Federal Ministry
Agriculture and Forestry, Climate
and Environmental Protection,
Regions and Water Management
Republic of Austria

The Triumph of Renewable Energies

Across the globe, energy companies, industry leaders, and investors are putting in orders for solar systems, wind power stations and other technologies using renewable energy sources or storage devices. Net additions of nuclear power capacity went negative in 2023.

"The debate is over", Dave Freeman wrote in 2017. "Nuclear power has been eclipsed by the sun and the wind."[1] The *New York Times* awarded the ex-manager and author, who passed away at the age of 94 in 2020, the honorary title "energy prophet". He had seen the sun rise and set on nuclear power. U.S. President Jimmy Carter appointed Freeman as head of the energy utility Tennessee Valley Authority (TVA) in 1977. Two nuclear power stations had been under construction in this state since 1972. The first unit was connected to the grid in 1996, 24 years after construction had begun, the second in 2016, 44 years after construction start. Since then, only two more reactors came online in the U.S. and none is under construction. Twelve reactors have been closed in the country over the past twelve years. The hopes of the industry lie now with the reopening of one of the closed units, Palisades in Michigan, that started construction in 1967, started up in 1971, and closed in 2022. The past as the future?

Renewables are Booming Around the World

Meanwhile, the U.S. Energy Information Administration expects grid connection in 2024 of 8 gigawatts[2] of wind energy and over 34 gigawatts of solar capacity to which over

[1] S. David Freeman, "Foreword", in Mycle Schneider et al., "World Nuclear Industry Status Report 2017", September 2017, see worldnuclearreport.org/The-World-Nuclear-Industry-Status-Report2017-HTML.html#link0.

[2] One gigawatt corresponds to 1,000 MW or one million kilowatts.

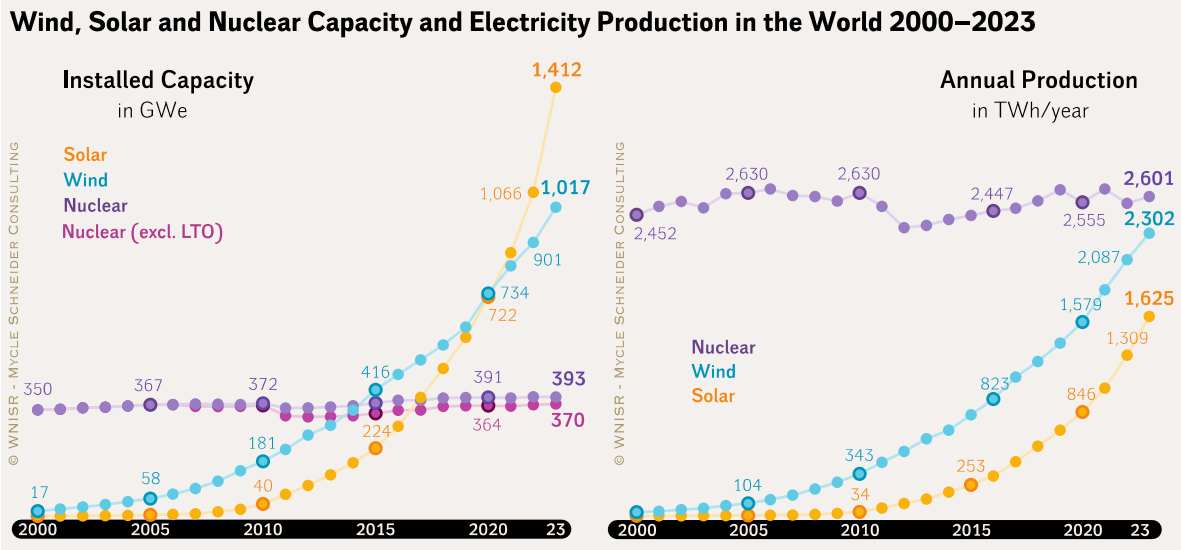
14 gigawatts of battery storage will be added.[3] Solar, wind, and storage account for 94 percent of the expected capacity additions. According to the International Renewable Energy Agency (IRENA), 473 gigawatts of renewable energy capacity were installed in the world in 2023 accounting for 87 percent of growth.[4] In the same year, the balance between new grid connections and closures of nuclear capacity was minus 1 gigawatt.[5] Contrary to public perception, today, as the Power Magazine recently headlined: "Analyst Says Nuclear Industry is 'Totally Irrelevant' in the Market for New Power Capacity".[6] While there are many announcements, little or nothing happens on the ground. In the world's largest nuclear power generating country, the United States, for example, there is not a single reactor under construction and none of the nuclear utilities has applied for a construction license.

China's Wind and Solar Expansion Dwarfs Nuclear

China is the only country that invested heavily in nuclear power since the turn of the millennium. Over the past two decades, 49 of the world's 102 new reactors were connected to the grid in China. Over the same period, 104 reactors were closed in the world, none in China. But even in China nuclear energy has become a niche product. In 2023, over 200 gigawatts of solar capacity were installed, whereas only one reactor with a capacity of 1 gigawatt was put into operation. Solar panels generated more power than nuclear reactors for the first time in 2022, a milestone reached by wind turbines already a decade earlier. Solar and wind together generated 3.5 times more power than nuclear plants in 2023.

[3] U.S.EIA, "Preliminary Monthly Electric Generator Inventory", United States Energy Information Administration, December 2023.
[4] IRENA, "Renewable Capacity Statistics 2024", March 2024, see irena.org/Publications/2024/Mar/Renewable-capacity-statistics-2024.
[5] IAEA-PRIS, 10 July 2024, see pris.iaea.org/pris/.
[6] *Power Magazine,* 8 July 2024, see powermag.com/analyst-says-nuclear-industry-is-totally-irrelevant-in-the-market-for-new-power-capacity/.

Figure 1: Renewables Are Booming – Nuclear Power Stagnating for Two Decades, Sources: WNISR with IRENA, and Energy Institute, 2024



Note: LTO=Long Term Outage, reactors that have not generated any power for at least 18 months.

Electricity generated by wind and solar systems in the E.U. represented 27 percent in the past year, outpacing nuclear that contributed only 23 percent. For the first time ever, the E.U. saw wind production alone overtaking the output of natural gas.[7]

“These renewable, free-fuel sources”, Dave Freeman wrote in 2017, “are no longer a dream or a projection – they are a reality that are replacing nuclear as the preferred choice for new power plants worldwide”. Seven years later, global reality honours the energy prophet.

Last update: 2024

[7] EMBER, “European Electricity Review 2024”, May 2024.