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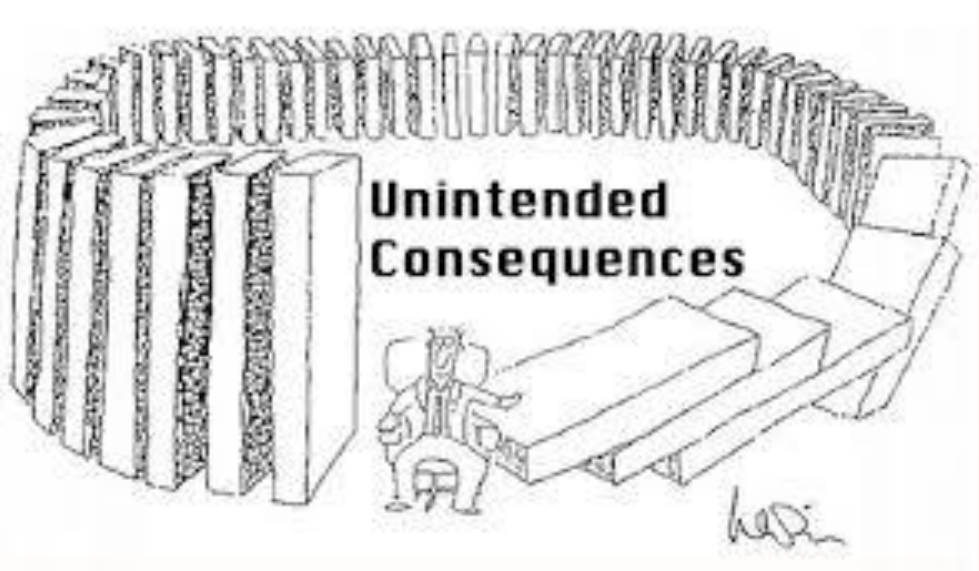
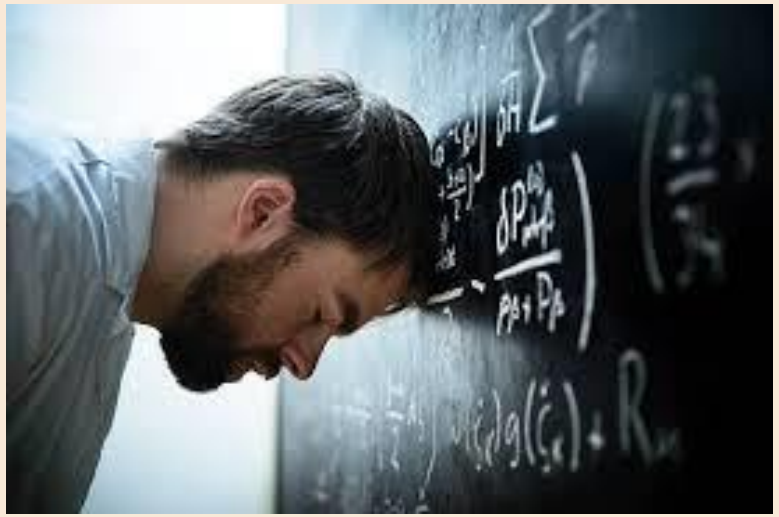
Unintended Consequences: A Monkey Wrench in Climate Change



Battling global warning is challenging enough without having to deal with good decisions that generate bad outcomes.

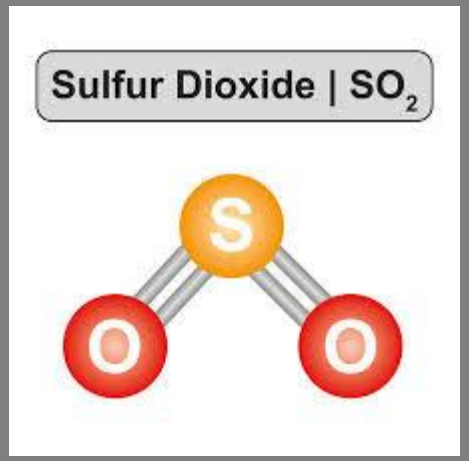
But that's the reality, and it's essential that we adequately factor in such circumstances.

Climate science puzzled



- The pace of global warming has accelerated in recent years.
- At 0.95° C above the pre-industrial average, 2019 was the hottest year on record.
- That is until 2023 when the global average jumped another 0.5° C above pre-industrial averages to nearly 1.5 ° C (2.7 ° F).
- And 2024 will likely set another record.
- This has climate scientists puzzled, which isn't exactly a revelation.
- My views on climate science are clear: as a nascent science errors are inevitable, but furthering the science is essential.

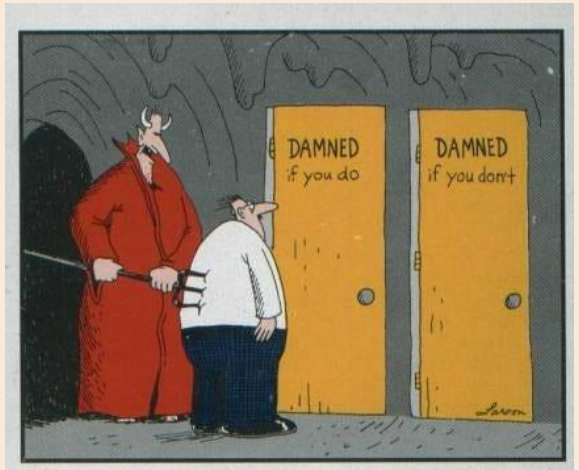
The fact that the climate models are inaccurate isn't unusual, but the reason for the error may be.



The maritime industry may have inadvertently engaged in a form of geoengineering when in 2020 it started eliminating sulfur dioxide from shipping fuels.

Unlike CO2, which can linger in the atmosphere for a millennium, sulfur dioxide doesn't stick around for more than 10 days or so.

Loss-loss isn't what we're shooting for

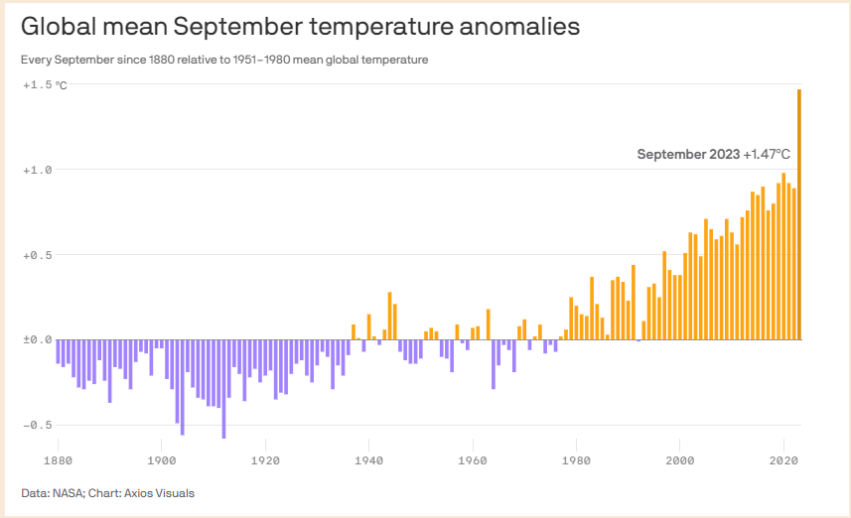


- No argument: sulfur dioxide is bad. It irritates the heart and lungs, worsens asthma, and causes acid rain.
- Except sulfur dioxide has one redeeming quality: it reflects heat back into space.
- A new study by researchers Ilaria Quaglia and Daniele Visioni believes that the removal of sulfur may be responsible for a temperature increase of 0.08° C.
- That's not much, but it may have made 2023 about 12 times likelier to happen.
- In the last year, other papers reached the same conclusion although estimates of the impact vary widely. Some put it at 0.003 to .008 ° C.

The magnitude isn't the point.

The point is that action-reaction doesn't always work in our favor.

Not the first double-edged sword



In October 2023 *Axios Generate* published a story with the following headline: *Global warming may be accelerating*:

In that article another unintended consequence was cited: the elimination of aerosols.

- Based on data from NASA, NOAA and EU-based Copernicus Climate Change Service, in the past 15 years, the pace of global warming increased by about 40%.
- El Niño and the continued burning of fossil fuels for energy were cited as the most likely culprits.
- But another reason was cited: the elimination of aerosols, another nasty substance with obvious downsides for human health.
- According to controversial research by James Hansen, post-2010, as compared to the period from 1970 to 2010, the elimination of aerosols may be contributing to a 50% increase in the rate of global warming.

And that cloudless sky may not be all it's cracked up to be

A recent study published in the journal *Science* concluded that in 2023 there was reduced low-cloud cover in the northern mid-latitudes and tropics.

A good thing you say? Maybe for vacationers and sun seekers, but not for global warming.

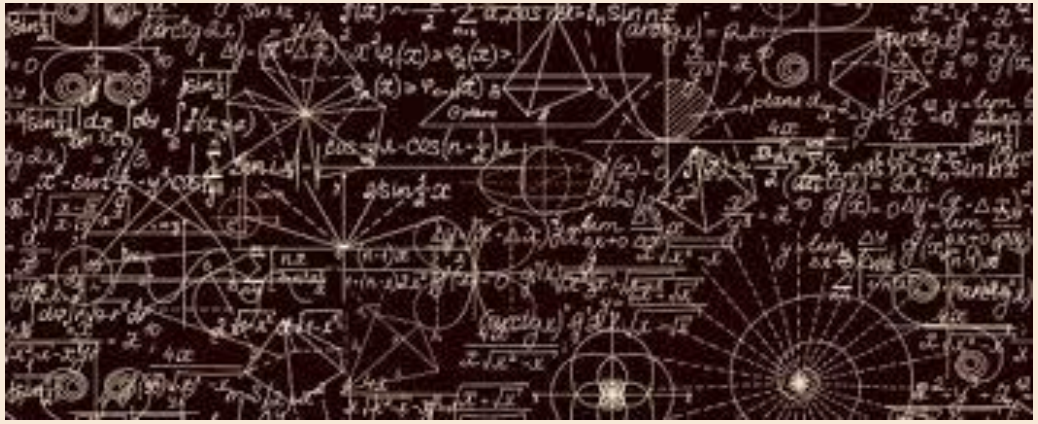
- Fun fact: clouds reflect solar radiation back into space.
- Fewer clouds means higher levels of radiation and that means warmer temperatures.
- What happened to the clouds? Scientists aren't sure.
- Possibilities include the El Niño weather pattern, a rapid decline in sulfate aerosol emissions from the maritime industry, or perhaps, global warming itself is changing cloud behavior.

What's the moral of the story?

On another note, the unpredictability of climate change on weather patterns is one of the many reasons why I don't believe solar and wind are the long-term answer.

Relying on technologies that are weather dependent when weather patterns are constantly shifting is asking for trouble.

The complexities of climate change are near impossible to model



- It sometimes seems like there are an endless number of variables involved in analyzing climate change.
- And the modeling complexity rises further due to hard to predict feedback loops - i.e. global warming results in less cloud cover, which exacerbates global warming. With that said, the climate models should be accounting for the double-edged impacts of things like aerosols and the reduction of sulfur dioxide.
- The fact that these unintended consequences may have taken climate scientists by surprise is somewhat alarming.
- Despite the complexity, the need to refine the models to more accurately predict any potential point of no return is absolutely essential.

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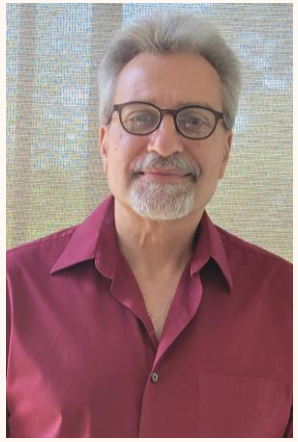

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Unbiased and Unfiltered

- An honest assessment of the climate change effort.
- I cover what's working – but more important - the issues/roadblocks that the industry would prefer to ignore.
- A must-read for anyone with a desire to understand what's really going on with renewable energy and climate change.

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