

Why Wind Power is Howling

A lot of High Powered and Influential money has come into Wind Power yet the sector remains far out of favor, below the majority of Investors radar screen.

I believe this is because of misinformation and a lack of understanding about a relatively new sector. Foremost tax incentives are not there because Wind Energy is too expensive, they are there because there is a lack of investment.

It looks like we might be near a wind of change, pardon the pun

Nov 18th 2014, IKEA announced it has purchased a 165-megawatt wind farm in Texas, US, making it the group's largest investment in renewable energy to date. The same day **Google** announced it will power its new Dutch data center through a **62-megawatt wind energy project**, with 18 turbines both onshore and off the coast in the North Sea.

“IKEA believes that the climate challenge requires bold commitment and action,” says **Rob Olson, IKEA US Acting President and CFO**. “We invest in renewable energy to become more sustainable as a business and also because **it makes good business sense**”.

The Google Green site, <https://www.google.ca/green/> reveals they have invested about \$725 million in 7 wind Projects plus a 37.5% stake in the Atlantic Wind Connection, an infrastructure project that will connect offshore wind turbines to the Grid. Wind represents over half of Google's Green investment.

At Climate Week, in September 2014 **Tim Cook, CEO, Apple** made several refreshing statements in his rare public appearance, including the fact **Apple is the largest private solar owner in the US**. He also said the new Apple HQ will be the greenest building in the world, a signal to the rest of Silicon Valley to follow suit.

These companies are part of the Climate Group with a goal that “**by 2020, 100 of the world's largest businesses will have committed to 100% renewable power**”, Businesses need a secure, reliable and affordable energy supply. While fossil fuels have historically provided this, drawbacks of using depleting and polluting resources make seeking alternatives critical. Renewable energy sources are a smarter option – providing an **affordable, clean, reliable and guaranteed future power supply**.

Facebook is working to keep up with its counterparts, Google and Apple, by investing in large amounts of renewable energy on their properties. These days, if you are running your data centers off anything less than 100 percent renewable energy, you are not keeping up with the industry. Facebook has announced plans to power their new Texas data center with 100% renewable energy by 2016 through 204 MW of new wind energy the company helped integrate into the Texas grid.

Through a majority-owned subsidiary, [Berkshire Hathaway Energy](#), Mr. Buffet plans to double the \$15 billion already committed to renewable-energy projects through 2015, and he is on the hunt for more utility acquisitions. Charles T. Munger, Mr. Buffet's longtime business partner and Berkshire's vice chairman, last year predicted that the company would be “*the biggest utilities business in the United States*” in a few years.

Wind capacity, which starts from a significantly larger installed capacity than it once had, grew by 8% in 2014, and is forecast to increase by 13% in 2015 and 14% in 2016.

https://www.eia.gov/forecasts/steo/report/renew_co2.cfm

Wind energy accounts for the largest absolute increase in renewable generation and for 40.0% of the growth in renewable generation from 2013 to 2038, displacing hydro power and becoming the largest source of renewable generation by 2040.

http://www.eia.gov/forecasts/aeo/executive_summary.cfm

I believe hydro power will continue to decline and probably faster as the US strains their water supply and the infrastructure fails.

According to **AJ Sabatelle, Associate Managing Director, Moodys Ratings** coal is now seen as a riskier investment than wind and solar.

While Big Investors like Buffet and the leading Tech companies are piling into Wind Energy, most other investors are not

- The stock markets continue to make record highs but Wind stocks just blow no where. The **Wind etf "FAN"** at \$11.00 is well below its 2008 \$30 high.
- **Capstone Infrastructure TSX:CSE** a Wind Project developer at \$3.40 is down near its 10 year lows around \$3.00. It looks like they might put themselves up for sale to award shareholders
- **Vesta Wind VWDRY** at \$20.25 is a major wind turbine manufacturer and is way down from its \$47 high in 2008 but at least above the \$2 lows of 2012
- **Alterra Power TSX: AXY** is a profitable Geothermal and Wind power producer, their Chairman, Ross Beaty a Canadian icon that built Pan American Silver keeps buying up the stock and now owns 1/3 of the company, yet at \$0.45 it is way down from its \$2.00 level of 2011
- **Wind Works Power OTC:WWPW** a small wind development company at just 3 cents has just over a \$2 million market cap yet in November 2014 they sold one of their Wind projects for \$27 million.

I believe the reason Wind Energy stocks are so out of favor with most investors is misinformation and/or poor understanding of a relatively new sector, I call it

The Myths about Wind Energy

Myth # 1 - A popular misconception is that Wind Energy is too expensive and requires subsidies. In reality Wind Power receives far less subsidies than other energy sources

A 2011 study by the consulting firm Management Information Services, Inc. (MISI) estimated the total historical federal subsidies for various energy sources over the years 1950–2010. The study found that oil, natural gas, and coal received \$369 billion, or 70% of total energy subsidies over that period.

A 2009 study by the Environmental Law Institute assessed the size and structure of U.S. energy subsidies in 2002–08. The study estimated that subsidies to fossil fuel-based sources totaled about \$72 billion over this period and subsidies to renewable fuel sources totaled \$29 billion. The study did not assess subsidies supporting nuclear energy.

The three largest fossil fuel subsidies were:

- Foreign tax credit (\$15.3 billion)
- Credit for production of non-conventional fuels (\$14.1 billion)
- Oil and Gas exploration and development expensing (\$7.1 billion)

The three largest renewable fuel subsidies were:

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- Alcohol Credit for Fuel Excise Tax (\$11.6 billion)
- Renewable Electricity Production Credit (\$5.2 billion) (**WIND ENERGY is in this category**)
- Corn-Based Ethanol (\$5.0 billion)

http://en.wikipedia.org/wiki/Energy_subsidies

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You cannot compare the cost of electrical generation of a 25 year Coal plant to a new Wind Farm. An Electrical Utility company is concerned with the costs of new electrical generation to replace the old end of life plants. When we look at these modern day costs, **Wind is very competitive!**

The EIA 2014 annual report that summarizes levelized costs for various electrical generation for plants coming on stream in 2020 shows land wind power is the cheapest electrical generation source at \$73.6 per megawatt hours along with Nat Gas at \$72.6 & \$75.2. Conventional Coal is \$95.1. Nuclear \$95.2

Levelized cost is often cited as a convenient summary measure of the overall competitiveness of different generating technologies. It represents the per-kilowatt hour cost (in real dollars) of building and operating a generating plant over an assumed financial life and duty cycle. Key inputs to calculating levelized costs include overnight capital costs, fuel costs, fixed and variable operations and maintenance (O&M) costs, financing costs, and an assumed utilization rate for each plant type http://www.eia.gov/forecasts/aeo/er/pdf/electricity_generation.pdf

Table 1. Estimated Levelized Cost of Electricity (LCOE) for New Generation Resources, 2019

U.S. average levelized costs (2013 \$/MWh) for plants entering service in 2020¹

Plant type	Capacity factor (%)	Levelized capital cost	Fixed O&M	Variable O&M (including fuel)	Transmission investment	Total system LCOE	Subsidy ²	Total LCOE including Subsidy
Dispatchable Technologies								
Conventional Coal	85	60.4	4.2	29.4	1.2	95.1		
Advanced Coal	85	76.9	6.9	30.7	1.2	115.7		
Advanced Coal with CCS	85	97.3	9.8	36.1	1.2	144.4		
Natural Gas-fired								
Conventional Combined Cycle	87	14.4	1.7	57.8	1.2	75.2		
Advanced Combined Cycle	87	15.9	2.0	53.6	1.2	72.6		
Advanced CC with CCS	87	30.1	4.2	64.7	1.2	100.2		
Conventional Combustion Turbine	30	40.7	2.8	94.6	3.5	141.5		
Advanced Combustion Turbine	30	27.8	2.7	79.6	3.5	113.5		
Advanced Nuclear	90	70.1	11.8	12.2	1.1	95.2		
Geothermal	92	34.1	12.3	0.0	1.4	47.8	-3.4	44.4
Biomass	83	47.1	14.5	37.6	1.2	100.5		
Non-Dispatchable Technologies								
Wind	36	57.7	12.8	0.0	3.1	73.6		
Wind – Offshore	38	168.6	22.5	0.0	5.8	196.9		
Solar PV ³	25	109.8	11.4	0.0	4.1	125.3	-11.0	114.3
Solar Thermal	20	191.6	42.1	0.0	6.0	239.7	-19.2	220.6
Hydroelectric ⁴	54	70.7	3.9	7.0	2.0	83.5		

You can see from the table above, the most recent 2014 forecast from EIA that land based wind is the cheapest source of electrical generation other than Natural Gas and Geothermal

http://www.eia.gov/forecasts/aeo/electricity_generation.cfm

The DOE Wind Technologies Market Report 2012 finds that “**The average levelized price of wind PPAs signed in 2011/2012—many of which were for projects built in 2012—fell to around \$40/MWh nationwide. That equates to 4 cents per kilowatt-hour (c/kWh). The price per kilowatt-hour is what is commonly seen on residential electricity bills.**”

Myth #2 - Capacity Utilization

The wind does not blow all the time so wind farms run far below their name plate capacity and need back up power generation so they save nothing.

Some of this is true, obvious the wind does not blow all the time and typically Wind farms generate **around 32% to 40% of their capacity** depending on location.

What most people don't know is Natural Gas fired electrical power plants are even less utilized, closer **to 30% of utilization.**

What you need to understand is the nature of the electrical power market. In North America and I imagine in most of the world **we use far more electrical power during the day then at night.** Typically twice as much electrical power is required in the day time then at night.

To manage this large swing electrical power utilities mostly use Nat Gas fired plants as the swing producers. They turn these on during the day as needed and idle some of them at nite. You can't shut down nuclear, way too expensive to start up again. Hydro often fluctuates over a season because water flow rates so has to be compensated too. Coal plants and any plant for that matter has to be shut down for maintenance, so typically coal is around 85% utilization.

Wind farms are not shut down, any maintenance is done one turbine at a time.

To summarize – just as more fossil fuel plants run during the day and shut down at night, **when wind is blowing strong, less fossil fuel plants are running and more turned on if wind is low, it is just the nature of the electrical market whether there is wind power or not.** Utilities in more wind advanced countries have found they can have up to 25% of their grid as wind power and be easily managed. We are not even at 6% in North America.

The nature of the market also means the price of electricity is always highest in the middle of the day because of high demand.

An interesting situation in Canada is the province of Alberta that has the countries on unregulated electrical market. It was early on in Wind development and has a 20 year history there, because it probably has the best wind in the country. However Alberta is know for it's oil&gas development so suffice to say Wind is not really welcome and receives no kind of incentives or tax favor. However with all the history we know that Wind lowers the electricity costs in Alberta. Wind Turbines need no fuel so when the wind is strong it lowers the demand for other electrical generation from fossil and hence lowers the pool price of electricity. For example, [Pembina Institute](http://www.pembina.org/blog/how-wind-and-solar-reduces-the-price-of-electricity-in-alberta) calculated that in 2013 whenever wind was strong generating 600MW - electricity was 65% less expensive compared to the days of low wind with production under 300MW.

<http://www.pembina.org/blog/how-wind-and-solar-reduces-the-price-of-electricity-in-alberta>

Simply put when the wind turbines blow, more expensive sources of electrical generation can be shut down or avoided. It does not help the wind producers though because wind energy lowers prices precisely when it is sold to the grid it gets the lowest price by a long shot, averaging just 5.5 cents/kwh in Alberta, so does not help the development of more wind farms.

Myth # 3 - The green or carbon factor and Jobs

I have heard some silly accusations in my day. Wind mills do not help pollution or eliminate carbon because we have to burn fossil fuel energy to build them. This is true but we do that to build any kind of power plant, at least until we get more wind power on the grid.

They need fossil fuel back up plants anyway – see Myth 2 above

There is no doubt - when wind is producing, the idle fossil fuel plants are not polluting as much.

Some other factors that few consider. A typical Coal fired power plant needs about 100 rail cars of coal per day, some as much as 200 per day. We know coal fired power plants are probably the heaviest polluters, than consider this -

How much pollution is created to ship the Coal to the plant? and yes some plants are near coal sources but not many. How much pollution is created to mine the coal? Or to produce the Oil or Natural Gas for that matter for those type of electrical plants. Huge amounts of Natural Gas is used to produce oil from the oil sands.

Water is becoming a more valuable resource every day. Wind Mills do not use water while all the fossil fuel plants use steam (water) generation.

The State of Iowa estimated the water consumption savings from wind projects in Iowa total nearly **3.4 billion gallons of water per year.**

<http://awea.files.cms-plus.com/FileDownloads/pdfs/iowa.pdf>

While fossil fuels are a mature industry creating fewer jobs as it once did, Wind is a new industry. These are 2014 stats for Iowa that reflect the payoff for Iowa's transformation from farm country to wind country: 6,001-to-7,000 direct and indirect jobs associated with wind and 12 manufacturing facilities in the State. In 2014 annual lease payments to Iowa landowners of \$17.1 million.

Oh! and you can still plant corn around a wind mill!

In 2014 just over 28% of electrical generation in Iowa was Wind and the State gives a tax credit at a production rate of \$0.015/kWh. The average residential electricity rate of 10.82¢/kWh in Iowa is 8.92% less than the national average residential rate of 11.88¢/kWh.

Many will complain that Wind Mills look ugly, they pollute the landscape. Personally and I cannot see why anyone would think a communication tower that is a lot higher and with ugly guide wires looks better? The wireless age has caused a big wave of these towers too. To stick with Iowa, the State had about 1,700 communication towers in 2010 up from about 900 in 1998 and there are many more now
<http://www.towerkill.com/reports/US/IA.html#start>

Myth # 4 Wind Mills are Bird and Bat killers

Birds and Bats are not that dumb, they don't fly into big slow moving turbine blades but collide with road traffic, building windows, fly into power lines and communication guide wires they can't see and fall prey to domestic cats. **If you own a cat, drive a car, live/work in a building with glass windows – shame on you to blame wind mills!**

According to Pembina Institute a Clean Energy Consulting Group.

Bird and bat fatalities can be reduced significantly by proper site selection and operating techniques. While it is important to take these impacts seriously, it is also important to understand that the overall environmental effects are lower for wind energy than for coal, nuclear, natural gas and even large hydro. As a source of energy, wind causes among the least harm to wildlife - second only to solar

USA Today May 2014 – If only birds had air bags

A new study shows that crashes with cars and trucks kill as many as 340 million birds on U.S. roads every year — a much higher toll than bird deaths from many other human activities.

Hunters bagged a mere 19 million U.S. ducks and geese in 2012, according to federal statistics, and a quarter-million to a half-million birds a year die after hitting wind turbines. Among well-studied causes of death tied to humans, only cats and collisions with buildings lead to more bird deaths than traffic does, the study says.

To most experts, though, there's a problem with the bird-mortality argument: The vast majority of research shows that wind turbines kill relatively few birds, at least compared with other man-made structures. **The statistics are shocking if you consider just how many people are crying out against wind power for the birds' sake:**

Man-made structure/technology	Associated bird deaths per year (U.S.)
Feral and domestic cats	Hundreds of millions [source: AWEA]
Power lines	130 million -- 174 million [source: AWEA]
Windows (residential and commercial)	100 million -- 1 billion [source: TreeHugger]
Pesticides	70 million [source: AWEA]
Automobiles	60 million -- 80 million [source: AWEA]
Lighted communication towers	40 million -- 50 million [source: AWEA]
Wind turbines	10,000 -- 40,000 [source: ABC]

<http://science.howstuffworks.com/environmental/green-science/wind-turbine-kill-birds.htm>

And a recent study in 2013 was done in Canada, by Environment Canada
<http://www.cbc.ca/news/politics/9-leading-causes-of-bird-deaths-in-canada-1.1873654>

(Wind turbines: 16,700)

1. Domestic and feral cats: 200 million
2. Power lines, collisions and electrocutions: 25 million
3. Collision with houses or buildings: 25 million
4. Vehicle collisions: 14 million
5. Game bird hunting: 5 million
6. Agricultural pesticides 2.7 million
7. Agricultural mowing: 2.2 million young birds, equivalent to one million adult birds
8. Commercial forestry: 1.4 million nests, equivalent to 900,000 adult birds
9. Communications towers: 220,000

There has been instances where wind turbines have been installed in bad locations, effecting some birds but because there has been so much focus here there is a lot more regulation now. In 2012 the Obama administration enacted new guidance for wind turbines location to reduce bird mortality. In Canada a 1 year bird study must be conducted at any potential wind mill site to ensure minimal impact.

It is known that the steady lights on tall communication towers kill lots of migratory birds. There has been instances of several thousand kills in a single night at just one tower. Advocates have been battling with the FAC for about 10 years, the only thing required is changing the lights to flash instead of being on steady – maybe someday?

That would have bigger benefit than anything involving wind mills. Decals or tape strips can be put on windows so birds can see them, but building owners will spend a **lot of money paying guys to run up and down sky scrapers to clean windows so we have a clear view to see if birds are flying into wind mills.**

It may be hard to prevent the millions of road kills. But we go to a lot of trouble to create conservation areas and protect wetlands. Then we build or have a high speed highway through the conservation area or bird, wetland sanctuary **really defeats the whole purpose.**

For example 32,000 species of animals, including birds killed on just a 3.6 km stretch of a 2 lane paved road adjacent to Big Creek National Wildlife area on Lake Erie over an approximate 1 year period (2 summer/spring seasons)

<http://longpointcauseway.com/library/Road%20Mortality%20on%20the%20Long%20Point%20Causeway.pdf>

Energy is big business and a lot of money is spent advertising and promoting various sectors and projects etc. With this comes some mud slinging, misinformation and half truths. Hopefully some things are more clear to you on the previous 4 myths.

"As companies buy wind, Americans will increasingly see that this is not a futuristic ideal, but a mainstream, technologically advanced power source available for us today," AWEA said. "After all, if it's good enough to power Facebook's data center, it's good enough to power our homes and businesses."