Wind Energy: How We Got Here

By John Droz, jr

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

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

1 - provide *large amounts* of electricity?
2 - provide *reliable* and *predictable* electricity?
3 - provide *dispatchable*[1] electricity?
4 - service one or more *grid demand element*[2]?
5 - have a *compact*[3] facility?
6 - provide *economical* electricity?

[1] A *dispatchable* source generates power on a *human-defined* schedule.

[2] *Grid Demand Elements* = *Base Load* (minimum amount of electric power required 24/7) + *Load Following* (power output responds to moment-to-moment changes in system demand) + *Peak Load* (the maximum load during a specified time period).

[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 saves on expensive transmission lines, which can have significant power loss.

A primary goal 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 source's rated capacity that grid operators can be confidant will be available during future times of greatest demand."

Knowing this accurately is the key to reliable system grid performance!

Back to our history: several options were proposed to satisfy the above criteria. To maximize public benefit, each was individually and *scientifically* vetted to ascertain whether the suggested source would comply with ALL of the needed conditions.

Our careful implementation of these has resulted in the world's most successful grid system.

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

Note that each of these current sources meet ALL of the above six essential criteria *— and if they don't then they get replaced:* by 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*.

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*. The current number one environmental impact consideration is *greenhouse gas emissions* (e.g. CO_2).

Why has this joined the Big Six? It is a direct result of the current debate on Global Warming. Despite what the media conveys, this is not yet a scientifically resolved matter. In response to intense political pressure, our government has acquiesced to make emissions an *additional* criterion.

Having the government **mandate** that utility companies change the principles that have been the foundation of our electrical supply system for a hundred years — for reasons not yet scientifically resolved — is rather disconcerting.

And there's more. **Concern #3** is that this new standard for electrical supply sources now has taken priority *over ALL THE OTHER SIX!* In fact, this new-boy-on-the-block has in reality become the *ONLY* important benchmark — the other six are now given only lip service!

In this unraveling of sensibility, there is one final incredible **insult to Science:** commercial electricity alternative sources that *claim* to make a consequential impact on CO_2 **don't even have to prove that they actually do it!**

Let's look at the environmental poster child: *wind energy*, and examine these criteria:

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

> **Yes, it could**. However, its effectiveness from most perspectives is inferior. For instance (because of the wide fluctuations of wind), on average, it produces only about 30% of its nameplate power. Then compare these energy densities (MJ/kg): nuclear = 88,000,000, gas = 46, wind = .00006.

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

> **NO**. Despite the wind industry's best efforts it is not reliable or predictable *compared to the standards set by our conventional electrical sources*. What's worse is that when power is really needed (e.g. hot summer afternoons) wind is usually on vacation.

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

> **NO**. Due to its unpredictability, wind can't be counted on to provide power *on-demand*, i.e. on a human-defined schedule.

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

NO. It can not provide *Base Load* power, *Load Following,* or *Peak Load*. Essentially wind energy is just thrown into the mix and gets used who knows where.

5 - Is industrial wind energy *compact*?

NO. To even approximate the nameplate power of a conventional facility, like nuclear, takes over *a thousand times* the amount of area. Wind promoters try to convince non-technical politicians that it can have real capacity value. Their tinker-toy "solution" is to connect multiple wind farms spread over vast areas (often several states). In Australia, it has been proven that this doesn't work. Even if it did, this would undermine the objective to be a *concentrated* power source.

Another "feature" of wind energy 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 transmission towers and cables, at an *enormous* expense to ratepayers.

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

NO. It is artificially subsidized WAY more than any conventional power source. A 2008 report by the US Energy Information Administration concluded that wind energy is subsidized to the tune of **$23** per megawatt-hour. By contrast, normal coal receives **44¢** per megawatt-hour, natural gas **25¢**, hydroelectric **67¢**, and nuclear power **$1.59**. [*Since these other sources meet ALL six criteria, there is some basis for subsidizing them!]*

And now the latest rule de jour:

7 - Does industrial wind energy make a *consequential reduction of* CO_2?

NO! No scientific study has ever proven that wind energy saves a meaningful amount of CO_2. In fact, the most scientific study done (by the *National Academies of Sciences)* says the opposite. Their 2007 report concludes that (assuming the *most optimistic*

conditions) the U.S. CO_2 savings by **2020** will amount to only **1.8%**. This is a trivial quantity, and amounts to about 1/80,000 of the world's CO2.

What about the critical factor of *Capacity Value*? The result of the above deficiencies is that wind energy has a Capacity Value of about **zero**. Compare this to the conventional sources, where essentially all of them have a Capacity Value near **100%**: *a stunning disparity.*

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 parties who want a piece of this TRILLION dollars, 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" are saying yes to everything the color of money.

Wind energy 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 energy is appropriate until **after** these significant problems are resolved — as some may *never* be (due to the laws of physics).

After understanding wind energy'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, property devaluation, etc. But what if they were "fixed" (with a protective ordinance) — *would wind energy then be OK?*

NO: excellent regulations don't address the fundamental grid limitations of wind energy identified above. **Wind energy will not be acceptable until ALL seven criteria are met.**

Put another way: wind energy should not be allowed on the public grid until there is scientific proof that it is a net societal benefit.

Does wind energy's abysmal failure mean that all "renewables" are similarly deficient? **NO.** Each alternative power source should be scientifically evaluated. Industrial Geothermal holds significant promise. For scientifically based energy information, see **WiseEnergy.org**

If we abandon our successful and time-tested criteria for selecting our sources of electrical power, and allow lobbyists to dictate our energy policies, there will be incalculable negative impacts on every person on the planet.

—John Droz, jr