Addenda #88 – August 2025, Update August 2026
Re: Ch. 8, 2050 Net-Zero Emissions; Impossible!!
SDG 7 – Ensure access to affordable, reliable, sustainable and modern energy for all

Wind power has been a source of energy in the United States since the first windmills were built in the 1850's. Initially used to pump water for irrigation, windmills developed into a means to generate electricity for homes and businesses. As the population expanded westward, more than six million windmills are erected throughout the countryside by the 1890's. As the price of oil spiked during the 1970's, there was a renewed interest in wind turbines and the energy they could generate. The Public Utility Regulatory Policies Act of 1978 required public companies to buy a certain amount of electricity from renewable energy sources, making the wind turbine industry even more popular. The first large, utility-scale wind farms were built in the 1980's and actual use and additional research improved efficiency and output of wind turbines. The Department of Energy published its *20% Wind Energy by 2030* report in 2008, creating a national plan for onshore and offshore wind energy that would supply 20% of the country's electricity in 2030 and 35% in 2050. [1]

As of June 2026, there are 1,385 utility-scale, land-based (onshore) wind farms in operation in the United States, with a total operating capacity of 166,248 MW of electricity from more than 77,000 wind turbines, the oldest of which were installed prior to 1990. The countries first offshore wind farm, the 30-megawatt Block Island Wind Farm went into operation in December of 2016. Since then, two other offshore wind farms, Coastal Virginia Offshore Wind (2020) and South Fork (2024) have been commissioned, and five others are under construction, for a combined total of 6,064 megawatts generation capacity from 459 turbines by 2027. [2, 3, 4]

Wind farms, especially those built in the ocean, don't last forever. As wind turbines age, their output decreases, just as solar panels do. The average wind turbine has a life span of 20 to 25 years, with some models lasting as long as 30 years while others are discarded sooner, damaged by lightning strikes, suffering blade failure or being replaced by longer more efficient blades. In contrast, nuclear and natural gas power plants can operate for more than 50 years Some gas-fired power plants are still in operation more than seventy years after they were built and the Nine Mile Point Unit 1 reactor in New York State has been in operation for 57 years. When wind farms are no longer "economically feasible", their owners have 2 choices; decommission and deconstruct, which causes loss of power to the grid and recycling challenges, or repower (replace), which is a very expensive process.

Wind turbine blades are made from very tough and durable fiberglass composite materials which are very difficult to dispose of. At the beginning of their large scale use, wind turbine blades were between 25 and 30 feet long, with the average turbine "hub" height around 30 feet. With advances in blade materials and fabrication, today's wind turbine blades can be as long as 351 feet (longer than a football field) weigh as much as 55 tons, with a rotor hub height of almost 500 feet. [5]

Traditionally, decommissioned wind turbine blades were cut into more manageable lengths for transportation, then buried in landfills, known as "wind turbine graveyards". The Casper Regional Landfill in Wyoming (left) holds more than 1,100 wind turbine blades. These fiberglass and resin blades will never decompose, but will degrade over time, leaching synthetic polymer chemicals into the soil. Note: The landfill stopped receiving blades in mid-2021.

Sweetwater Texas, which boasts it is the "Wind Energy Capital of North America." also has a 40 acre wind turbine graveyard that is the final storage place for thousands of turbine blades. An additional 1,300 blades were dumped in three Iowa locations, with promises of them being recycled never fulfilled.

A U.S. Department of Energy study published by the National Renewable Energy Laboratory in 2021, projected that unless changes are made in recycling, the waste from decommissioned wind turbine blades will reach almost 43.4 million tons globally by 2050, with approximately 2.1 million tons located in the United States. [6] The study states that while there are recycling options available, direct burial is a more cost efficient method of disposal. An alternative to burial is recycling the components in the blades. The Veolia North America recycling plant has processed more than 7,000 decommissioned wind turbine blades since 2020, shredding the blades and sorting the blade material, which is then used to make cement and a fuel replacement for coal. This too is a very expensive process, as blades must be shipped hundreds or even thousands of miles to reach the nearest recycling facility.

Advocates of renewable energy claim that it is cheap and clean, but close examination of all the facts show that renewable energy is neither inexpensive nor clean. A 2025 report published by the International Energy Agency (IEA) noted, *Despite years of research on wind turbine blade recycling, large scale solutions remain scarce, and many countries still lack viable end of life options for blades. Key challenges persist, including the technical difficulty of recycling glass fiber thermoset composites, the economic competitiveness of landfill in several regions, and the lack of reliable methods to assess future waste volumes. These factors continue to hinder the development and implementation of sustainable recycling value chains.* [6] In Europe, which has embraced wind power for decades, the IEA reports that 80,000 or more tons of turbine blades will be decommissioned annually within the next eight years, with no sustainable and "viable end of life options" for disposal.

Regardless of the fact that wind turbine produced electricity is not a cheaper option when *all costs* are included, nor is it sustainable when all the factors of production and eventual decommissioning are considered, António Guterres, Secretary-General of the United Nations continues to insist "we need to shift into overdrive" in order to achieve the Sustainable Development Goals by 2030. It doesn't matter that electricity prices in Europe, which renewable energy accounts for twice the production/consumption of electricity compared to the United States, are also two to four times higher. And that is all due to Europe's big push to reach the renewable energy transition goals of Agenda 2030. [7]

Addenda #88 Sources:

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