From:	Puco ContactOPSB
To:	Puco Docketing
Subject:	public comment 21-0669 and 21-0277
Date:	Monday, May 23, 2022 9:34:37 AM
Attachments:	Stark Raving Green.pdf

From: Linda Bishop <bish2468@yahoo.com>
Sent: Monday, May 23, 2022 9:12 AM
To: Butler, Matthew <matthew.butler@puco.ohio.gov>
Subject: Starke Raving Green Article attached

20-0277-EL-BGN Cass
21-0669-EL-BGN Washington

All Solar Facilities in general

Linda Bishop

The duty is ours; the Results are God's John Quincy Adams

Stark Raving Green

What will it take to reach Biden's lofty goals of zero carbon emissions by 2050? The answer may surprise you.

AP Images

No comparison: Orlando's six-megawatt solar farm powers 2,100 homes, but only when the Sun is shining. In the distance, the 929 MW coal- and natural-gas-fired Stanton Energy Center serves 650,000 homes around the clock.

by Ed Hiserodt & Rebecca Terrell

2050: That's the deadline that President Joe Biden has set to decarbonize the U.S. power sector and supposedly save the planet from man-made climate catastrophe. In issuing his December executive order prioritizing a "Clean Energy Economy," Eco-Joe pledged you, the American taxpayer, to spend billions in the next three decades to achieve net-zero carbon emissions "across federal operations" by mid-century.

Blue-state governors and some power companies hail the proposals as groundbreaking, according to the International Business Times. However, Biden is facing hostility from Republicans and coal-producing states, who are challenging the Environmental Protection Agency (EPA) in the Supreme Court about whether the administration has authority to implement the scheme.

What few are talking about is how unfeasible the plans actually are. They "are not just impossible. They are pie-in-the-sky, flying unicorns, bull-goose looney impossible," writes analyst Willis Eschenbach in his article *Bright Green Impossibilities* posted at the award-winning science blog Watts Up With That?

Eschenbach's critique may seem harsh, but is it justified? To answer that question, we'll review what he postulates it will take to accomplish Biden's plans. First, a brief tutorial is necessary to understand terms. Then we'll look at world energy needs and determine what portion the United States will require.

Ed Hiserodt is a contributor to The New American *and Rebecca Terrell is a senior editor.*

Generating Electricity

Energy is always measured as power generated or consumed over a period of time. A familiar unit is the kilowatt-hour (kWh), which means one thousand watts of power used in one hour. The average U.S. home uses around 1,000 kWhs of electrical energy per month, according to the U.S. Energy Information Administration (EIA). But when referencing electricity needs across the globe per year, we are entering the realm of trillions of kilowatt-hours. Luckily, there is another prefix that conveniently stands for all those zeros: the petawatt is one trillion kilowatts.

The World Energy Council estimates that, based on current trends, by 2050, total global energy consumption will reach 244 petawatt-hours per year (PWh/yr). So-called renewables make up around 20 percent of the current average energy mix. This includes wind and solar along with biomass, geothermal, hydro, and tidal power. These must replace roughly 80 percent — or 195 PWhr/yr — if eco-alarmists pull the plug on demonized "fossil" fuels.

Since "renewable energy" purists focus on wind and solar, we'll simply install more windmills and solar panels. How many will we need? That answer requires a few calculations, starting with worldwide estimates and from there, determining the U.S. contribution.

First, we establish how much new energy-generating capacity is required by dividing 195 PWhr/yr by the number of hours in a year: 8,766. The answer is approximately 22 terawatts (TW).

Per the United Nations Paris climate agreement, the world has until January 1, 2050 to add this 22 TW of generating capacity. With little more than 10,000 days in which to build, install, test, and commission all the new generators, we need to add roughly 2.2 gigawatts (GW) of energy generating capacity *each day* until 2050. (The computation is 22 TW divided

by 10,000 days = 2.2 GW.) You read that right: an additional 2.2 GW *per day* of "renewables" added to the energy mix if we are to phase out the eco-banes of coal, oil, and natural gas.

An Aside

Before looking at how many wind turbines and solar panels that number entails, it's important to address several points. First, electrical energy must be produced as it is used, and used as it is produced. Obviously, there are peaks and troughs in demand. Electricity distributors quantify these fluctuations with a peak-to-average ratio, which Eschenbach acknowledges could be as high as 2.3. He also admits that roughly 15-percent reserve capacity is needed to ensure grid stability. Together these two factors can more than double our 22 TW figure.

Other variations in efficiency and heat loss would further influence the number, not to mention the additional energy necessary to manufacture and install the myriad generators that carbon-neutral goals demand. However, for brevity's sake, we will omit these considerations because even if we cut our conservative figures in half, the result would still send unicorns into orbit.

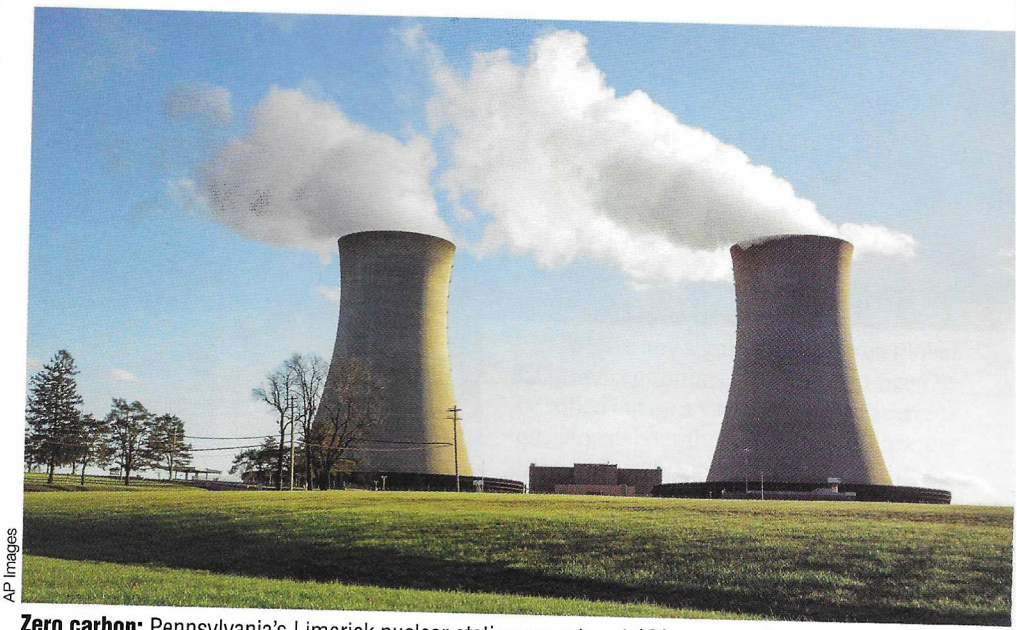
Additionally, Eschenbach penned his analysis more than one year ago, just as Biden re-joined the UN Paris climate treaty, pledging our nation to climate neutrality by 2050. Eschenbach's points bear repeating in light of the recent executive order, and our analysis updates his calculations with current numbers.

It's Not Easy Being Green

Armed with our 2.2 GW estimate, let's calculate how many clean, green generators we will need to add each day across the globe by 2050. We'll start with that darling of the green-set: wind.

The Department of Energy reports that the average power rating of turbines in the United States is three megawatts (MW), which is 3,000 kW. This "nameplate rating" does not reflect how much the turbine will actually contribute, only its capability under ideal conditions. Since wind doesn't blow all the time, well-sited turbines average about 35 percent of nameplate capacity. A three MW-rated turbine would therefore produce around one MW on average.

In issuing his December executive order prioritizing a "Clean Energy Economy," Eco-Joe pledged you, the American taxpayer, to spend billions in the next three decades to achieve net-zero carbon emissions "across federal operations" by mid-century.



AP Images

Zero carbon: Pennsylvania's Limerick nuclear station operates at 100 percent of its 1,200 megawatt rating and powers more than two million households while emitting no carbon.

That means we'd better get busy building, installing, commissioning, and bringing online 2,200 turbines *each day* between now and 2050.

Keep in mind that these are not Don Quixote's windmills. Modern turbines tower 30 stories or more above the ground, with blades that can add nearly 200 feet to overall height. Positioned too closely to each other, turbulence from upwind rotors would destroy downwind machines. The National Renewable Energy Laboratory (NREL) estimates about 85 acres per megawatt of nameplate capacity for each omnidirectional turbine. That means clearing nearly 880 square miles every day, or almost 8.8 million square miles across the globe by 2050. (By comparison, North America is 9.54 million square miles in area.)

Perhaps this is a bad time to ask what happens when wind stops blowing and there is no reliable generator to take up the slack. Here's a lesson from Down Under: After the government closed Victoria's coal-burning Hazelwood power station in 2017, an ensuing "wind drought" ushered in blackouts and skyrocketing usage rates. "The drop in wind supply pushed average South Australian prices for the June quarter to $116 per MWh, up from $81 in the previous June quarter," reported *The Australian*. "40,000 homes are now without power in 37 degree [Celsius] heat," tweeted Australian politician Matthew Guy the following summer.

Never fear; solar is here! However, you may be disappointed to know NREL posits that a utility-scale solar installation averages about 8.3 watts per square meter (6.9 watts per square yard), depending on multiple variables including location, temperature, and time of year. To deliver our daily 2.2 GW, we would have to cover more than 100 square miles of

Eyesore: A mix of aging and updated wind turbines clutters the landscape outside Palm Springs, California, where state law requires all electricity to be generated from zero-carbon sources by 2045.

AP Images

graded and treeless ground with functioning solar panels *every single day* from now until 2050. And every night when the sun isn't shining, solar will need reliable backup. Wind could help only on blustery evenings.

There is a clean-energy solution that can back up wind, solar, or any other unrealistic enterprise of leftist lunacy, though its reputation is sullied by decades of unscientific propaganda and irrational fear of radiation. In fact, nuclear power could easily stand on its own and replace all so-called renewables and fossil fuels, but we'd need to get started immediately bringing a 2.2 GW power plant online every day from now until 2050. That's a total of 10,000 new nuclear reactors, twice as large as those you are likely to see from the highway as you drive by.

U.S. Requirements

So far we have discussed global green needs. Since EIA estimates that the United States uses one-sixth of the world's energy, we can easily determine our share by simple division.

WIND: Watch out trees! We need a lot of open space — more than 105 square miles — for 267 wind turbines to be installed *each and every day*. That amounts to nearly 30 percent of available square mileage in the country by the time we're through, not to mention that we will need to replace many of them before 2050 since a turbine's average lifespan is 20 years. And bye-bye, birdies; the American Bird Conservancy estimates that wind turbines kill as many as 1.17 million birds annually. That number is bound to rise exponentially as wind farms expand. Likely so will negative effects on human health. Research from the Washington University School of Medicine reveals problems including nausea, vertigo, tinnitus, ear pressure, and sleep disturbance reported in areas where turbines are installed. Additionally, says Eschenbach, going green with wind means a complete revamp of the electrical grid, from power stations to gas-heated homes.

SOLAR: Every day until 2050 it will take roughly 17 square miles of treeless land for utility-scale solar panel installation. That comes to 170,000 square miles of denuded countryside, much of which has hefty competition. The Pennsylvania State Grange is now lobbying its state legislature to protect productive farmland from solar-project encroachment, and farmers in Iowa are hoping for passage of a state senate bill to outlaw solar installations on quality farmland. Eschenbach quotes the California Bureau of Land Management running into siting problems since land set aside for solar "must not disturb native wildlife or endangered species." Moreover, the average lifespan of solar panels is 25 years, so many will not live to see their day of green glory in 2050. And as does wind, solar requires a complete grid overhaul.

NUCLEAR: We could save ourselves the grid revamp by going nuclear, which would require 1,667 new reactors by 2050 to reach Biden's goal. Even if we only use nuclear as backup, Eschenbach estimates needing between 50 and 90 percent of the total generating capacity in nuclear "for the all-too-frequent times when the sun isn't shining and the wind isn't blowing." The United States currently has about 104 nuclear power generating plants, built over the last 70 years. Some required up to a decade of litigation and approvals from the U.S. Nuclear Regulatory Commission and other bureaucratic agencies. We had better get litigating pronto if we're going to build at least 833 new nuclear plants by 2050.

The Costs

Admittedly, the above analysis omits many variables that also merit consideration. For example, we haven't looked at the cost of each installation project in terms of time, energy, real estate, and manufacturing. Eschenbach quotes top consulting firm McKinsey, which slaps a price tag of "around $30 billion per day for the next 25 years" on UN net-zero emissions targets. However, even without that figure it is easy to see why Eschenbach calls them "looney."

Another matter we overlooked is the real-life example of Germany, where *Forbes* reports a renewables transition to the tune of $580 billion by 2025. The country is also looking at "a 50% increase in electricity prices, flat emissions, and an electricity supply that is 10 times more carbon-intensive than France's," where nuclear is king.

The punch line is that all this upheaval of world energy sectors is to prevent a hypothetical human-caused 1.5° Celsius rise in average global temperature. Perhaps that will be a consolation when we're paying exorbitant utility bills by candlelight. ■

Summary: Public Comment of Linda Bishop, via website, electronically filed by Docketing Staff on behalf of Docketing