Windmills for Suckers: Pickens' Genocidal Plan

Billionaire T. Boone Pickens' boondoggle to create the world's largest wind farm in the Texas Panhandle, is scientifically and economically worthless, as Gregory Murphy reports.

The old saying that everything is bigger in Texas sure fits the Texas-sized boondoggle of hedge-fund billionaire T. Boone Pickens, in his attempt to foist windmills on the state. On July 9, Pickens announced a $58 million campaign of TV commercials, media interviews, a *Wall Street Journal* op-ed, and a website to promote his plan to substitute wind power for the natural gas currently used to produce about 22% of America's electricity. Pickens also proposes to substitute natural gas (in which he is heavily invested) for the gasoline currently used in transportation, and claims that his plan can be accomplished within ten years.

Unless you want to kill people by energy starvation, wind is useless for an industrial society. It is intermittent, unreliable, subsidy dependent, with high costs and low energy density, and, for these reasons, wind requires a full-time back-up power source.

When it comes to wind, it sounds like Pickens and Al Gore have been drinking the same Kool-Aid, but Gore must have had a stronger dose, because Gore's plan is to convert *all* of the U.S. energy grid to "renewables" in the next decade. The most sickening part of the promotion of these genocidal plans is that both Pickens and Gore (and recently, Sen. Barack Obama, too) wrap their presentation of this nonsense in the spirit of the U.S. Apollo Program that landed a man on the Moon. The U.S. population has been so intentionally dumbed down about science, that they cheer at these comparisons. The Apollo Program was about gaining further scientific discoveries, not rolling energy technology back to the 12th Century.

If, as a country, we were to follow either Gore's or Pickens' plan, people would die because of the energy deficit produced by the replacement of reliable baseload sources with unreliable "renewables" like wind power, as well as the alarmingly high costs associated with renewable energy sources. The United States' role is as a high-technology producer and exporter of machine tools, nuclear plants, and other advanced equipment needed for world development. Windmills end that—which is why Prince Philip and his fat minion Al Gore are pushing it.

The Non-Science of Wind

Let's look at the basic scientific problem with wind energy, and then return to the attempt to put in place a Texas-style wind boondoggle. Wind, as with most renewables, needs lots of land area to produce its energy. For comparison, let's take a nuclear reactor in Texas; I have chosen the Comanche Peak Plant, south of Dallas, which has two units with a combined a capacity of 2,500 megawatts (MW). Comanche Peak is sitting on

Sandia National Laboratory

An offshore wind farm in Denmark, the country that has the most wind turbines per capita. But even with its large number of turbines, Denmark has never been able to shut down one of its coal-fired plants.

4,000 acres, which includes a man-made cooling lake, which also serves as a recreation spot.

How many 1.5-MW General Electric wind turbines (the kind Pickens has chosen) would it take to produce the same amount of energy that the Comanche Peak reactors produce? First, we divide the amount of energy that the reactor produces—2,500 MW—by the nameplate rating of the wind turbine, which is 1.5 MW. That gives us the number of turbines that would be needed to produce that same amount of energy as the nuclear reactor: 1,667 wind turbines.

But not so fast: It is not that easy, because the average wind turbine has a capacity factor of between 20 and 35%. That 35% is a very charitable estimate at best, although it is the capacity factor that the American Wind Energy Association uses in its studies and promotional materials, hyping the value of wind energy.

Since we are looking at the energy density of wind energy, we need to know how that capacity factor is figured. The capacity factor represents the amount of energy actually produced by the wind turbine, divided by the amount of energy at which the turbine is rated. The average wind turbine has a capacity factor of 25%, which means that it will take four turbines to equal the nameplate-rated output of one turbine. Given that fact, we must now multiply our 1,667 wind turbines by 4, which gives us 6,668 turbines, rated at 1.5 MW each.

This means that it will take 6,668 1.5-MW wind turbines to equal the energy produced by the Comanche Peak nuclear plant. It should be noted that this number of wind turbines is more than three times the number that Pickens says he will install on his massive wind farm.

Now, let us look at the amount of land area that would be needed for these 6,668 wind turbines. General Electric, the producer of the 1.5-MW turbines used in this example, recommends spacing the turbines at three times the diameter of the turbine rotors, so that the wind trailing off the rotor doesn't affect neighboring turbines. GE also recommends that the spacing between rows of turbines be five times the diameter of the rotor, so that the next row of turbines can make use of the available wind.

The GE 1.5-MW wind turbine has a rotor diameter of 77 meters (262.6 feet). To get an idea of the size of the turbine, the area that the rotor sweeps out is big enough to place a 747 jumbo jet inside. Keep that in mind as we continue.

To figure the spacing of the wind turbines, multiply the rotor diameter of 77 m by 3, which gives 231 m as the spacing between the turbines. Now let's figure the distance between the rows of turbines by multiplying the rotor diameter of 77 m by 5, which gives 385 meters between the rows.

If we multiply 231 by 385, it will give us the total area required to site one of our 1.5-MW wind turbines. This comes out to 88,935 square meters, or 22 acres of land for one 1.5-MW turbine. If we now multiply the 22 acres by the 6,668 wind turbines, we get 146,696 acres, which is 229.21 square miles (about three times the size of the metropolitan Washington, D.C. area). So it appears that it will take 146,696 acres of land covered with wind turbines, compared to the 4,000 acres of land for the nuclear power plant (which includes a cooling lake used to provide water to the cooling towers).

But remember that this land can't be just anywhere. It must be in an area where the wind blows steadily,

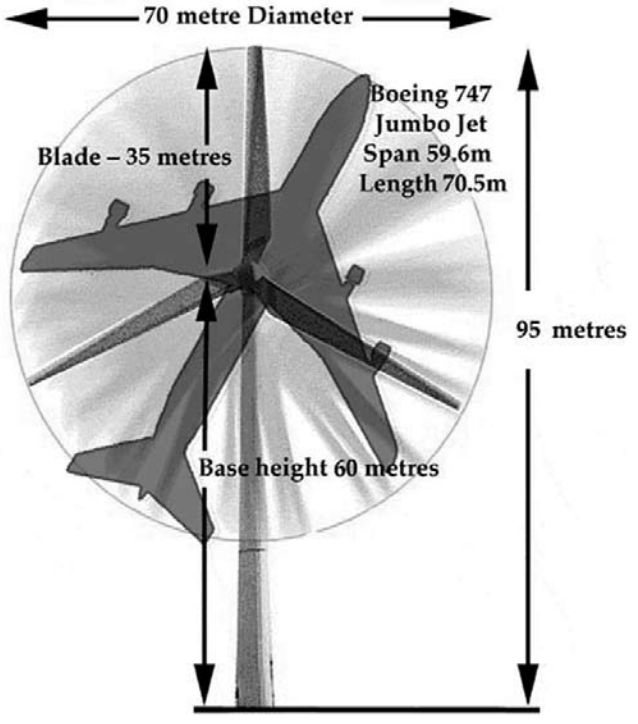
and the turbines may not be located one behind the other on a flat plain, thus further increasing the land area required to equal one nuclear power plant.

'Availability'

The promoters of wind energy like to play games with what is known as the availabilty factor, which is the percentage of time that the wind turbine or any other power source is available. Wind energy advocates purposely confuse the availability factor and the capacity factor in their promotional materials, and this is how they show that a certain number of wind turbines can produce the same energy as a nuclear power plant. In truth, although the availability factor of the wind turbine is 100%, because it is available to produce power at any time, wind turbines actually produce power less than 25% of the time, and that is only when the wind blows.

Compare this to the nuclear power plant, in which the availability factor and the capacity factor are the same—about 95%. The only time the nuclear reactor is not producing power is during maintenance periods. But wind turbines also have maintenance downtime—and a lot more of it.

Wind turbines have another limit. For reasons of the physical constraints of the turbine blade, wind turbines are not able to make use of the large amounts of energy available in the wind. The amount of available energy in wind is a cube of the wind speed. So when wind speed increases, say from 8 mph to 12 mph, there is a large increase in the amount of energy available. But the limiting factor in the ability to use this available energy is that the wind turbine has to be engineered so that the "tip speed"[1] doesn't exceed a certain limit. This speed limit is determined by two things: the materials out of which the rotor is constructed, and the length of the rotor. Simply put, as the rotor of the wind turbine becomes larger in an attempt to squeeze out more energy contained in the wind, the slower the rated tip speed will become.



Naturstrom-Euphorie

This shows the immensity of a 1.5-megawatt wind turbine, the model T. Boone Pickens has ordered from General Electric for his project to build the world's largest windfarm, in the Texas panhandle. As you can see, the area that the rotor sweeps out is large enough in which to place a 747 jumbo jet.

If the blade tip speed were allowed to increase over its defined speed limit, the stress on the turbine would cause great damage to the turbine generator which produces the electricity. In that situation, the turbine's rotor could throw its blades, which could cause damage, or even death to the workers at the wind farm.

This combination of factors makes engineering a wind turbine a very difficult process. It is why the turbine is constructed so that it can make use of low wind, such as the low cut-in speed of 7.8 mph for the GE 1.5-MW turbine. As the wind speed increases, the turbine begins to produce its rated capacity of 1.5 MW at 27 mph. But as wind speed increases to more than 27 mph, the turbine still produces only the rated capacity, and will continue to do so until it reaches the cut-out speed of 55 miles an hour. At that point, the turbine generator trips, and the turbine is no longer producing power of any kind.

So, no matter what Al Gore or T. Boone Pickens

1. The maximium tip speed is the most limiting factor in designing a wind turbine for electricity production. Maximum rotor tip speed is a linear function of the radius of the rotor blade. That is, if you look at the rotor of a wind turbine, you will notice that the hub turns at a certain speed, but as you increase the length of the rotor, the speed increases until you reach the tip where the speed is the fastest. So, as wind turbines are designed to make the most of the available energy contained in the wind, the rotors are made larger, forcing the engineers to limit the rotor tip speed. This tip speed limit is necessary to keep from damaging the turbine, since its equipment is very sensitive to overspeed.

The rated maximum tip speed for Pickens' GE 1.5-MW wind turbines is 184 mph.

say, a wind turbine can never make use of the large amount of energy available in wind.

Promoters of wind energy don't tell you these basic physical facts. They also use fraudulent figures in their ads and promotional materials to hype the great benefits of wind energy. The biggest fraud is in their comparisons of the levelized cost.

Levelized cost is figured by taking the nameplate-rating capacity and multiplying it by, say, 30 years. Then subtract the cost of maintenance and other such costs, to produce a so-called levelized cost of wind or other sources of power generation. In the case of wind, there is a major element of fraud: It is assumed that the wind is going to blow 27-35 mph every hour of every day for 30 years! In truth, there is no place on the planet where the wind blows at those speeds every day for 30 years.

Further, there is a similarly silly estimate of maintenance costs for the turbines.

The Boone-doggle

Let's take a hard look at what T. Boone Pickens would have us believe is a serious plan, but in reality is one that is awash in subsidies. Pickens' plan is based on a Department of Energy report that was released in May of this year, entitled "20% Wind by 2030: Increasing Wind Energy Contribution to U.S. Electric Supply." (Right now, wind produces about 1% of the U.S. power grid.) The report was co-authored by the National Renewable Energy Lab and the American Wind Energy Association.

After the report was released, a DOE official informed the attendees at a June 9 wind industry meeting that reaching the goal of 20% wind by 2030 would entail replicating, every year, the entire existing U.S. wind system (about 17,000 MW of capacity constructed over the past decade), starting in 2018. This is a pure greenie wet dream, because the United States doesn't have the capacity to build that number of wind turbines each year, and if policy-makers in this country tried to ramp up production of this number of wind turbines, it would add to the present collapse of the economy. To underscore the point, General Electric, one of the largest producers of wind turbines, announced in April, that it has $12 billion in back orders for wind turbines that it could not fill. So if Pickens wants to substitute wind energy for any other baseload source, he will have to wait in line.

Pickens states on his website and in his television commercials that his plan, "would be accomplished solely through private investment with no new customer or corporate taxes or government regulation." Don't believe it. Pickens contradicts his own claim, in a July 9 *Wall Street Journal* op-ed, in which he calls on Congress to "mandate" wind power and its subsidies.

Photo by Dirk Ingo Franke

A huge wind turbine in Brunsbüttel, Germany, advertised as the largest in the world. It's 183 meters tall—600.39 feet. (For comparison, the Empire State Building is 1,472 feet high.) It's big, but it still needs a back-up power source for reliability.

In fact, the Pickens plan is totally dependent on subsidies, like the Production Tax Credit, which is a 1.8 cents tax credit per kilowatt hour (1 MW = 1,000 kW) for the first ten years of the wind turbine's life. The Production Tax Credit is due to expire in December of this year, and so far Congress has failed to extend it. The American Wind Energy Association has

an ongoing lobbying campaign, claiming layoffs and job losses if Congress fails to extend the Production Tax Credit. If the tax credit is not extended, the AWEA has said, all of the gains in wind energy over the recent years would simply blow away. Backing this up, the *Atlanta Journal-Constitution* pointed out on July 9, that, "In 1999, 2001, and 2003, when Congress temporarily killed the credits, the number of new turbines dropped dramatically."

This Production Tax Credit was sure to have been a topic that Pickens brought up in his private discussions with Senators and Congressman during his recent tour of Washington, D.C., to pimp for his new plan to "save America." Pickens had announced in June that his Mesa Power company in Texas was going to build the world's largest wind farm, in the Texas Panhandle area. According to Pickens, this will produce 4 gigawatts (4,000 MW) of electricity from 2,000 wind turbines on more than 200,000 acres. With an extension of the Production Tax Credit, Pickens stands to make a tidy annual taxpayer gift on his anticipated capacity.

And Pickens is picking the pocket of the American public with the aid of other subsidies, such as the ability to accelerate depreciation for wind power generating equipment. The state of Texas also entices wind developers with franchise tax exemption to manufacturers, sellers, or installers of wind devices, along with a corporate deduction from the state's franchise tax for renewable energy sources. Best picking of all, there is a 100% property tax exemption on property and equipment associated with wind power production.

Taking all of these subsidies into account should prove to the average citizen that T. Boone Pickens is not their friend, but is out to rob them blind with the aid of the Federal and state treasuries.

There's more.

Part of Pickens' plan is for the construction of new transmission power lines to be added to the present electrical grid, so that he will be able to transmit electricity—if any is produced—from his massive wind farm. To this end, Pickens' influence swayed the Electric Reliability Council of Texas in April to approve $4.93 billion for the development of the wind farm transmission lines. True to form, Pickens denies that the money is earmarked for him. But who else is building a massive wind farm in the Texas Panhandle?

This recent push by Pickens for wind energy is has a double purpose: one, to make a killing on the subsidies and the elevated energy cost to the public; and two, to get the environmentalists off his back about his water profiteering.

Pickens has a plan to exert his water rights to 200,000 acres of groundwater in Roberts County, located over the rapidly depleting Ogallala Aquifer, and sell the water to the city of Dallas. To be able to sell this water, Pickens needs to develop pipelines. So Pickens would have to purchase "rights of way," for the pipes, which is often expensive and time-consuming. Some landowners won't sell the right of way, and, as a private citizen, Pickens cannot legally compel them to sell. Only a government entity can exert "eminent domain," but for Pickens: not a problem.

At Pickens' behest, the Texas Legislature changed state law to allow the two residents of an eight-acre parcel of land in Roberts County to vote to establish themselves a a "municipal water district," a government agency with eminent domain powers. And who are those two residents? They are Pickens' wife and the manager of Pickens' nearby ranch.

What does this have to do with Pickens' plan for wind power? You see, Pickens needs pipelines to sell his water, and transmission lines to sell his wind-generated electricity. He will have the same right-of-way problem with his transmission lines as he does with his water pipelines. But never fear; the Texas Legislature has given him another gift. This time, they passed a law that allows renewable projects to piggyback on a water district's eminent domain power. Pickens can use his municipal water district to compel sales of the right of way for his electricity transmission lines.

As for dealing with the environmentalists: Pickens' water plan was attacked by Carl Pope, executive director of the Sierra Club, which has assailed all forms of water profiteering and has lobbied to shut down development projects because of water shortages. Just two years ago, in fact, Pope referred (quite accurately) to Pickens as a "con man and a junk bond dealer." But now, after Pickens' wind energy announcement, Pope has proclaimed that "T. Boone Pickens is going to save America," and is flying on Pickens' private plane to join him in media interviews. And, in tandem, since July 9, when Pickens announced his wind energy plan, the attacks on Pickens' water profiteering have been dramatically cut back. The question arises: Is the genocidal wind plan just a cover story so that a $1 billion water cash cow could move forward?

REpower Systems, http://www.ocean.udel.edu/WindPower/docs/5m_uk.pdf

These photos from a REpower brochure show one of five sections of the tower of the 5-MW prototype wind turbine at Brunsbüttel in 2004, as it was transported to the site. The rotor sweeps out an area of 12,469 square meters (134,216.32 square feet)—or 3.081 acres.

Lots of Hot Air

To review: The case against wind energy ever becoming a mainstay power source is inherently strong: Great tracts of land are needed to simply produce the same amount of power as a nuclear power plant. You cannot forecast the wind patterns, and even if the wind blows strongly in an area, the wind turbines have physical design requirements that limit the effectiveness of the turbine, so that you cannot make the most use out of the available energy contained in the wind. And, as stated above, there always has to a back-up power source running, just in case the wind stops.

Before plans like that of Pickens and Gore are adopted, we should look long and hard at the demonstrated unreliability of wind power. The residents of Texas saw how this works on Feb. 26 of this year, when they narrowly escaped a total blackout of the energy grid. The reason for this was that the wind in West Texas suddenly stopped blowing. This near-blackout, which garnered national press coverage, was set in motion by the heavy push in Texas for large tax incentives to build wind farms instead of nuclear power plants.

The near-blackout was averted by the quick response of the Electric Reliability Council of Texas (ERCOT), which quickly brought online several back-up sources to meet the energy grid's needs. Kent Saathoff, vice president for systems operations at the Council, told the *Dallas Star-Telegram* on Feb. 27: "Tuesday's event illustrates the inherent challenges associated with using wind energy. Because the wind sometimes stops blowing without a moment's notice, engineers at ERCOT must remain nimble enough to respond to resulting instability on the grid."

This time, there was back-up ready to come online, but if Pickens' or Gore's plans are enacted, and the sole provider of power is wind, then there will be no power unless the wind blows.

Pickens and Gore say that if we install all the windmills needed to replace coal and natural gas production of electricity, we are going to be able to turn off those power plants. This is a genocidal pipedream. Take Denmark as an example. Denmark has more wind turbines per capita than any country in the world, and still, it has not been able to turn off even one coal-fired plant.

The future should be about increasing scientific knowledge and making discoveries. The human race has been given the power of reason to make discoveries that have saved us from having our lives dictated to by the whims of nature. Let's have the courage to see the sheer fraud and anti-science folly of the Al Gore and T. Boone Pickens wind plans, and give them the response they so richly deserves: to be laughed at and ridiculed.