'Big Wind' can't deliver the energy it promises

Numbers don't support spending billions on Molokai, Lanai projects

MIKE BOND
IN MY OPINION

PBN reporter Sophie Cocke is to be commended for attempting to understand — and convey — what seems a complex issue: How much energy could Big Wind produce? ("How much energy could Big Wind produce?" May 27 PBN Biz Blog.)

Yet, her question remains unanswered. Would the proposed $3-4 billion "Big" Wind project really deliver much electricity to Oahu at all? Or is this monstrous scheme to cover a good part of Molokai and Lanai with gargantuan turbines with blades larger than the wings of a Boeing 747, and taller than the tallest building in Hawaii, really just a tax and ratepayer-gouging scam, as more and more experts are now stating?

The economics of industrial wind development are straightforward. As Texas billionaire T. Boone Pickens said, the only thing green about it is the money it puts in my pocket — largely through major electricity rate increases (to us), taxpayer subsidies (from us) and tax breaks for large corporations (from us). Those subsidies mean we have less money for Medicare and education and the defense of our nation, and they us drive inexorably closer to the worst bankruptcy America has ever faced.

To understand how much (or how little) electricity "Big" Wind might actually generate, let's look at the numbers:

■ **Installed capacity:** the potential maximum electricity produced if the wind blows at a constant high level 24 hours a day, 365 days a year. For "Big" Wind this is 400 megawatts (MW).

■ **Capacity factor:** the estimate of the electricity produced under actual wind conditions. Since most industrial wind factories have a capacity factor of 19-24 percent (they operate at 19-24 percent of installed capacity), the highly optimistic estimates from the state energy office of 40 percent of installed capacity for "Big" Wind are extremely unlikely. A more reasonable maximum for "Big" Wind is probably 20 percent, which reduces the production from its installed capacity to 80 MW (400 MW x 20 percent).

The Bonneville Power Administration, which has 12 percent of installed U.S. wind capacity, recently announced its system runs at 19 percent or lower, despite being located in one of the windiest areas in the U.S. In the UK, which is considered to have the best wind availability in the world, its 1,000 turbines ran at 19-24 percent installed capacity throughout all of 2009-2010.

The state energy office estimates become even more ludicrous when we realize that almost no wind data exist for Molokai, so it is not known whether the wind would even run turbines there. Frank Leary, a Molokai resident who has run smaller turbines on his land for many years, has stated that for the last 20 years on Molokai, the wind has been less than 10 miles per hour intermittently as much as half the time.

A former supervisor for a Hawaii power company recently told me that on an island such as Molokai or Lanai, non-firm transmission of electric energy is dumb … the intermittent generation from wind generators of what would be 200 MW would honestly be about 12 MW on a time curve.

■ **Curtailment factor:** Even 20 percent of installed capacity (80 MW) for "Big" Wind may be optimistic, since all of that will not be usable all the time. Wind typically and uneconomically blows more when power is not needed (at night or non-peak hours) and thus wind generation must often be curtailed, or "turned off" by the receiving utility. This curtailment factor could reach 40 percent, meaning that "Big" Wind's actual utilized generation would be closer to 48 MW.

■ **Net cable transmission:** The proposed cable is projected to lose 5 percent in transmission, which would cut the gross generation from 48 MW to about 45 MW of actual delivered electricity.

■ **Spinning reserve:** Net generation analysis must also deduct the kilowatts lost in backup generation (spinning reserve). Because wind is so variable, rising and falling often in a matter of seconds, a huge level of fossil fuel generation (which is reliably firm) must always be kept running offline to back up wind generation if the wind slows suddenly when power is needed. (This is why European utilities with major wind investments have found they do not lower fossil fuel use or carbon dioxide emissions at all). This fossil fuel use (the equivalent of the kilowatts wasted) must also be subtracted from gross wind generation to arrive at a true number for net generation. This spinning reserve factor varies between seasons and locations but can exceed 20 percent.

A SIMPLE EQUATION

Net Generation (what is actually utilized) = Installed Capacity (what you would get if each turbine ran perfectly 24/7/365) x Capacity Factor (percentage of electricity produced under actual wind conditions) – Curtailment Factor (what is lost when the wind is blowing but the turbines are shut down because the power is not needed) x Net Cable Transmission (after transmission loss is deducted) – Spinning reserve.

Thus: 400 MW installed capacity x 20 percent capacity factor = 80 MW.

80 MW – 40 percent curtailment factor = 48 MW.

48 MW – 5 percent cable loss = 45.6 MW.

45.6 MW – 20 percent loss of backup kilowatts (spinning reserve) = 36.5 MW.

Generating 36.5 MW is 320,000 MWh/year or 320 million kWh/year, which is 4 percent of Oahu's 2010 total demand, and barely 2 percent of Oahu's potential demand in 2030. Under no financial or engineering analysis is 36.5 MW worth a construction cost of $3-4 billion, which is what two industrial wind factories plus the undersea cable will cost Hawaii electricity consumers and taxpayers.

The state Department of Business, Economic Development and Tourism recently announced that state agencies have cut their electricity use 8.6 percent over the last three fiscal years, at little cost. With minimal effort, all electricity consumers on Oahu could do the same, easily doubling the 4 percent potential contribution from "Big" Wind at a fraction of the cost. That is without even considering distributed generation via rooftop PV, which would cut Oahu's power demand substantially.

As Jay Griffin noted in Ms. Cocke's article, estimates are tricky. But to ignore them and blithely spend what is likely to exceed $4 billion, while driving electricity rates up 30 percent and depriving taxpayers of $2-3 billion that is urgently needed elsewhere, seems both duplicitous and irresponsible. And, given the perilous state of our national finances, to hand $2-3 billion in tax writeoffs to corporations such as GE ($10 billion profits in 2010 — no taxes paid) seems close to treasonous.

When the Legislature passed Act 162 (SLH 2006) amending Section 269-27.2 of the Hawaii Revised Statutes, the intent was that alternative-energy generation would be used to lower ratepayer costs, not raise them. The act requires the PUC to establish that "the rate for purchase of electricity by a public utility shall not be more than 100 per cent of the cost avoided by the utility when the utility purchases the electrical energy rather than producing the electrical energy." It also requires the PUC to set "just and reasonable" rates to "enable utility customers to share in the benefits of fuel cost savings resulting from the use of non-fossil-fuel-generated electricity." With "Big" Wind, however, the costs will far exceed avoided cost, and instead of cost savings, another 30 percent will be added to everyone's electric bill.

Is "Big" (Little) Wind really such a good idea for Hawaii? Or is it, as more and more commentaries note, an impending financial disaster, flagrant taxpayer theft, engineering nightmare, environmental catastrophe, and monumental insult to Hawaii's heritage? While the governor, HECO et al continue to conceal the relevant financial and technical information, the real costs to all Hawaii residents, and particularly to the citizens of Lanai and Molokai — are quite clear.

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Letter to the Editor

Solar energy makes progress

Thanks for continued coverage of efforts to get more solar power on our electric grids, one important part of Hawaii's clean-energy future. Your May 27 story, "Feed-in tariff has worked for only 3 projects," focused on just part of that story.

At the end of May, the total FIT capacity installed and in queue on Oahu, Hawaii Island and in Maui County was nearly 8 megawatts, very presentable progress for a program in effect for less than nine months.

This progress comes from only the first two tiers of the FIT; a proposed third tier for larger projects (up to 5 MW on Oahu and to 2.7 MW on Maui and Hawaii Island) is being reviewed by the Public Utilities Commission. It will offer one more way for customers to add solar power at their homes and businesses.

As important, the FIT adds to but does not substitute for ways our customers can sell renewable energy to us. Especially successful is net energy metering, which many customers still find is the most advantageous way to add solar, with nearly 5,500 NEM agreements statewide. We also have contracts for two utility-scale solar farms on Oahu pending PUC approval, with more coming.

The year 2010 was a banner year for solar power in Hawaii. With state tax credits for solar photovoltaics retained by the Legislature, 2011 should be another. Hawaii is recognized as a national leader among states in solar watts per person and we are working to retain that title into the future.

Peter Rosegg
Spokesman,
Hawaiian Electric Co.

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