A Climate Science Update

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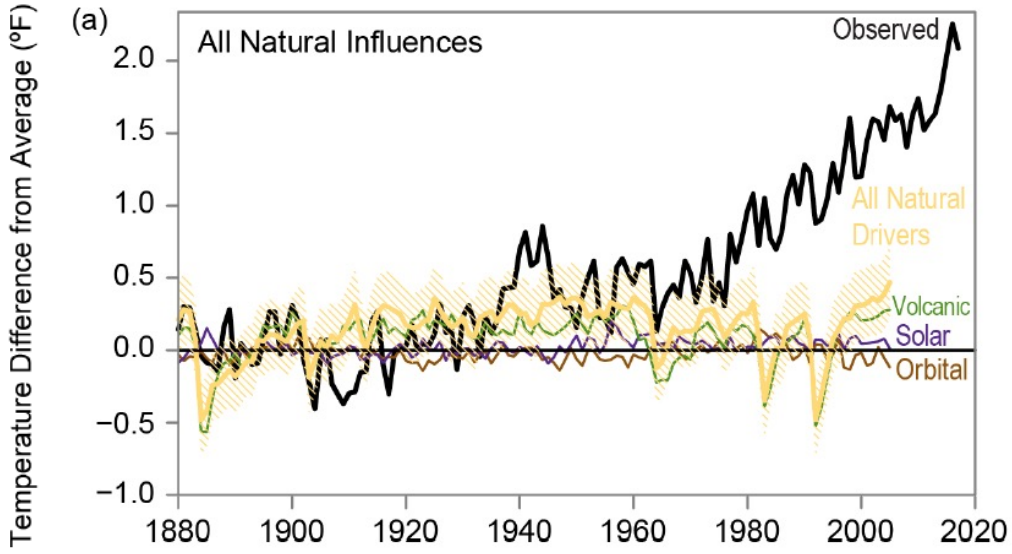
Centre County Democrats
Leadership Circle Summer Reception
June 20, 2023

What I chose to discuss in 20 minutes

- Human contribution to climate change
- Some recent unusual events
- Emissions: how they are changing and who's responsible
- Past environmental successes

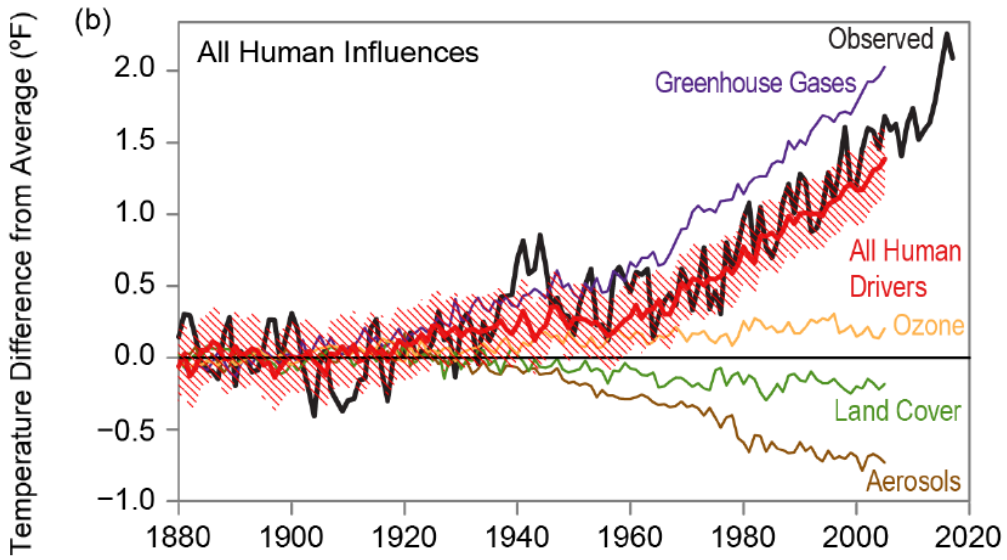
We cannot explain observed warming with natural drivers …



Fourth National Climate Assessment, Hayhoe et al. (2018)

Hayhoe, K., Wuebbles, D.J., Easterling, D.R., Fahey, D.W., Doherty, S., Kossin, J., Sweet, W., Vose, R., Wehner, M., 2018. Our changing climate. In: D.R. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, B.C. Stewart (Editors), Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment. US Global Change Research Program, Washington, DC, USA, pp. 72–144.

… but we can with human drivers



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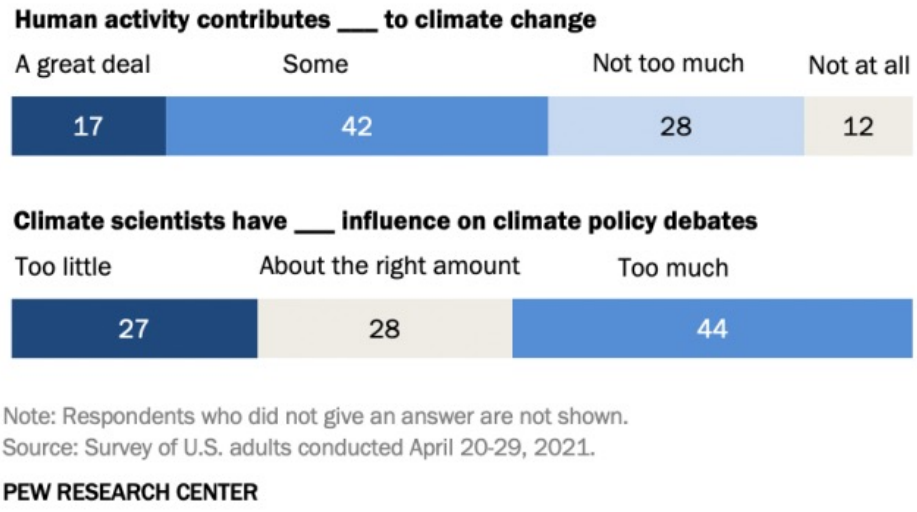
Republicans think otherwise

% of Republicans and Republican leaners who say …



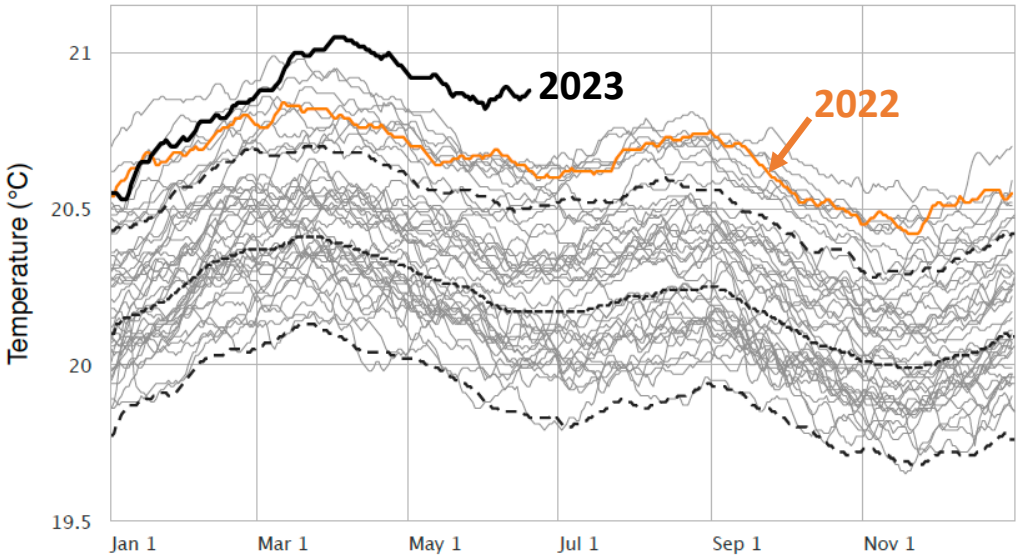
Note: Respondents who did not give an answer are not shown.
Source: Survey of U.S. adults conducted April 20-29, 2021.

PEW RESEARCH CENTER

https://www.pewresearch.org/short-reads/2021/07/23/on-climate-change-republicans-are-open-to-some-policy-approaches-even-as-they-assign-the-issue-low priority/

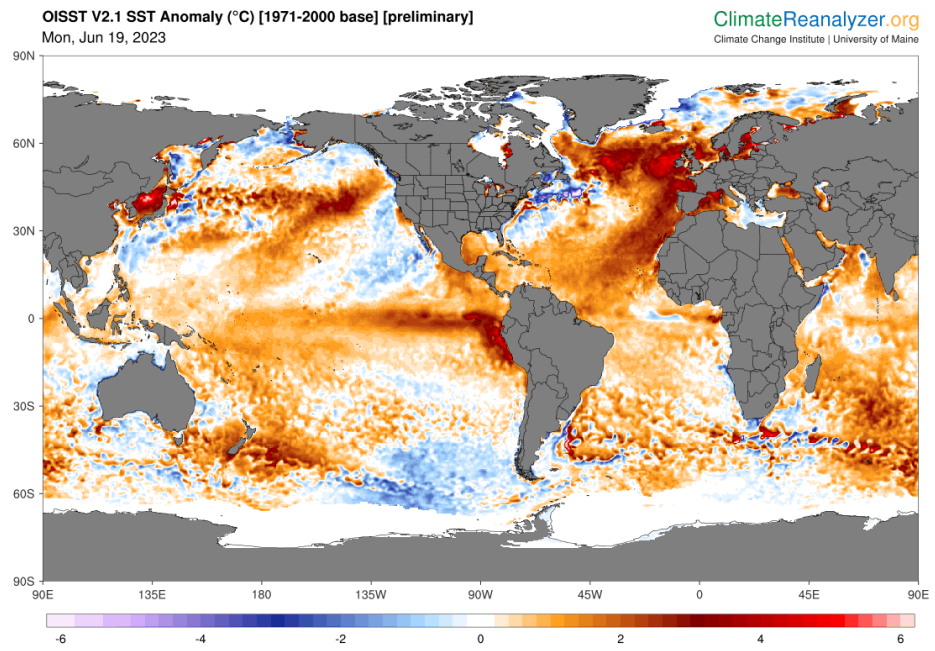
The ocean surface is extremely warm now

Each line represents a year of global average sea surface temperature since 1981



https://climatereanalyzer.org/clim/sst_daily/

Some of it is El Niño, but the North Atlantic is a big surprise



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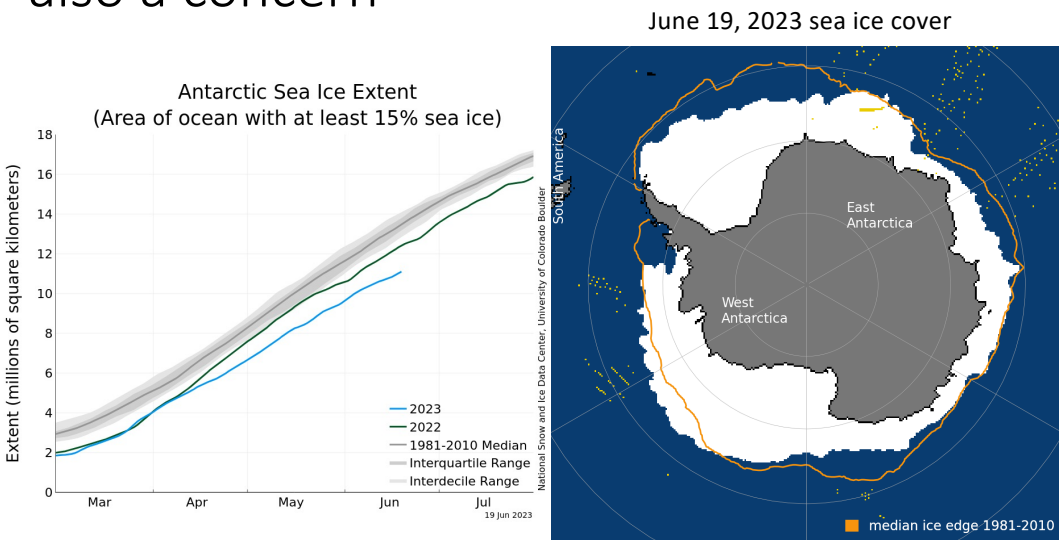
Sea ice declines have long been a worry in the Arctic, but now the Antarctic is also a concern



Source: National Snow and Ice Data Center

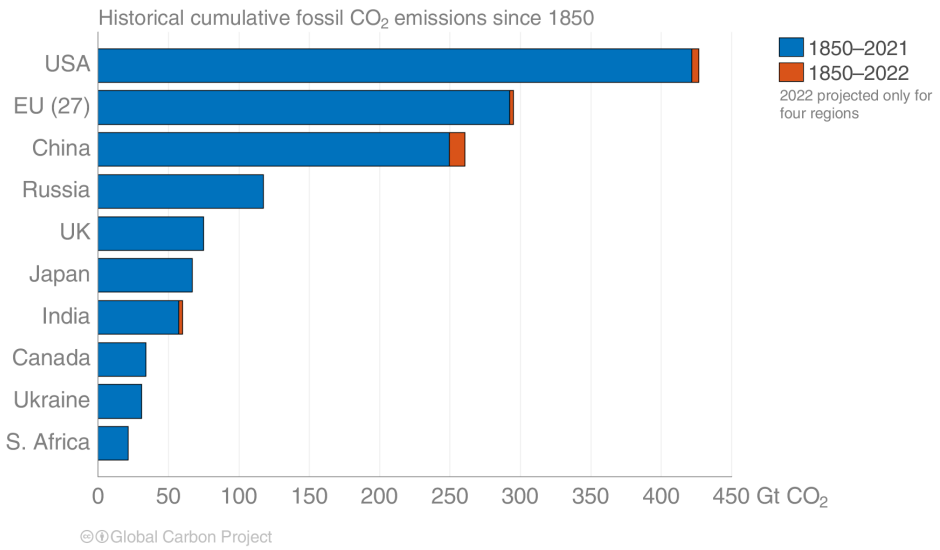
https://nsidc.org/arcticseaicenews/

Emissions: Who's responsible?

What Nikki Haley recently said in the CNN Town Hall:

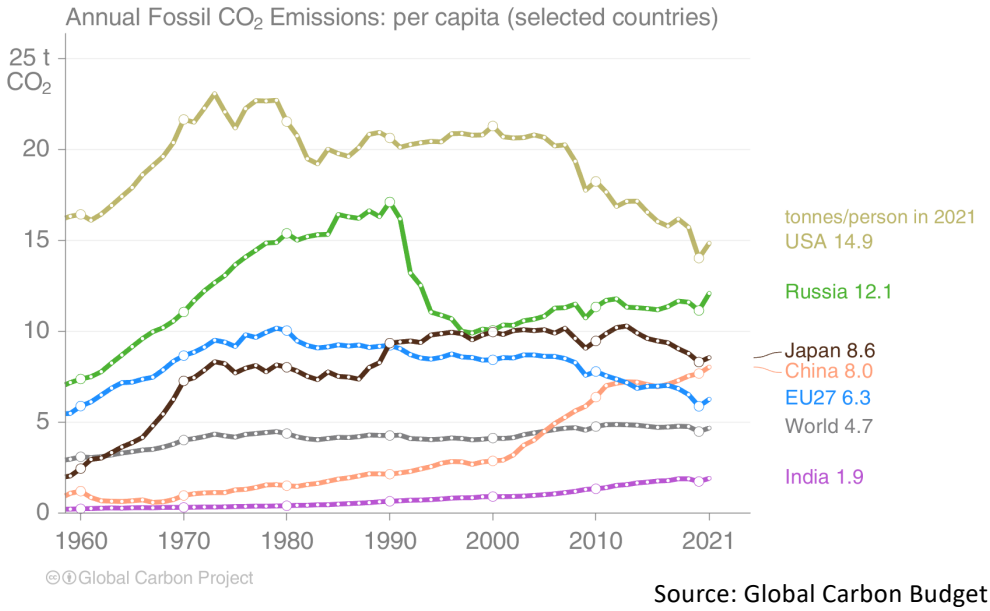
"If we want to really fix the environment, then let's start having serious conversations with India and China. They are our polluters. They're the ones that are causing the problem."

The US is the biggest historical contributor to CO_2 emissions



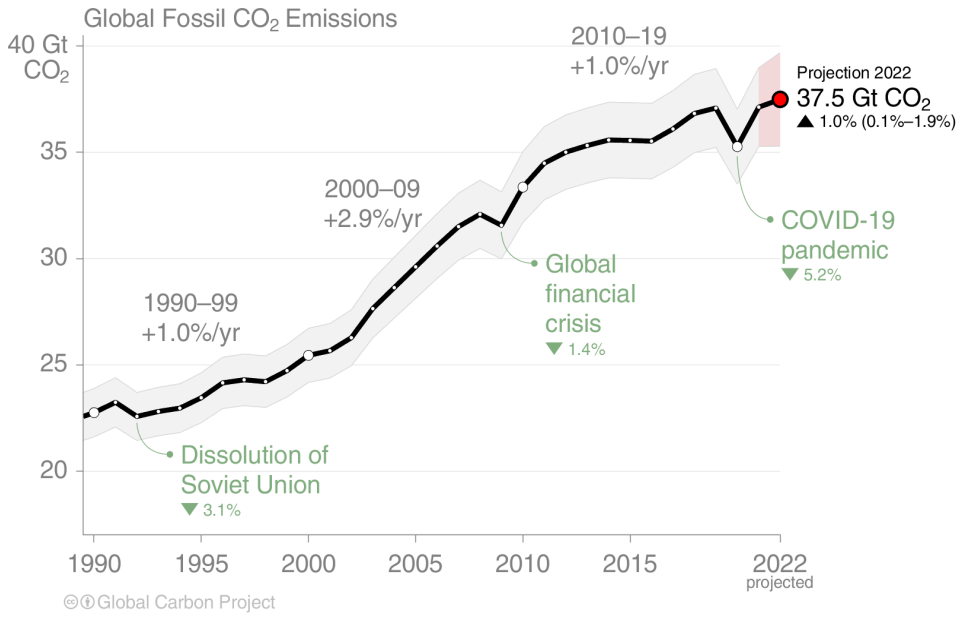
Source: Global Carbon Budget 2022

The US is also the largest per capita contributor to CO_2 emissions



Source: Global Carbon Budget 2022

Are we nearing peak emissions?



Source: Global Carbon Budget 2022

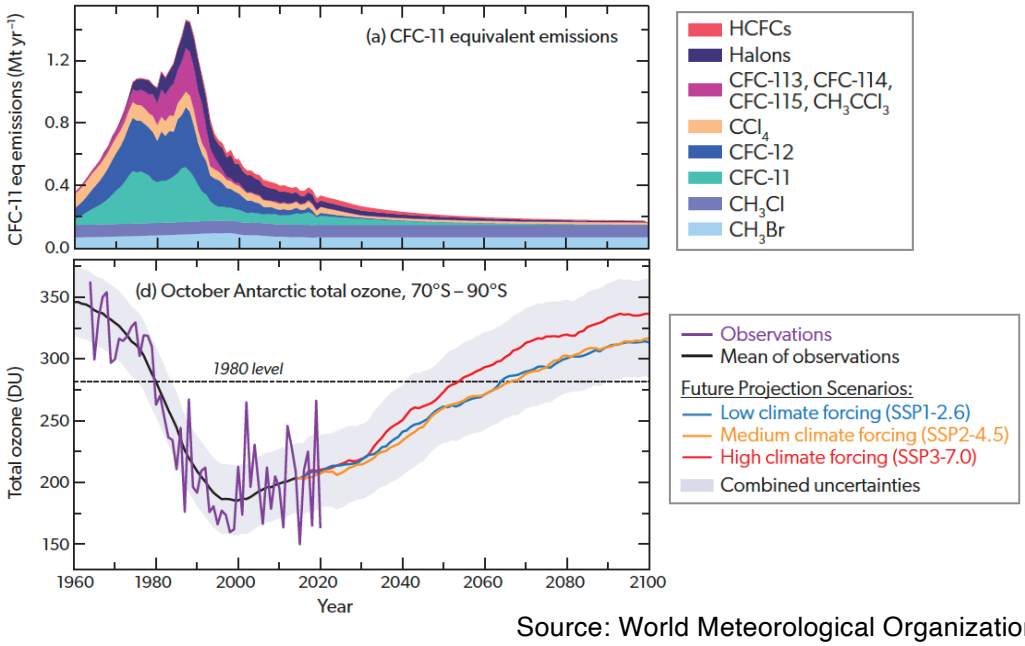
A local advance

- “With a goal of achieving 100% greenhouse gas emissions reduction by 2035, Penn State — under the direction of President Neeli Bendapudi — is moving forward with several of the recommendations presented by the University’s Carbon Emissions Reduction Task Force in spring 2022”
- “Penn State has already reduced its GHG emissions by 42% since 2005”

Source: Penn State

https://www.psu.edu/news/administration/story/president-bendapudi-addresses-climate-action/

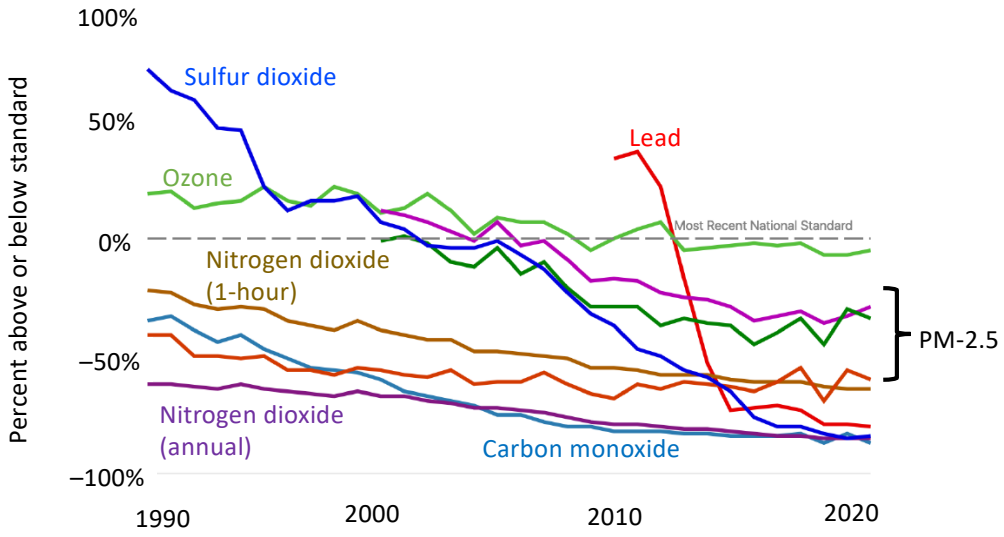
The ozone layer is recovering because we reduced CFC emissions



Source: World Meteorological Organization

World Meteorological Organization (WMO). Executive Summary. Scientific Assessment of Ozone Depletion: 2022,
GAW Report No. 278, 56 pp.; WMO: Geneva, 2022.

US air quality has improved dramatically over the past 30 years



Source: US EPA

https://gispub.epa.gov/air/trendsreport/2022/#introduction