Wind Power: How We Got Here

I saw an article in *Mother Earth News* that was shamelessly supporting wind power (a topic I know something about), so I contacted the writer. My question to him was: *what scientific information do you have that **proves** that wind power does what it is supposed to do?*

After several evasive correspondences, he finally conceded that he had none. In a desperate attempt to defend this untenable position he then said that *no proof was needed*!

In exploring this unexpected line of thought with this reportedly knowledgeable individual, it became quite clear to me that he did not have a big-picture concept of what is going on here. But since this deficiency is clearly shared by many other people, let's do a quick review as to how we have arrived at our current electrical energy predicament…

The first practical use of electricity, in the late 1800s, is generally attributed to Thomas Edison (a founder of General Electric). Of course there were actually dozens of people who contributed to making commercial electricity a reality. And there were a LOT of formidable hurdles to overcome.

One of the initial primary issues was: *where was this electricity going to come from*? For the first **hundred years** or so, there were six over-riding concerns about commercial electricity generators:

1 - could they provide *large amounts* of electricity?
2 - could they provide *reliable* and *predictable* electricity?
3 - could they provide *dispatchable*[1] electricity?
4 - could they service one or more of the *grid demand elements*[2]?
5 - could their facility be *compact*[3]?
6 - could they provide *economical* electricity?

[1] *Dispatchable* means a source can generate higher or lower amounts of power *on-demand*, i.e. on a *human-defined* schedule.

[2] *Grid Demand Elements* = *Base Load* (the minimum amount of steady rate electric power required 24/7) + *Load Following* (regulation of power output in response to moment-to-moment changes in system demand, so as to maintain the system within predetermined limits) + *Peak Load* (the maximum load during a specified period of time).

[3] *Compact* is the ability to site an electrical facility on a relatively small and well-defined footprint, preferably near high demand, e.g. cities. This would save on transmission lines which are extremely expensive, unsightly, and produce power loss.

The implementation of these has resulted in the most successful grid system on the planet.

I would like to avoid getting too technical here, but the primary goal of all of these efforts was to achieve *capacity*. To ensure reliability at the lowest cost, grid operators consider capacity in several ways as they evaluate electricity sources — but the most important is *Capacity Value.* The layperson's definition of this is: "the percentage of a machine's rated capacity that grid operators can be confidant will be in available during upcoming times of greatest demand." Knowing this accurately is the key to reliable system grid performance.

Back to our history. Many options were proposed to satisfy these six criteria. To maximize public benefit, each was individually and *scientifically* vetted (*before* being put on the grid) to ascertain whether the suggested source would comply with all of the needed conditions.

Over time, what resulted from these assessments was that we selected the following sources to provide commercial electricity for us: **hydroelectric**, **coal**, **nuclear**, **natural gas**, and **oil**. (Oil is *by far* the smallest source, as only about 1% of U.S. electricity comes from that.)

*Note that each of these current sources meet **ALL** of the above six essential criteria — and if they don't (like oil now being more expensive) **then they get replaced,*** by other conventional sources that **do** meet all criteria.

As a result, **today,** and **a hundred years from now**, these sources can provide ALL of the electrical needs of our society — *and continue to meet all six criteria*.

It's important to also note that **ALL** of the primary conventional sources use home-grown energy. Regarding our electrical energy sources, we have *always* been **energy independent!**

So what's the problem?

Ahhh, the problem is that a **new** element has been recently added to the list of requirements: *environmental impact* — and the current number one environmental impact consideration is *greenhouse gas emissions* (e.g. CO2).

So why has this joined the Big Six? It is a direct result of the current debate on Global Warming. Note the word *debate*. This is not yet a scientifically resolved matter (though some would like to have you think so). In response to intense political pressure, our government has acquiesced to these forces to make emissions an *additional* criterion.

Having the government step in and **mandate** that utility companies change the principles that have been the foundation of our electrical supply system for a hundred years is a bit disconcerting... Transforming such a successful system based on a position that is not yet scientifically resolved is *seriously* disturbing. That's **concern #2**.

And there's more — **much** more. **Concern #3** is that this new standard for electrical supply sources now has taken priority *over ALL THE OTHER SIX!* **Concern #4** is that this new-boy-on-the-block has in reality become the *ONLY benchmark of importance* — the other six have essentially been put aside, and are now given only lip service.

In this unraveling of sensibility there is one final incredible insult to science (**concern #5**): alternative sources of commercial electricity that *claim* to meet this new super-criteria (to make a consequential impact on CO2) **don't even have to prove that they actually do it!**

> I know that this is a lot to absorb here. Maybe you want to take a moment to let the profound impact of these latest developments sink in...

Just in case you think I am not being accurate here, we'll look at the environmental poster child: *wind power*. Let's examine each of the six time-tested criteria, then the new one...

1 - Does industrial wind power provide large amounts of electricity?

Yes, it could. However, its effectiveness from most perspectives is inferior. For instance (because of the wide and unpredictable fluctuations of wind), it only produces, on average, about 30% of it's nameplate power. Another example of its dilutedness is that it takes over *one thousand times* the amount of land for wind power to produce a roughly equivalent amount of energy as does a nuclear facility.

2 - Does industrial wind power provide *reliable* and *predictable* electricity?

NO. Despite the wind industry's absolute best efforts it is not reliable or predictable *compared to the standards set by our other conventional electrical sources*. What's worse is that when power is really needed (e.g. hot Summer afternoons) wind is usually on vacation. Compare its performance to a car (windmobile) run solely by wind power.

3 - Does industrial wind power provide *dispatchable* electricity?

NO. Again, due to its unpredictability, wind can not be counted on to provide power *on-demand*, i.e. on a human-defined schedule.

4 - Does industrial wind power provide one or more of the *grid demand elements*?

NO. It certainly can not provide *Base Load* power, which is what is needed to supply an underlying 24/7 demand. It can not provide *Load Following,* which is in response to moment-to-moment changes in system demand. It can not reliably provide *Peak Load*, which is needed maximums during specified periods of time (like hot Summer afternoons when lots of air conditioners are on, and the wind is usually still).

5 - Is industrial wind power *compact*?

NO. As mentioned above, to even approximate the nameplate power of a conventional facility, like nuclear, takes something like *a thousand times* the amount of area. Wind promoters are desperately trying to convince gullible politicians that it can have some real capacity value. Their tinkertoy "solution" is to try to connect multiple wind farms spread over vast areas (often several states). In addition to being speculative, all of this, of course, completely undermines the objective to be a *concentrated* power source.

And another "feature" of wind power is that most of the windiest sites (and available land) are a LONG way from where the electricity is needed. This will result in *thousands* of miles of huge unsightly transmission towers and cables, at an *enormous* expense to ratepayers — most of it completely unnecessary. Kite flying will be a thing of the past.

6 - Does industrial wind power provide *economical* electricity?

NO. It is artificially subsidized WAY more than any conventional power source. A 2008 US Energy Information Administration report concluded that just *some* of the federal subsidies for wind energy amount to **$23+** per megawatt-hour. By contrast, normal coal receives **44¢** per megawatt-hour, natural gas **25¢**, hydroelectric **67¢**, and nuclear power **$1.59**. In addition to these, there are significant state subsidies and mandates. And, as of this writing, there are some 200 bills pending before Congress to add *more* incentives!

And now let's add the latest rule dejour:

7 - Does industrial wind power make a *consequential reduction of CO2*?

NO! No independent scientific study has ever shown that wind power saves a meaningful amount of CO2. In fact, the most independent scientific study done (by the National Academy of Sciences) says the opposite. Their 2007 report concludes that (assuming the *most optimistic conditions*) the U.S. CO2 savings by **2020** will amount to only **1.8%**. An earlier EIA report said **1.3%**. *These are trivial quantities!*

What about the critical factor of *Capacity Value*? The result of the above deficiencies is that wind power has a Capacity Value of about **10%**. Compare this to the conventional sources, where essentially all of them have a Capacity Value over **90%**: *a stunning disparity.*

Huh? How can this *possibly* be? How could the U.S. be on the path to spend over a TRILLION dollars on an electrical source that **fails** five out of six of our historically important criteria, *AND has no scientific proof that it even meets this new emissions criterion?*

It's all about the money. Lobbyists for businesses, and parties who want a piece of this TRILLION+ dollars (e.g. T. B. Pickens), are leaving no stone unturned. Environmentalists who have taken their eye off the ball are promoting this palliative non-solution. Politicians eager to be seen as "green" (a current fad) are saying yes to everything the color of money.

Wind power proponents typically try to rationalize away its serious shortcomings saying that things will "get worked out" *mañana*. What essentially is happening though, is that our politicians are trying to pound a square peg into a round hole. **Zero** wind power is appropriate until **after** these significant problems are resolved — as some may *never* be.

Another consideration is that after understanding wind power's inherent electrical generation defects, it might put some other issues into perspective. For instance, it is entirely legitimate to be concerned about bird and bat mortality, noise intrusions, flicker effect, property devaluation, etc. But what if they were "fixed" — *would wind power then be OK?*

Let's say that (to help with some of these issues) a conscientious town's ordinance required a one mile separation of wind turbines from all houses. *Is wind power then an "acceptable" source for providing us commercial electricity?* The fact is that this excellent regulation would in *no way* address the fundamental electrical grid limitations of wind power identified above. **Wind power will not be acceptable until all seven criteria are met.**

Does wind power's abysmal failure mean that all "renewables" are a similar scam? **NO.** Each proposed new power source needs to be objectively evaluated, *independently*. For example, based on MIT's 2007 report, industrial Geothermal holds significant promise.

In any case, this profound turn of events in how we select our sources of electrical power (by abandoning our successful and time-tested criteria) is having, and will continue to have, incalculable negative impacts on every person on the planet.

There is a solution — and it will cost a lot less that a Trillion dollars. 90% of what we do spend should be on improving the conventional sources that already "work." The remaining amount could go towards exploring new options that (by definition) would have to meet or exceed conventional sources (i.e. the six criteria). Then add conservation.

Please speak out against the idiocy of this insidious insult to science and mankind!

John Droz, jr.
Physicist & Environmental Activist

9/26/08; rev 11/8/08

For scientifically based information about wind power, see my webpage: <<http://www.WindPowerFacts.Info>>. email: aaprjohn *at* northnet *dot* org.

— — — — — — — — — — *Some References* — — — — — — — — — —

(All links should be clickable. Additional references are available on request.)

Electricity Timeline <<http://inventors.about.com/library/inventors/blelectric2.htm>>
Electricity Market <<http://en.wikipedia.org/wiki/Electricity_market>>
Energy Definitions <<http://tinyurl.com/5n8s9o>>
Base Load Power <<http://www.ruralmissouri.org/07pages/07OctWatts3.html>>
Why Wind Won't Work <<http://stopillwind.net/downloads/WhyWindWontWork.pdf>>
US Electricity from Oil <<http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html>>
31000+ Scientist Dispute Global Warming <<http://www.oism.org/pproject/>>
Subsidies <<http://topics.energycentral.com/centers/wind/view/detail.cfm?aid=1837>>
Nuclear Heresies <<http://phe.rockefeller.edu/docs/HeresiesFinal.pdf>>
Nuclear in Perspective <<http://tinyurl.com/29fmn8>>
GE report (pp 2.6-2.7) <<http://www.uwig.org/phase%20_1_feb_02_04.pdf>>
NAS Report <<http://www.nap.edu/nap-cgi/report.cgi?record_id=11935&type=pdfxsum>>
CO2 & Wind Power <<http://www.ref.org.uk/images/pdfs/Whiteco2.pdf>>
Enron & Wind Power (PDF) <<http://tinyurl.com/668bhh>>
Energy and Environmental Myths & Facts" (PDF) <<http://tinyurl.com/65kanx>>
WSJ re EIA Report <<http://online.wsj.com/article/SB121055427930584069.html>>
Scientific Methodology <<http://en.wikipedia.org/wiki/Scientific_method>>
Energy Business Future <<http://phe.rockefeller.edu/docs/appeaausubel12april.pdf>>
Geothermal-MIT Report (pdf) <<http://web.mit.edu/newsoffice/2007/geothermal.html>>