

SUSTAINABILITY TIMES

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Wind Power: The Good, the Bad, and the Ugly



We are hearing a lot about wind power these days. We hear it may be the salvation of our broken economy and that the potential for generating electricity from the wind across America's prairies is almost limitless. We hear wind makes electricity we cannot use because it is in the wrong places. So how do we sort through all this to figure out if the US should be promoting wind energy?

To do so, let's look at the good, the bad, and the ugly about wind energy and wind farms.

THE GOOD:

To be sure there is a lot to like about wind energy.

- First, it is a completely renewable energy source and creates absolutely zero waste, zero pollution, and zero greenhouse gases.
- Second, there has always been lots of wind on the Earth and there always will be, at least as long as the Earth continues to spin on its axis. The U.S. Dept. of the Interior has stated that wind power could supply all the electricity needs of the country from turbines placed off our coastlines (*Los Angeles Times*, April 3, 2009).
- Third, the energy from the wind is completely and utterly free, which is great when we think about our current economic troubles and when we think about the long-term impact of fuel prices on our society.
- Fourth, the technology to build turbines to generate electricity from the wind is very well established. We don't need to pour billions into research to develop the ability to harness the wind.
- Fifth, as this photograph illustrates, we can sprinkle modern windmills around the land and still use the land below for other purposes, chiefly farming and ranching.
- Sixth, wind turbines can be built and used singly or in groups, allowing both individuals and companies to use them where feasible and rather easily.
- Seventh, currently electricity produced from wind energy is nearly comparable in price to that produced from fossil fuels.

- While we are in a recession or a jobless recovery, wind expansion also has another significant plus: Lots of workers are needed to build the turbines, the blades, and the structures.

THE BAD:

Probably the worst thing about wind farms is that the windiest places tend to be in the mountains of the West and the prairies of the Midwest, while the greatest demand for electricity is along the California coast and the Northeastern seaboard. Moving the electricity generated in western or midwestern wind farms to one of the coasts involves thousands of miles of transmission lines weaving across the country. While many lines already exist, their capacities are too limited to accept the tremendous amounts of electricity that could be produced in these areas. So, the supply and the demand are not conveniently located. Other problems exist with building wind farms off shore, but nearer to large population centers. Turbines in these areas may pose hazards to shipping and are more susceptible to damage from storms.

Wind power is also somewhat variable. While modern turbines only require about a 7 mph breeze to generate electricity, they do not create a stable level of power at all times (unlike nuclear and fossil-fuel plants). This characteristic of wind power suggests that significant energy storage systems would augment the usefulness of wind power. Such technology is still in the development stage and needs significant funding to become practical.

THE UGLY:

Some people claim wind turbines are plain out ugly and object to them on this basis. Others (such as this author) find them elegant and immeasurably more beautiful than a traditional power plant or even the ubiquitous cell-phone towers. Just as there are areas of the country that are protected from oil drilling activities, there should be areas protected from wind turbines (such as national parks and coastal areas). But there are hundreds of thousands of square miles where turbines would not disturb a pristine view.

On Sept. 22, *USA Today* carried an article about the problem of bird deaths occurring at wind farms, particularly the Altamont Pass farm just east of Oakland, CA. Migrating birds, particularly raptors, tend to fly into the structures or be hit by the blades of turbines. Several methods are being tried to either shut down the turbines when birds are near or to warn or scare the birds away, but so far little success has been realized. This situation can be partially improved by better siting decisions that do not place turbines in common migration paths or near ridge-lines. The concept of building wind farms to save our environment is somewhat mitigated by the specter of millions of dead birds.

CONCLUSIONS:

Just like almost everything in a modern world, wind power is both good and bad at the same time. Do we need it to help solve the energy crisis? Most assuredly. Do we need to invest in distribution systems and the development of better storage systems? Of course. Do we need to be careful about where we put wind farms? Absolutely. At **ZWORC** we believe it is quite possible to increase dramatically the number of wind turbines in America in order to gain the good while mitigating both the bad and the ugly. America is up to meeting this challenge. Wind power will not meet all the electricity needs of society, but it is likely to grow into a significant portion. We just need to grow it thoughtfully.

Did You Know ... ?

Geneticists at Texas A&M recently announced they have developed a technique for removing a toxic substance called gossypol from cottonseed. About 44 million metric tons of cottonseed is produced annually as a byproduct of growing cotton. Since 23% of cottonseed is protein, this genetic alteration will allow enough new protein to enter human diets to provide all the protein required for 500 million people. This research result may have major impact on the Earth's ability to sustain its inhabitants into the distant future. For more information, see Time Magazine, Sept. 14, 2009, p. 54.

Parenting 101

By Gary Bergmiller

Full disclosure: I have two young children, ages 7 and 10.

American parents are a strange breed. We concentrate heavily on our careers (often both Mom and Dad working long hours) in order to provide a good life for our kids. We socialize them in day care at 2 months and sign them up for the best pre-school in the region (Hang the cost, I'll work some overtime!) at 2 and a half. They're taking swimming lessons at 6 months, playing soccer at 4, taking ballet at 5, and plinking on a piano by 6. All of these activities are not really meant for fun so much as to give them a boost in meeting the unrelenting competition they will face throughout their lives. Montessori schools, language specialists, and Sylvan Learning Centers are immediately called at the first hint of a "problem."

And what is wrong with that? you may be asking. Nothing is wrong with that. Nothing at all. Nada.

But I find an underlying inconsistency that is the real topic of my ranting. While we are busy preparing our kids to succeed and rise to the top of the heap, we are driving our F-250s, Odysseys, Explorers, Escalades, and Hummers all over the place in a transportation frenzy to get to all those lessons and such. We buy a bigger TV every 2 years. We eat fast-food or cook from boxes and packages because we are too busy to cook from real food like Grandma did in the 1950's. We back conservative politicians with "family values" who are so connected with Big Oil that truth sometimes takes a back seat to profit. We look the other way while polar bears and manatees and rainbow trout are killed off by exploratory drilling. We ignore our carbon footprint as the world grows ever warmer and unhealthy.

Is it really more important to our kids' future to prepare them to be super-achievers than it is for us to prepare the world to be a healthy and resource-rich environment during their lifetimes? Is it? Really?

If we could successfully frame environmental responsibility as a big part of good parenting, American-style, I think we would easily find ways of enabling our kids to be high-achieving individuals while we also protect and improve the environment they will be inheriting from us. They will thank us all the days of their lives and so will our grandkids.

Did You Know ... ?

Norfolk Southern has developed an all-electric locomotive which uses 1,080 rechargeable 12-volt batteries as its power source. The NS 999 can pull the same load as a diesel locomotive for 24 hours on a charge. It uses regenerative braking to boost its power and can be fully charged in 2 hours. The NS 999 costs the same as other locomotives, too. Innovations such as this will eventually contribute a great deal to reducing our carbon footprints and the negative effects of global warming.

Waste Reduction Technique of the Month

Cogeneration



One of the biggest energy losses in some process systems is the loss of heated water or air that leaves a process location as a by-product of the process. If this air or water is allowed to cool down in the atmosphere, the energy used to heat it previously is not recovered for other uses. Companies with particularly hot wastes should consider using the wastes to preheat make-up water or air or perhaps to warm the building. Cogeneration equipment may also be used to generate electricity that can be fed into the power system to offset the energy drawn from the utility. Cogeneration processes may recover substantial energy loss and serve to reduce total power costs. Every facility should be evaluated to see if opportunities for cogeneration exist.

Cogeneration may increase the output of traditional electrical generation systems. For example, Stanford University has an on-campus power plant that generates power from a 39.2 MW natural gas powered turbine that feeds a heat recovery system operating a 10.7 MW steam-powered turbine. (See <http://www.stanford.edu/group/EMG/html/cef.html> for details.) This installation improves the efficiency of the process by about 20% over a typical gas system without the cogeneration add-ons.

Cogeneration systems may also be used to drive mechanical processes in production in such various industries as pharmaceuticals (Abbot Laboratories), plastics (Elgin Molded Plastics), construction (Gallagher Asphalt), chemicals (Phoenix Chemicals), and nurseries (Thornton Turf Nursery). (For more examples, visit <http://www.cogeneration.org/index.html>.) Anywhere that extra heat is produced, the possibility to use that heat to generate electricity, heat the building, pre-heat process water or air, or drive mechanical equipment exists. Don't waste the good heat you have already produced in your system.

Founder's Corner

Everyone Helps

By Paul McCright



Sometimes I am frustrated that I cannot buy an all-electric car and power it from my solar power system while growing all my food and composting my wastes. I am convinced that each of us can find a few things we can do now to reduce our impact on the environment. If everyone helps as they can, we can reduce the pressure on the environment while the really big innovations are developed. We all have an important role.

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