC*. N.p., n.d. Web. 11 Apr. 2014.

Levelized Cost of Wind Data

"U.S. Energy Information Administration - EIA - Independent Statistics and Analysis." *U.S. Energy Information Administration (EIA)*. N.p., n.d. Web. 13 Apr. 2014.