November 2024

CliSciPol

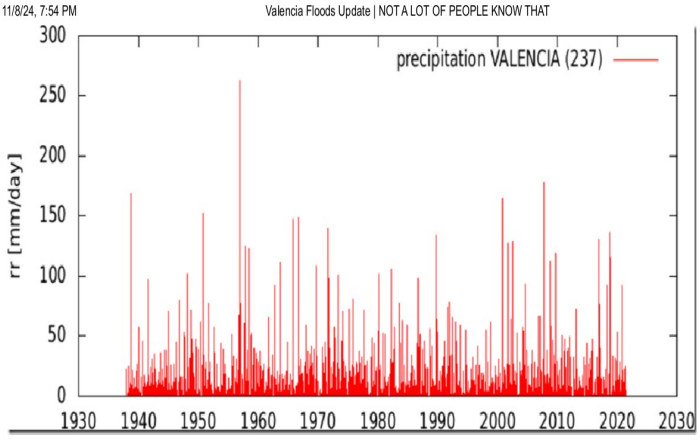
Climate Science and Policy for Nonscientists

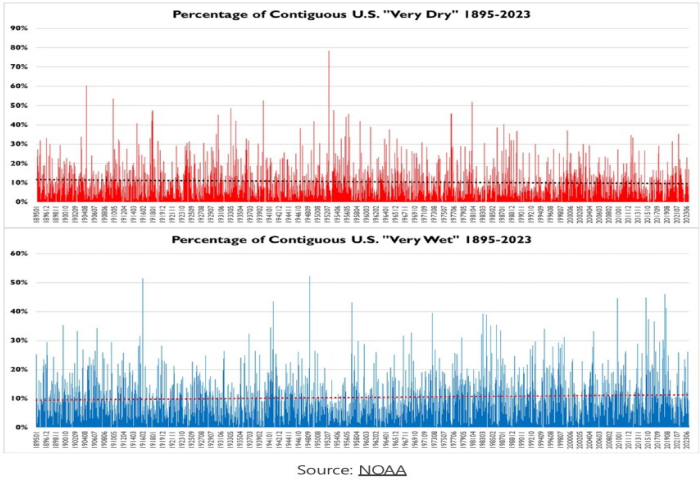
One picture is worth a thousand words.

Floods, Rain, Drought

In late October and early November the Valencia region of Spain suffered devastating river floods. The media was quick to declare the floods "unprecedented" and caused by climate change despite there having been horrendous prior floods in 1897 and 1949.

The data on precipitation in Valencia shows no upward trend. What it does show is great year-to-year variability. The most recent IPCC Assessment Report found that river peak flow trends have shown high regional variability, and that the data failed to show any statistically significant world trend. [AR6 WGI p.1568 (2021)]. The IPCC made general findings that trends in river flooding, heavy precipitation, and pluvial flooding have not emerged and are not expected to emerge by the year 2050. (AR6 WGI p.1856)

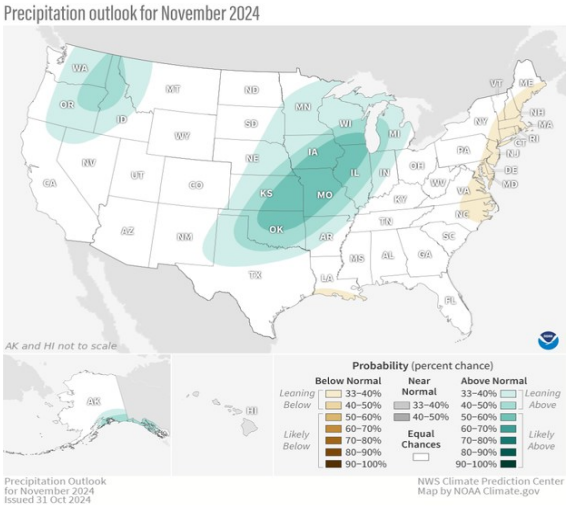


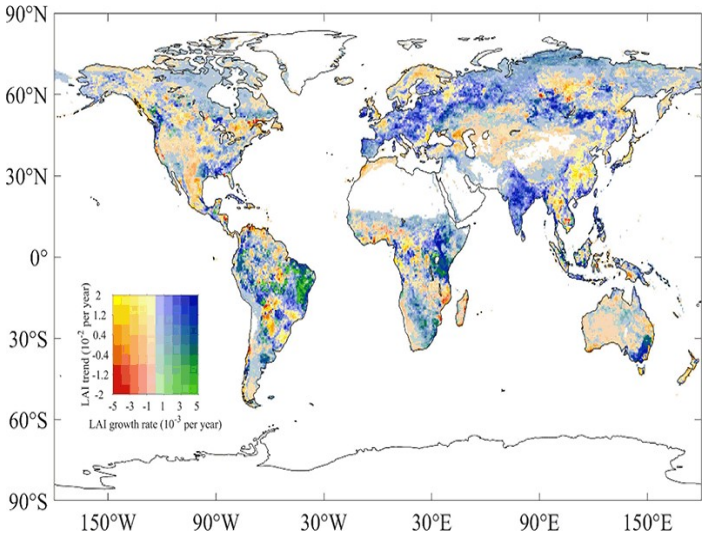


Source: NOAA

Drought is the prolonged absence of rain. Rain is highly variable from year to year and from place to place. For example, there is significant variance from year to year in the parts of the continental US that are either very wet or very dry with a very slight downward trend in very dry and a very slight upward trend in very wet.

Presently the Northeast coast is experiencing a drought while much larger portions of the Midwest and Northwest are experiencing above average rainfall.

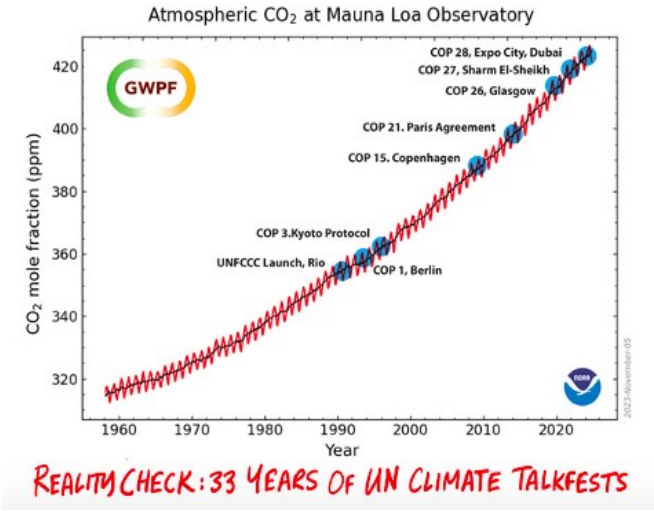


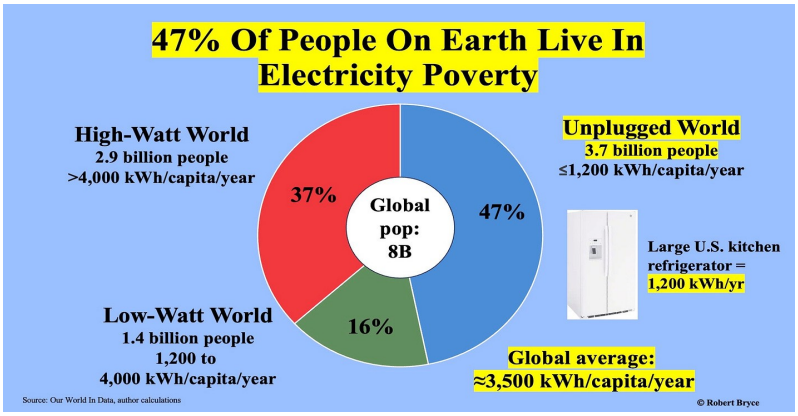


The overall trend since the early 1980s is towards a greener world. (AR6 WGI p. 292, 365-6). A recent study of world leaf area from 2001 to 2020 found that greening is occurring and accelerating over 55% of land area, and desertification is increasing over 7%. Increased greening is consistent with CO2 fertilization at the global scale as atmospheric CO2 levels rise. (AR6 WGI p.365, 1057, 1062). CO2 is both plant food and plant fertilizer.

COP29 in Baku

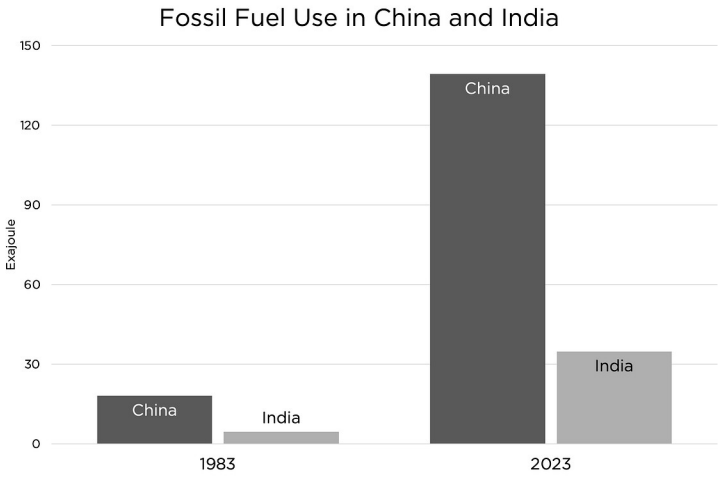
The 29th Conference of the Parties on Climate Change (COP29) began in Baku, Azurbaijan, on November 11, 2024. The Paris Agreement was adopted at COP21 in 2015, but, as shown, atmospheric CO2 levels have been steadily rising since 1959 with no apparent effect from all the climate conferences. Greta Thunberg has lamented that the COP meetings do not lead to any meaningful change. During COVID (2020-2021), when human CO2 emissions declined around 6%, the rate of atmospheric CO2 rise did not diminish, so it is uncertain how much the rise of CO2 levels will diminish if human CO2 emissions are again reduced.

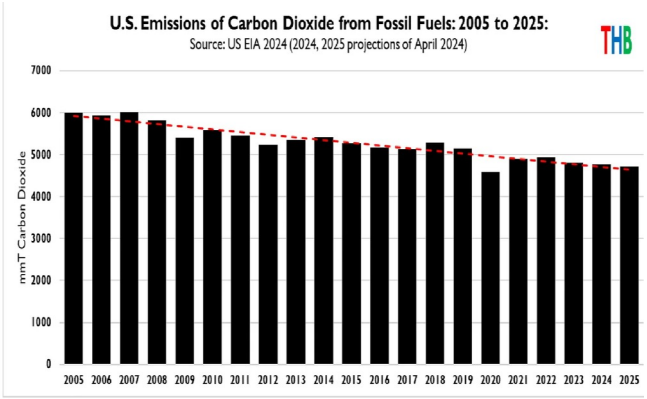




On November 12 Azurbaijan's president told the delegates that fossil fuels are a "gift of the Gods," and he criticized the "double standard," the habit of developed countries to lecture the undeveloped countries on climate matters. An estimated 47% of the world's population lives in "electricity poverty."

China and India are building large numbers of coal fired power plants to provide the cheap, reliable electricity to lift their populations out of energy poverty. Over 1,700 fossil fuel lobbyists have been granted access to COP29. The top item on the COP29 agenda appears to be getting the developed nations to pay "climate reparations" to undeveloped nations.





University of Colorado **Boulder**

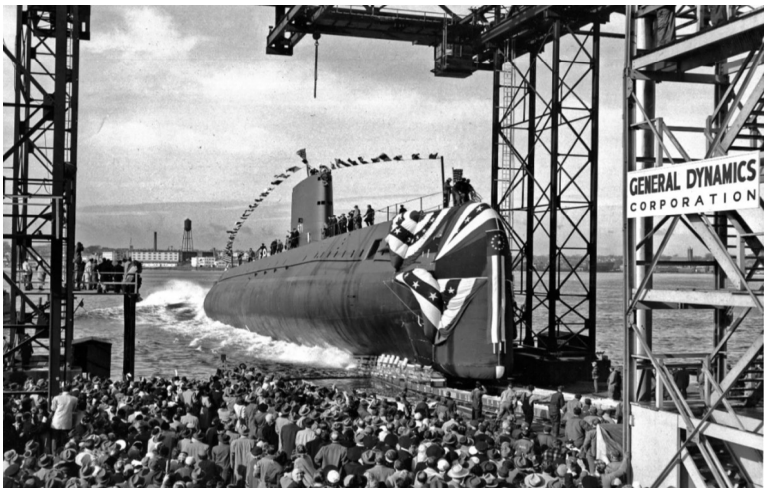
The US has reduced its CO2 emissions by 18% since 2005. Some of this reduction is due to the increased use of wind and solar. But the principal cause of the reduction has been that relatively cheap natural gas has been replacing coal. Burning natural gas only emits about half the amount of CO2 that burning coal emits to produce the same amount of electricity. While US emissions have fallen, China's emissions have increased so rapidly that China now emits twice the US's amount. Yet at COP29 in Baku China is claiming $1.3 trillion in climate reparations from the developed world.

Small Nuclear Reactors

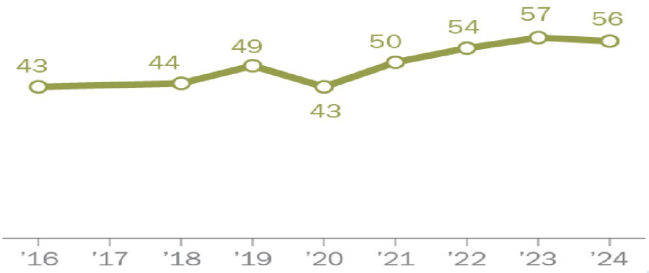
Interest in small modular nuclear reactors (SMRs) is growing dramatically. The depicted SMR demonstration project was approved by the NRC this year.

This Hermes demonstration project is expected to be completed in 2027. These new Generation IV reactors do not need massive cooling towers, because they do no use water for cooling. Amazon, Google, and Microsoft are turning to nuclear power to assure their own reliable electricity supply for their AI centers.

The US Navy has been operating SMRs to power its ships without significant incident since 1954 when the Nautilus was launched.



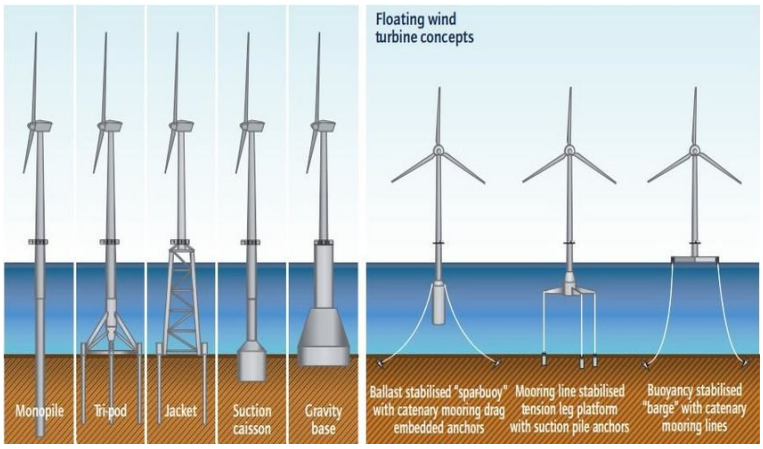
*% of U.S. adults who **favor** more nuclear power plants to generate electricity in the country*

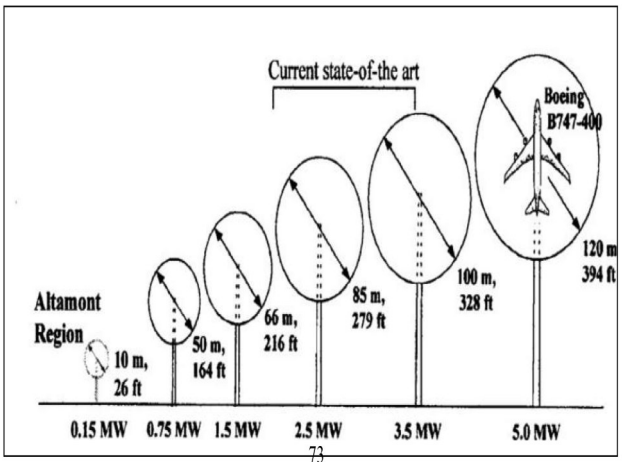


The percentage of US adults who favor more nuclear power plants has increased significantly since 2016.

Wind Farm Feasibility

In what has been called a "stunning financial blow" the Biden Department of Transportation in October rejected a $456 million grant application to build a floating offshore wind project in the Gulf of Maine. Floating offshore wind is experimental. There is not sufficient actual operational data to demonstrate the reliability or the reasonable cost of current proposed designs.





Part of the problem is the rapid increase in turbine size in pursuit of greater efficiency. But production and maintenance problems increase dramatically with size. Capital costs of fixed-bottom offshore wind has been estimated at $95 per megawatt hour versus $145 for floating offshore wind. Projects are not presently feasible absent massive subsidies. Four windfarms off Great Britain have now received over one billion pounds in subsidies over their lifetimes, and Britain is now paying subsidies to home owners who no longer can afford their electricity, which is generated by offshore wind

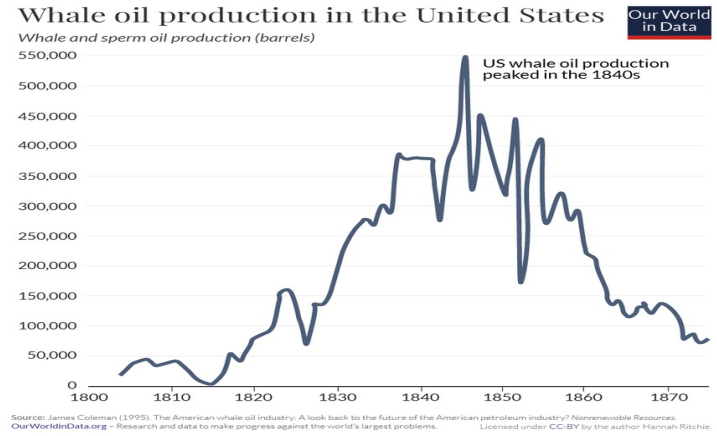
President Trump reportedly has vowed to kill US offshore wind projects. The rate of offshore wind farm development will clearly slow significantly in coming years. Massachusetts and the other New England states need to revisit their energy plans that rely heavily on floating offshore wind in the Gulf of Maine.

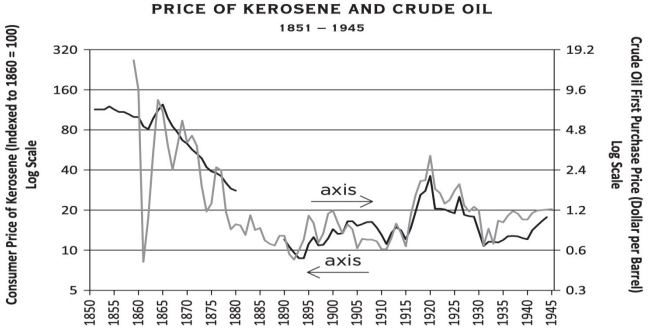
EVs

The City of Dortmund in Germany planned a full transition of its bus fleet to EVs but has found that electric buses are significantly more expensive than diesel, even with government subsidies. The transition plan is now being delayed. The city is continuing to buy diesel buses at 400,000 Euros versus 800,000 Euros for a EV bus. Joseph Sternberg writes in the Wall Street Journal that Europe's EV mandates are "killing blue-collar jobs by the tens of thousands in Germany's auto industry." Meanwhile in the US Ford lost $1.2 billion in Q3 on EVs, or over $58,000 for every EV sold.

Standard Oil Saved the Whales

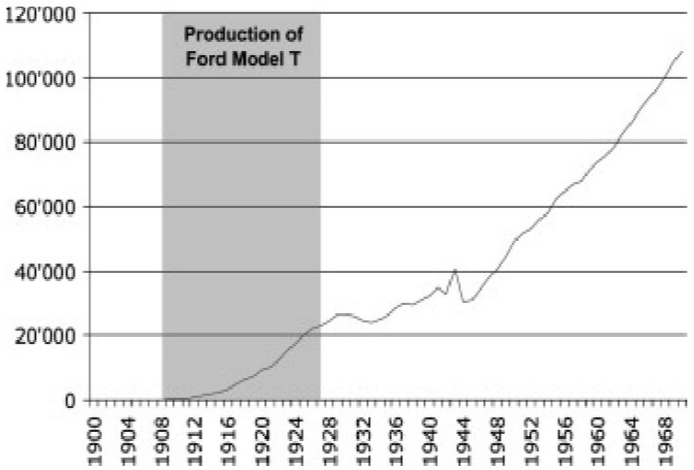
Some environmentalists believe that wind farms kill, whales although this is much contested by other environmentalists and by the wind farm industry. The first savior of the whales was Standard Oil. There was a market for whale oil, because it provided clean-burning light (the whale-oil lamp). Standard Oil was founded in 1870. It saved the whales, because it produced a source of cheap lighting that was superior in the market place to whale oil. No one bought whale oil any more, so whaling came to a stop.

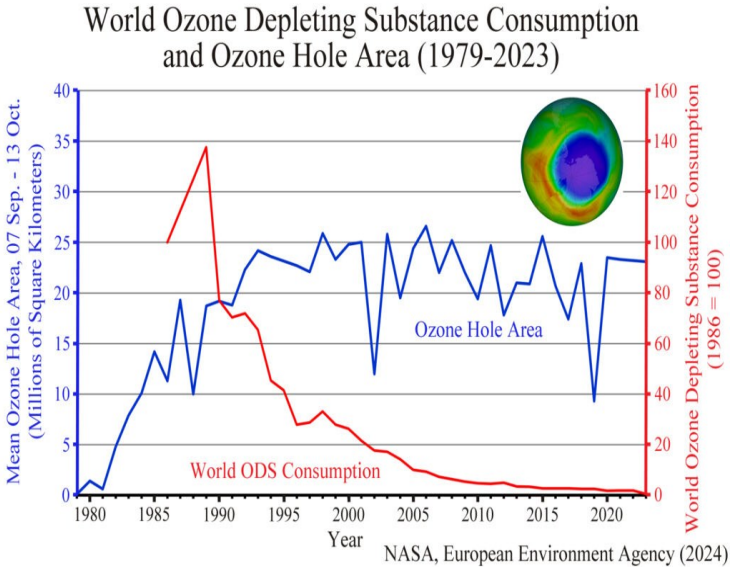




The new source of lighting was kerosene, which first came to market in the 1860s. A significant reason that Standard Oil could buy up its competitors was that Standard Oil was constantly finding new technology to produce and sell kerosene at lower prices to the benefit of consumers. Standard Oil also developed hundreds of by-products from each barrel of oil, including paint, varnish, lubricating oils, petroleum jelly, paraffin wax, and anesthetics.

Gasoline did not become a significant product for Standard Oil until after the invention of the internal combustion engine and after the introduction into the market of affordable automobiles in the early 1900s.





The Ozone Hole

In the 1970s and 1980s scientists warned that chlorofluorocarbons were ozone depleting substances ("ODSs") and were causing what became known as the Ozone Hole over the Antarctic. This led in 1987 to the Montreal Protocol, an international agreement to ban ODSs, which has dramatically reduced the world's use of ODSs. In 2015 NASA scientists predicted that the Ozone Hole would be half closed by 2020. But the data through 2023 shows the size of the Ozone Hole to be unchanged for 30 years. Looks like the scientists were wrong on their theory of causation.

Establishing causation is extremely difficult for climate scientists, because the climate is so complex. Scientists usually prove causation by controlled experiments, but It is impossible to perform controlled experiments on the climate itself, and it is virtually impossible to simulate the climate in the laboratory.

Work Cited

Intergovernmental Panel on Climate Change Assessment Report 6, Working Group I, The Physical Science Basis (2021) (AR6 WGI)