The Answer, My Friend is NOT Blowing in the Wind

By Jay Dwight and Joe D'Aleo

Many states and the Federal Government are putting a lot of faith in renewable energy sources especially wind and solar as solutions for our energy independence and future cost reduction. However, unlike other energy sources such as natural gas, oil, coal, nuclear, tidal, geothermal and to a large degree hydro, wind and solar are much less reliable and cost effective, requiring heavy subsidization. See how Shell Oil just announced today it is backing off its wind and solar efforts as they found them to be not cost effective.

In fact of the primary energy sources, wind power is the most expensive:

Wind = 21.97 cents per kwh
Gas and oil = 12.28 cents per kwh
Nuclear = 11.06 cents per kwh
Hydro = 7.60 cents per kwh

Believing in wind is a fool's errand. The reasons are simple. Wind is costly, inefficient and erratic.

The New Hampshire Climate Action plan to be released on March 27th by Governor Lynch like the one in neighbor state Maine relies heavily on wind power. Dr. Fred Ward using the NHDES's own calculations, found you could put a wind power turbine on every hill in the state and yet get at most half the electricity that one single nuclear power plant could deliver.

Vaclac Klaus from the Czech Republic in his book "Blue Planet in Green Shackles" asked the question "Could the Czech Republic replace the power output from the Temelin nuclear power plant by wind?" Using conservative estimates the answer is yes but it would take 7,750 wind turbine power plants requiring 8.6 million tons of material and would cover a 413 mile long line of turbines 492 feet high, corresponding to a distance from Temelin in the southern Czech Republic to Brussels in Belgium or in the US, the distance from Concord, NH to Washington DC.

Even if, under ideal conditions, wind could provide a substantial portion of the energy needed for a state or region, you would have to have a back-up permanent and reliable source to turn to when the wind fails. See examples of how the wind has stopped when needed most here, here and here. In other words, hydro, gas, oil, nuclear, or coal turbines must be available and in ready back-up mode at all times. If the 'shovel ready' sources are at a much less expensive cost, why waste money on an unreliable source? Ask Arnold how the enviro inspired government programs are working so far in his state, which he proudly announced was leading the nation.

Wind energy can be a 'supplemental', but is will never be a reliable 'primary' supply of

electricity on a large scale. Solar and wind both may have greater potential regionally, say in the deserts of the southwest, the intermountain and the high western plains, but that generated energy must be carried to the national grid and the transmission lines often meet resistance from the same environmental groups pushing the wind and solar as the solutions.

The governors, state legislature even congress and the administration can't mandate the wind blow and sun shine, like they can and do control virtually every other aspect of our lives. They brush this off with talk of a smart grid, but while that is necessary, energy storage is just as important, and that has gotten little attention.

To summarize, wind power has half a dozen major problems: erratic behavior, system load problems, dependency problems, need to transmit the energy usually long distances from remote locations, energy must be stored and merged with other sources and the technology requires heavy taxpayer subsidy.

We certainly support conservation and energy innovation but we believe all sources of energy must be pursued including (as Obama called for during his campaign in coal states) clean coal, drilling for oil and gas offshore near the Gulf and in ANWR, extracting oil from tar sands and oil shale, a second generation nuclear, geothermal, tidal, solar and wind. If we don't let the environmental lobby control our future using a failed theory to focus all attention on the carbon dioxide boogeyman and restricting our choices for future energy sources, we CAN be energy independent and have the future we all envisioned possible not too many months ago.

APPENDIX:

Wind is not the lowest cost. It is the highest. As the following figures for kwh and formulas prove.

RELATIVE COSTS OF SOURCES OF ENERGY

Reprinted here with permission of Carroll R. Lee P.E. Energy and Business Consultant, Brewer, ME

Wind = 21.97 cents per kwh
Gas and oil = 12.28 cents per kwh
Nuclear = 11.06 cents per kwh
Hydro = 7.60 cents per kwh

The formula can get very complex, but I will provide a simplified version:

For nuclear:
Annual fixed charge (cost of capital, depreciation, taxes)=15% (this is an annuity over 35 years+/-

Installed cost=$4000/kw

Annual fixed charges=.15(4000)=600/kw

Annual capacity factor=85%

Annual fixed cost/kwh=600/(.85)(8760)=$0.0806/kwh

Annual operation and maintenance (O&M), including fuel=$0.02-.03/kwh (a range, depending on size)

Total cost=.0806+(.02-.03)=.1006-.1106/kwh

For gas (oil would be similar):

Installed cost=$800/kw

Annual fixed charge=.15(800)=120/kw

Annual capacity factor=60% (lower than nuclear because of higher fuel cost)

Annual fixed cost/kwh=120/(.60)(8760)=0.0228

Annual O&M plus fuel=.10/kwh (assume fuel cost of $10/Mmbtu, heat rate of 7500 Btu/kwh, O&M
of ..025/kwh)

Total cost=.0228+.10=.1228/kwh

Hydro

Annual fixed charge=14% (lower than others because of longer life)

Installed cost=$2500/kw

Annual fixed cost=.14(2500)=$350/kw

Annual capacity factor=60%

Annual fixed cost=350/(.60)(8760)=.066/kwh

Annual O&M=.01/kwh

Total cost=.066+.01=.076/kwh (note: to be fair, I believe the federal production tax credit and many state renewable credits-send wind below- also apply to hydro-so need to add .08/kwh to get consumer cost)

Wind

Installed cost=$2500/kw (on-shore wind with typical transmission interconnection)

Annual fixed cost=.15(2500)=$375/kw

Capacity Factor=33%

Annual fixed cost/kwh=375/(.33)(8760)=.1297

Annual O&M=.01/kwh

Federal production tax credit=.02/kwh

State renewable energy credit=.06/kwh

Total cost=.1297+.01+.02+.06=.2197/kwh (note-this does not include cost needed to back-up wind when wind does not blow-could be another .01/kwh +)

You can change the assumptions, particularly cost of capital and installed cost, and get results for particular projects. The O&M and fuel costs can be more complicate-depending on efficiency, fuel costs, etc.).

Carroll R. Lee P.E.
Consultant, energy and business
25 Locksley Lane
Brewer, Maine 04412
(207) 989-6539
Cell:(207)478-0072
crlee001@aol.com

J Dwight
President & Chief Investment Officer
Dwight Investment Counsel
120 Orchard Dr.
Wilton, ME 04294
207-645-9415
www.buffettstyle.net