

**The natural foods grocery chain, *Whole Foods*, failed to do its homework when it agreed to buy “wind energy” and, thereby, launch the nation’s largest demonstration to date of “ green energy” pseudo-environmentalism!**

**An analysis of  
Whole Foods’ January 9, 2006, “wind energy” Purchase**

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**Three of the interesting conclusions from the analysis:**

- *“109 huge (32+ story, 350+ foot), low electricity producing wind turbines will be needed to produce the 458,000,000 kWh of “wind generated” electricity that Whole Foods has (in theory) purchased.”*
- *“\$1 million spent for energy efficient light bulbs would avoid the use of 171,550,000 kWh of electricity over 5 years -- which is more than 3 times the 56,064,000 kWh of electricity that a \$1,000,000 wind turbine might be able to produce over 20 years!”*
- *“Like the leaders in other organizations that have undertaken similar pseudo-environmental actions, it appears that Whole Foods executives thought only about the favorable PR benefits they would enjoy, while failing to consider the adverse impacts of their action.”*

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**By**

**Glenn R. Schleede**

**Round Hill, VA**

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**The natural foods grocery chain, *Whole Foods*, failed to do its homework when it agreed to buy “wind energy” and, thereby, launch the nation’s largest demonstration to date of “green energy” pseudo-environmentalism!**

On January 10, 2006, the popular natural foods grocery chain, *Whole Foods*, proudly announced that it was purchasing 458,000,000 kilowatt-hours of “renewable energy credits” from “wind farms,” enough to offset 100% of the electricity used in all its facilities in the US and Canada. The action was applauded by various wind energy advocates and widely reported in the media.

Unfortunately, *Whole Foods* executives apparently (i) did not do their “homework” on energy, environmental, and economic costs and benefits of wind energy (ii) overlooked meaningful measures that would have made a lot more environmental, energy and economic sense, and (iii) were hoodwinked by aggressive wind energy promoters, some of whom will profit from *Whole Foods*’ mistake.

Thus, in their bid for favorable “environmental” plaudits, *Whole Foods*’ executives have launched the nation’s largest demonstration to date of “green energy” pseudo-environmentalism.

This brief analysis will explain *Whole Foods*’ mistakes in five lessons:

- Lesson #1: Calculates the number of huge (32+ story, 350+ foot) low electricity output wind turbines will be needed to produce the 458,000,000 kWh of “wind generated” electricity that *Whole Foods* has (in theory) purchased.
- Lesson #2: Compares the energy impacts of a \$1 million investment in “wind energy” with an equal investment in energy efficient light bulbs, demonstrating that the latter makes much more environmental, energy and economic sense.
- Lesson #3: Calculates the amount of electricity use that could have been avoided if *Whole Foods* had used the extra money it is spending to buy electricity produced from “wind” to buy energy efficient light bulbs and *give them* to its customers.
- Lesson #4: Calculates the number of huge, low-output “wind turbines” that will be needed to produce the electricity use each year that could be avoided if *Whole Foods* had given away energy efficient light bulbs.
- Lesson #5: Explains the true costs and benefits of wind energy – countering the false and misleading claims made by the wind industry and other wind energy advocates.

(Note to reporters and analysts: The first four “Lessons” that follow are a bit complex. You will have to do some arithmetic if you wish to understand *Whole Foods*’ mistakes.)

**Lesson #1: Calculating the number of huge (32+ story, 350+ foot), low electricity output wind turbines will be needed to produce the 458,000,000 kWh of “wind generated” electricity that *Whole Foods* has (in theory) purchased.**

*Whole Foods*' press release indicates that it has purchased 458,000,000 kWh of “renewable energy credits” to permit (at least in theory) it to use of electricity produced from wind.

As you will see when you do the arithmetic, it will take about 109 huge wind turbines to produce the 458,000,000 kWh of “wind generated” electricity that *Whole Foods* has, in theory, purchased. (Subsequent “Lessons” will demonstrate that there are more responsible actions that *Whole Foods* could have taken.)

To do the calculations for Lesson #1, you need to begin by recognizing that:

- Today's wind turbines are huge machines – often 32 to 40 stories or 350 feet or taller. (For perspective, note that the US Capital and the Statute of Liberty are about 300 feet tall.)
- The area covered by the spinning blades is about equal to the length and wing span of a Boeing 747 airplane standing on end.
- Despite their size, the turbines produce only small amounts of electricity.
- They produce electricity only when the wind is blowing in the right speed range. That is, they start producing with wind speed of roughly 6 miles per hour (MPH), reach rated capacity at about 35 MPH and cut out (to avoid equipment damage) at about 56 MPH. (Some don't restart again until the wind speed drops to about 45 MPH.)
- The net effect is that wind turbines have low “capacity factors” compared to reliable, base load generating units. (An annual capacity factor for a generating unit is calculated by dividing actual measured output – in kWh – by the rated capacity x 8760 hours per year.)

For this calculation, assume that the wind turbines used to produce *Whole Foods*' electricity are similar to many being built in the US that have a rated capacity of 1.5 megawatts (MW) or 1,500 kilowatts (kW). Also, assume that they will achieve a generous capacity factor of 32%.

Based on these reasonable but generous (to wind energy) assumptions, arithmetic shows that 109 of the huge wind turbines will be needed to provide the 458,000,000 kWh of “wind generated” electricity that *Whole Foods* has, in theory, purchased. The arithmetic is as follows:

- One 1.5 MW (1,500 kW) wind turbine achieving a 32% capacity factor would produce 4,204,800 kWh of electricity annually. (Arithmetic: 1,500 kW x 8760 hrs in year x .32.)
- The total electricity required, 458,000,000 kWh, divided by 4,204,800 kWh (annual output of one 1.5 MW turbine) = 108.9.

Before going on, please note that you will begin to understand the growing citizen opposition around the US and the world to “wind farms,” if you are able to:

- Visualize 109 of the huge, 32+ story machines stretching along a scenic mountain ridge – including at night when the aircraft warning lights are flashing,
- Visualize 109 of the huge machines standing in the remaining, ecologically unique Tallgrass Prairie in Kansas, or the impact on the associated animal and bird ecosystem.
- Visualize 109 of the huge machines planted among small farms and homes in rural America,
- Count accurately the bats and birds that don't make it through the turbine blades,

- Experience the “flap,” “flap,” flap” noise as the blades spin near your home at night (when the turbines are most likely to be running), and/or
- Visualize the impact of the hilltop and hillside tree clearing and land and stream disruption undertaken when building “wind farms” and associated roads and electric transmission lines.

Like the leaders in other organizations who have undertaken similar pseudo-environmental actions, *Whole Foods* executives probably thought only about the favorable PR benefits they would enjoy, while failing to consider the *adverse* impacts of wind energy and their action.

**Lesson #2: Comparing *Whole Foods*’ action with a measure that would make more environmental, energy and economic sense.**

On January 19, 2006, a few days after *Whole Foods*’ PR gambit hit the news (e.g., USA Today on January 9, 2006), an interesting advertisement appeared in the Washington Post. It was an ad by home improvement company, *Lowes*, offering *Sylvania* Energy Star Mini Twist compact fluorescent light bulbs for \$1.98 cents each. *Sylvania* says that the bulbs have an 8,000 hour life and use 13 watts of electricity to provide light equivalent to a 60-watt incandescent bulb.

Which measure, *Whole Foods*’ purchase of “wind energy” or the light bulbs, offers greater potential for environmental, energy and economic benefits at least cost? Consider the facts:

- *Wind Energy.* According to the US Energy Information Administration, the cost of wind turbines has been about \$1,000,000 per megawatt (MW) of generating capacity. Current costs are probably much higher but the \$1,000,000 number will suffice for this example.

Simple arithmetic shows that a 1 MW (or 1,000 kilowatt -- kW) wind turbine could produce 2,803,000 kilowatt-hours (kWh) of electricity in 1 year *if* it were able to achieve a 32% capacity factor. (The arithmetic: 1,000 kW x 8760 hours per year x .32% = 2,803,000 kWh), and that it might produce 28,032,000 kWh in 10 years (if it lasts that long, and no one knows since none of these turbines has operated that long) or 56,064,000 kWh in 20 years.

- *Energy Efficient Light Bulbs.* Each of the *Sylvania* bulbs used in place of a 60-watt incandescent bulb would avoid the use of 47 watt-hours of electricity for each hour in use. Using one energy efficient bulb in place of an incandescent bulb for an average of 4 hours per day over 365 days would avoid the use of 68,620 watt-hours (68.620 kWh) each year,

At *Lowes*’ price, the \$1,000,000 could purchase 500,000 of the *Sylvania* efficient light bulbs. Over 1 year, those 500,000 light bulbs could *avoid* the use of 34,310,000 kWh of electricity, and over 5 years could avoid using a total of 171,550,000 kWh. (The arithmetic: 47 watt-hours x 4 hours x 365 days x 500,000 bulbs x 5 years = 171,550,000 kWh.)

*The conclusion from Lesson #2: \$1 million spent for energy efficient light bulbs could avoid the use of 171,550,000 kWh of electricity over 5 years -- which is more than 3 times the 56,064,000 kWh of electricity that a \$1,000,000 wind turbine might be able to produce over 20 years!*

**Lesson #3: Calculating the amount of electricity use that could have been avoided if *Whole Foods* had used the *extra* money it is spending to buy electricity produced from “wind” to buy energy efficient light bulbs and *give them* to its customers.**

Apparently, *Whole Foods* has not revealed the extra cost that it will incur to buy “renewable energy certificates” entitling it to claim use of electricity produced from wind. However, the USA Today story quotes a wind energy advocate from the National Renewable Energy “Laboratory” (NREL) as speculating that the extra cost might be \$0.01 per kWh.

Now, let’s do the calculations:

- If we assume the \$0.01 per kWh is correct, *Whole Foods* will be spending \$4,580,000 more for electricity than it would have otherwise paid. (Arithmetic:  $458,000,000 \text{ kWh} \times \$0.01$ .)
- If that \$4,580,000 had been spent to purchase the Sylvania energy efficient light bulbs, *Whole Foods* could have purchased about 2,290,000 light bulbs. (Arithmetic:  $\$4,580,000$  divided by \$1.98, rounded to \$2).
- If those 2,290,000 light bulbs were given to its customers and were used an average of 4 hours per day in lieu of incandescent bulbs, electricity usage *avoided* would be:
  - 157,139,800 kWh annually (Arithmetic:  $2,290,000 \text{ bulbs} \times 68.62 \text{ kWh per bulb}$ ).
  - 785,799,000 kWh over their 5-year life (Arithmetic:  $157,139,800 \text{ kWh} \times 5$ ), or nearly twice the amount of electricity that *Whole Foods* uses annually.
- The electricity “savings” could have been doubled if *Whole Foods* sold the energy efficient light bulbs at \$1 each and doubled the number of bulbs distributed.

There would have been no net cost to *Whole Foods* since the company would be giving the extra \$4.58 million to a “renewable energy” marketing company anyway – to permit it to claim that it was using “wind energy.”

**Lesson #4: Calculating the number of huge low-output wind turbines that will be needed to produce the 157,139,800 kWh of electricity used each year that could be avoided if *Whole Foods* had given away 2,290,000 energy efficient light bulbs.**

The answer is that 37 of the huge, low output machines could have been avoided! The arithmetic is as follows:

- As explained in Lesson #1, based on reasonable but generous (to wind energy) assumptions, one 1.5 MW (1,500 kW) wind turbine achieving a 32% capacity factor would produce 4,204,800 kWh of electricity. (Arithmetic:  $1,500 \text{ kW} \times 8760 \text{ hrs in year} \times .32$ .)
- As explained in Lesson #3, if *Whole Foods* had purchased 2,290,000 light bulbs and given them to its customers and the bulbs were used an average of 4 hours per day year, the annual electricity usage *avoided* would be 157,139,800 kWh. (Arithmetic:  $2,290,000 \text{ bulbs} \times 68.62 \text{ kWh per bulb per year}$ .)
- Therefore, about 37 of the huge turbines could be avoided because they would not be needed to produce the 157,139,800 kWh per year. (Arithmetic:  $157,139,800 \text{ kWh avoided}$  divided by the 4,204,800 kWh of potential annual production from each turbine.)

**Lesson #5: Understanding the facts about the true costs and benefits of “wind energy.”**

Ideally, *Whole Foods* executives would have taken the time to learn the FACTS about wind energy before making their unfortunate decision.

If they had done so, they would have learned that the wind industry and other wind energy advocates have, for more than a decade, distributed false and misleading information that overstates the environmental and energy benefits of wind energy and understates the true economic costs and the adverse environmental, ecological, scenic and property value impacts.

They have misled the public, media and government officials and succeeded in getting federal and state governments to establish faulty and costly wind energy policies.

During the past 3 years, over 200 citizen-led groups around the world have made progress in uncovering and publicizing the truths about “wind energy.” These groups have a long way to go to catch up with wind energy advocates misinformation, but the following documented facts about “wind energy” are beginning to be recognized by those who are serious about the nation’s energy and environmental challenges:

1. *Tax avoidance, not environmental and energy benefits, has become the primary motivation for building “wind farms.”* Currently, two-thirds of the economic value of wind projects comes from federal tax benefits.
2. *Huge windmills – some 35 stories tall -- produce very little electricity.* All the 12,000+ windmills now scattered across thousands of acres in 30 states in the US produce less electricity than some single, reliable electric generating plants.
3. *Electricity from wind turbines has less real value than electricity from reliable generating units.* Wind turbines produce electricity only when the wind is blowing in the right speed range. Their output is intermittent, highly volatile and largely unpredictable and can’t be counted on when electricity demand is highest; e.g., during hot summer afternoons.
4. *The true cost of electricity from wind energy is much higher than wind advocates admit.* Advocates ignore the huge costs of subsidies and fail to acknowledge that reliable generating units must be kept available and running to balance and “back up” the intermittent, volatile output from wind turbines so that electricity always will be available when required by electric customers. Windmills use transmission capacity inefficiently, adding to costs.
5. *Claims of environmental benefits of wind energy are exaggerated.* For example, advocates generally ignore the fact that backup generating units must be immediately available and running at less than their peak efficiency or in spinning reserve mode, and that backup units continue to emit while in these modes. Also, under “cap and trade” rules, *credits* for sulfur dioxide or nitrogen oxides emissions that may be displaced by wind could be sold to other emitters, with NO reduction in those emissions.
6. *“Wind farms” have significant adverse environmental, scenic and property value impacts that wind advocates like to ignore.* People living in areas where “wind farms” have been constructed have become painfully aware that – in addition to the high cost of the electricity – “wind farms” impair environmental, ecological, scenic and property values. Adverse impacts include noise, bird kills, interference with bird migration and animal habitat, destruction of scenic vistas and ecological rarities, distracting blade “flicker” and aircraft warning lights, and lower value of properties near the huge structures.

7. *“Wind farms” produce few local economic benefits, and they are overwhelmed by the higher costs imposed on electric customers through their monthly bills.* A few landowners may get additional income but the added cost of electricity to electric customers will overwhelm the total of the land rental payments.
8. *Wind energy has NOT been a great success in other countries.* Denmark and Germany have residential electricity prices that are among the highest in the world and are experiencing many problems due to their use of wind energy. Opposition to wind turbines is also growing in other countries. Expectations that wind energy will make significant contributions toward meeting European Kyoto goals have been discredited.
9. *Renewable Portfolio Standards are an insidious device.* They result in enriching a few “renewable energy” producers at the expense of many ordinary electric customers.

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*Rampant Pseudo-environmentalism.* In *Whole Foods’* defense, the company is merely the latest organization that has sought to capitalize on faulty popular wisdom about the costs and benefits of “wind energy” and – with as much PR glitz as could be mustered – committed to buy so-called “green energy.”

Similar pseudo-environmental measures have been undertaken by various city, town and county governments; federal and state agencies; schools, colleges and universities; commercial building owners, restaurants, and retail chains and stores.

Electric utility executives (who, if they understand their business, know the truths about wind energy) have “played along” by creating money-losing “green energy” programs -- probably with the hope of pacifying regulators, politicians, and an uninformed media. The high costs of the “green energy” programs that are not recovered from the few people willing to pay premium prices are passed along to other unsuspecting electric customers and hidden in monthly bills.

At least two US presidents and some governors have, unfortunately, issued executive orders requiring agencies to buy “green energy” at premium prices. The premium prices that agencies must pay for “green energy” add to the profits of heavily subsidized “renewable energy.” generating companies. The extra costs, of course, are hidden in agency budgets and passed along to taxpayers.

*Faulty Government wind energy policies.* There is no question that the wind industry and other wind energy advocates and their lobbyists have been successful in getting the federal and state governments to grant huge tax breaks and other subsidies to the wind industry.

The Congress, the Administration, state and local government officials seem unable to resist the wind energy advocates and their lobbyists. As a result, the nation now has a collection of federal and state wind energy policies that are:

- Transferring millions of dollars annually from the pockets of ordinary taxpayers and electric customers to a few companies that own “wind farms.” Several of the largest companies are foreign owned.

- Steering billions of capital investment dollars to projects (“wind farms”) that produce very little electricity – with that electricity being of low in value because it is intermittent, highly volatile, and unreliable. Further, it is least likely to be available when it is most needed because winds tend to be strongest at night and in winter.

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As readers of this paper might guess, some wind industry officials and wind energy advocates object to my research, analyses, and papers. They frequently respond with ad hominem attacks and false claims. For that reason, I am showing below a brief resume, explanation of my reasons for doing SELF-FINANCED analysis and writing about wind energy, and an opportunity for wind advocate to check on my claims of self-financing.

#### **About the Author**

GLENN R. SCHLEEDE is semi-retired after working on energy and related matters in government and the private sector for over 30 years. He now devotes a large share of his time to *self-financed* analysis and writing about (a) government policies and programs that are detrimental to consumers and taxpayers, and (b) government or private sector activities that are presented to the media, public and government officials in a false or misleading way.

From 1992 until September 2003, Schleede maintained a consulting practice, Energy Market and Policy Analysis, Inc. (EMPA), providing analysis of energy markets and policies. During that time he worked primarily on natural gas and electricity issues.

Prior to forming EMPA, Schleede was Vice President of New England Electric System (NEES), Westborough, MA, and President of its fuels subsidiary, New England Energy Incorporated. His time with NEES included responsibilities for procurement and transportation of coal, natural gas and oil for NEES facilities, NEEI’s oil and gas exploration and coal shipping ventures, and NEES economic planning and budgeting functions.

Previously, Schleede was Executive Associate Director of the U.S. Office of Management and Budget (1981), Senior VP of the National Coal Association in Washington (where he was employed from 1977-1981) and Associate Director (Energy and Science) of the White House Domestic Council (where he served from 1973-1977). He also held career service positions in the U.S. OMB and the U.S. Atomic Energy Commission. He has a BA degree from Gustavus Adolphus College and an MA from the University of Minnesota. He is also a graduate of Harvard Business School’s Advanced Management Program.

Schleede is the author of many papers and reports on energy matters. His articles appear in various journals and/or are covered in the energy trade press. Some appear in full text on various public policy group web sites. Since 2001, Schleede has analyzed and written extensively about wind energy. The facts (a) convinced him that wind turbines are a niche technology that would never make a significant contribution toward meeting US energy requirements, and (b) demonstrated that the US DOE’s Office of Energy Efficiency & Renewable Energy (DOE-EERE), the National Renewable Energy “Laboratory” (NREL) and other DOE contractors, *using tax dollars*, distribute false and misleading information on wind energy.

Schleede has been a frequent target of ad hominem attacks by officials from the wind industry as well as NREL and other DOE-EERE contractors. Their attacks seldom deal with the substantive issues he raises. AWEA and other DOE funded organizations (using tax dollars that flow through DOE-EERE) have claimed falsely that Schleede works for fossil-fuel industries. In response, Schleede notes that their claims are false and that ALL his work on wind energy has been self-financed. He has offered leaders of the attacking organizations (including NREL) the opportunity to review all his personal and business financial records, provided that (a) the work is done by an independent third party who can assure appropriate confidentiality of information and (b) the work is paid for by the individual and organization making the charges and is not reimbursed by DOE or otherwise paid for by using more tax dollars.