

Fig. 1. Surface temperature anomalies ($^{\circ}\text{C}$) in April relative to 1951-1980 mean.

Hotter Hotspots, Drier Dryspots, Wetter Wetspots, and Stronger Storms

April 2022 Temperature Update

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What else is new? Hotspots are getting hotter. The major hotspot in April stretched from Iraq to India and Pakistan, and toward the northeast through Russia (Fig. 1). Temperature exceeded 45°C (113°F) in late April in at least nine Indian cities,¹ on its way to 50°C (122°F) in Pakistan in May,² where a laborer says “It’s like fire burning all around” and a meteorologist describing growing heatwaves since 2015 says “The intensity is increasing, and the duration is increasing, and the frequency is increasing.” Halfway around the world, Canada and north-central United States were cooler than their long-term average, but people in British Columbia and northwest United States remember being under their own record-breaking hotspot last summer.

It’s sometimes said that we are in a “new normal” and that we must reduce greenhouse gas (GHG) emissions to keep this new normal tolerable. Yes, we must reduce emissions as rapidly as practical, but our target cannot be just minimizing how intolerable climate becomes. For multiple reasons – crucially for preserving our coastal cities – we must return to a more propitious, cooler, climate. We are now in a transient climate phase that’s sure to get hotter in the near term, but in the near future – at latest by the 2030s – we must begin to manage Earth’s energy balance to restore a cooler climate. We will finish a paper soon that we hope will help illuminate this matter.

Rising temperature is the least of it. Dry places get drier and wet places wetter. Notably affected subtropical dry regions include the U.S. Southwest, the Mediterranean, and the Middle East. Tropical regions now subject to greater deluges include much of Central America, Southeast Asia and Africa. Moreover, throughout the world, wet times become wetter, dry times become drier, and storms tend to be stronger. These conclusions are not news; they were all included in a paper³ that we and other colleagues at the NASA Goddard Institute for Space Studies wrote in 1989. The conclusions were based on physical science arguments, but also on GCM climate simulations with increased atmospheric CO_2 . In the climate simulations, we sorted the diagnostics into wet times and dry times at each location. This revealed that increased GHGs cause wet times to become wetter and dry times dryer, regardless of how annual-mean precipitation changes. This paper was the basis for much of the [testimony of JEH to the U.S. Senate](#).⁴

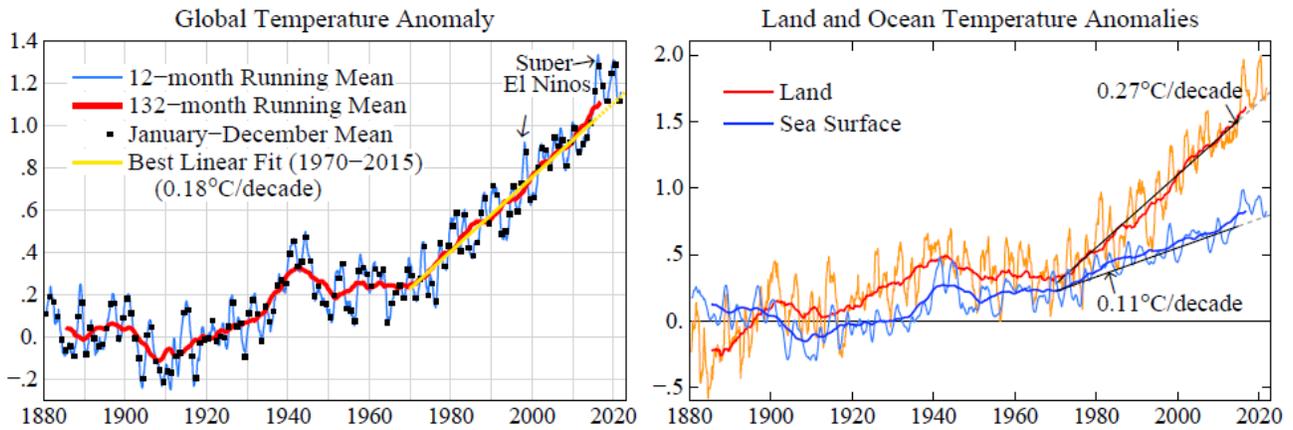


Fig. 2. Surface temperature ($^{\circ}\text{C}$) relative to 1880-1920 mean for the globe, land, and ocean.

Increasing climate extremes are occurring because of global warming that is now 1.16°C (2.09°F) for the 12-month running mean (Fig. 2). Background (Nino neutral) global warming (relative to 1880-1920) is now at least 1.2°C (2.2°F) as a result of accelerated warming since 2015. The current global temperature is reduced by a continuing La Nina, which is rather strong, considering the effect of increasing global ocean warming on the Nino index (Fig. 3a). The La Nina seems set to last through the summer, possibly into next year according to models focused on the tropics (Fig. 3a). Continuation of La Nina this summer favors strong tropical storms in the Atlantic region because the vertical wind shear that can decapitate tropical storms is minimal during the La Nina phase.

Despite the La Nina, we can be sure that 2022 will be warmer than 2021 because of the present record planetary energy imbalance. (We'll discuss facts about the energy imbalance in next month's temperature update.) The next El Nino will bring record global temperature of at least $+1.4^{\circ}\text{C}$, possibly 1.5°C . The basis for confident prediction is, again, the present planetary energy imbalance.

We will keep reporting on the increasing GHG amounts, the planetary energy imbalance, and the rising global temperature. There is some merit in chronicling and understanding these changes. But what is the value of understanding these changes, if the information has no significant effect on government policies and the course of human-made climate change? [Sherry Rowland said it better: "What is the use of having developed a science well enough to make predictions if, in the end, all we're willing to do is stand around and wait for them to come true."] Thus, we go a step further here and discuss some of the implications for policy.

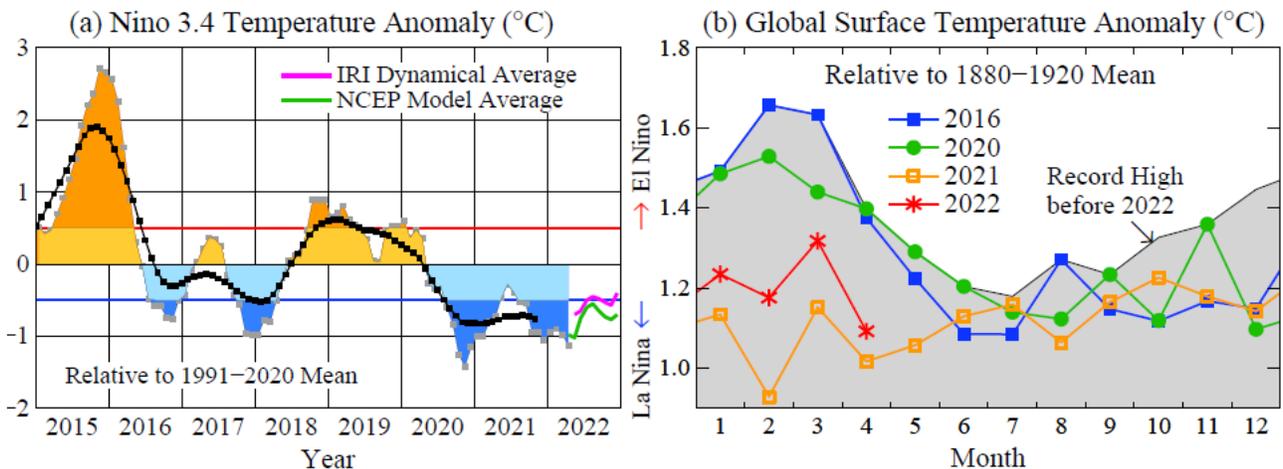


Fig. 3. Nino3.4 temperature anomaly ($^{\circ}\text{C}$) and monthly global surface temperature anomaly.

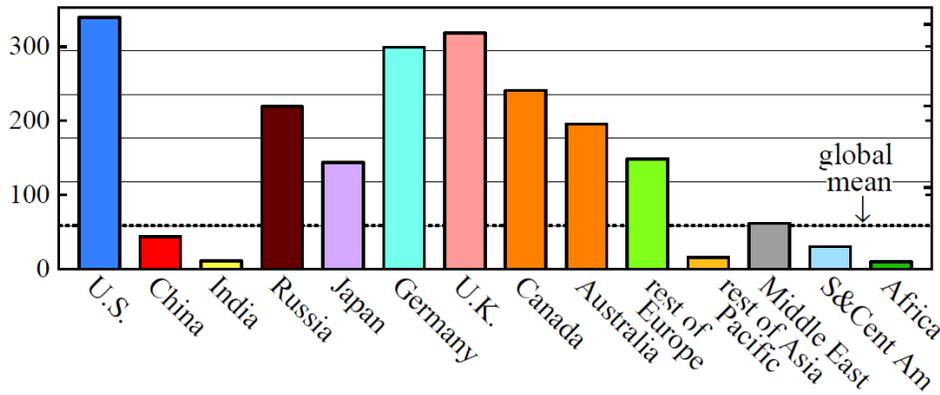


Fig. 4. Cumulative 1751-2020 fossil fuel carbon emissions (tons C/person; 2020 populations). Horizontal lines are multiples of the global mean. The order of individual nations from left to right is based on current national emissions.

Long-term implications. Given the present Russia-Ukraine war, with its impacts on global energy use and climate, this is a good time to reflect on energy policies. It's important that young people understand causes of the spectacular, continuing failure of governments to adopt effective long-term energy and climate policies. We must all be aware that demands for effective policies will yield only superficial change as long as the role of special interests in government remains unaddressed.

One fundamental fact is that fossil fuels are a convenient, condensed source of energy that has helped raise living standards throughout much of the world. Fossil fuels will continue to provide a large fraction of global energy (now about 80 percent) and release CO₂ to the air as long as the price of fossil fuels does not include their costs to society, i.e., as long as we allow the atmosphere to be a free dumping grounds for the waste products of fossil fuel mining and burning.

A second fundamental fact is that the United States is most responsible for climate change caused by fossil fuel emissions as measured by total national emissions,⁵ but even more so on a per capita basis (Fig. 4). [Note that India and Pakistan (Pakistan is included in the “rest of Asia Pacific bar in Fig. 4) as of today are negligible contributors to global warming, but they suffer grave impacts.]

There is no indication that incumbent governments are even considering the fundamental actions that are needed to slow and reverse climate change. Instead, they set goals for their future emissions and hope that the collective outcome will be good. When data suggest otherwise, they revise hopes for future emissions downward, all the while knowing – if they have any common sense and technical understanding – that their claims for the expected future emissions are (to put it plainly) hogwash because they have not taken the fundamental actions required to achieve those goals.

It is asking a lot to expect young people to understand the overall global predicament, let alone to help lead in crafting a solution. Yet that's not inconceivable. Let's look at some evidence.

Fossil fuel emissions. The United States has a lead role in creating the problem and the potential for a lead role in solving it. Almost 15 years ago the carbon fee and dividend idea (let's abbreviate it F&D) became popular and Citizens Climate Lobby (CCL) adopted F&D as its goal. Barack Obama – who promised to give priority to a “planet in peril” in his campaign – overtook the Democrat's establishment candidate (Hilary Clinton) in large part because he was supported by young people. Obama was elected President in 2008, facing immediately a global financial crisis and opportunity.

Economists agreed that a gradually rising carbon fee (increasing \$10 per ton of CO₂ each year, reaching the equivalent of 90 cents per gallon of gasoline in 10 years) would by itself reduce U.S. fossil fuel emissions 30% in 10 years. With the funds distributed uniformly to the public, most

people (especially low-income people) would gain financially. In 15 years, emissions and fossil fuel use would be reduced by about half.

If initiation of a F&D program had been included in the legislation to address the financial crisis, the U.S. would have capacity today to produce the fossil fuels needed to replace Russian exports to Europe. European fossil fuel requirements also would have declined due to a border duty on fossil fuel products, which would have encouraged a rising carbon fee in Europe and other countries.

Obama was aware of F&D but made no effort to include it in his financial rescue package. Instead, climate policy was addressed in a separate bill in Congress. JEH was fortunate to get a meeting with Senator John Kerry, who shepherded the (Waxman/Markey) bill. Kerry agreed on the superior merits of F&D, but concluded “I can’t get one vote for that.” Instead, every relevant lobbyist in Washington who did not have a broken arm got to write a piece of the bill, which was several thousand pages long – but even it failed to pass because fossil fuel special interests opposed it.

As years went by and global emissions continued to grow, economists united in advocating for carbon F&D and young people picked up on this science-based solution. In 2020 [more than 350 college student government presidents](#) – representing more than 4 million students in all 50 states – issued a bipartisan statement in support of carbon F&D, and the next year more than 700 high school leaders from all 50 states came out in support of this policy.⁶

Will this support of young people overcome the power of special interests? No. But they learn something. Many young people are getting involved in the political process in a positive way. As they witness the power of special interests over our government, they can adjust tactics.

Let’s look at a second example of the role of money in our government.

Military-industrial-congressional complex. When President Dwight Eisenhower was preparing his farewell address, in which he warned the nation of the threat of a growing military-industrial complex, an early draft of the speech referred to the military-industrial-congressional complex. But Ike backed off. When his brother, Milton, asked about the deletion he replied “It was more than enough to take on the military and private industry. I couldn’t take on the Congress as well.”⁷

Eisenhower’s warning seems to have merit. A strong Department of Defense is essential in today’s world, but the size of the DoD budget is open to question. Investments in defense contractors outperform the overall stock market.⁸ Does the massive military-industrial complex encourage “wars of choice”⁹ that the public does not want? Maybe. It’s worth viewing an [8-minute description](#) of American military adventures overseas and discussing whether these actions are doing more harm or good. It’s important to take the long view. America did not enter World War II until we were attacked. We emerged from the war as an admired nation and were generous to the defeated as well as to allies worn down by the long war. Since then, we have become involved in numerous wars and regime changes worldwide, ostensibly to make us safer. Many wars have been hidden from the American public, but the public in nations where fighting takes place are usually aware of American involvement. These wars and interventions overall may have done more to create ill-will toward America and make us less safe, rather than safer. The founders of our democracy expected Congress to exercise control over war-making, but Congress is not doing its job.

Eisenhower’s omission – the role of Congress in this distortion of the democratic process – is a fundamental problem: Congress is permitted to accept bribes under the rubric of “campaign” funds. This problem grew when the Supreme Court ruled in *Citizens United* that corporations – with their vast resources – are free to participate in this vulgar, legalized corruption. Public frustration with the Washington swamp of special interests contributed to the rise of the extremes in both American political parties. As power oscillates from one party to the other and neither party delivers,

frustrations grow higher. This two-party oscillation is unstable and could result in the collapse of our democracy, if we do not solve the underlying problem.

Summary. The aim of this commentary on the politics of the climate/energy situation is to help people – especially young people – understand that the fundamental actions to address climate change are not being taken – and the reason they aren't has a lot to do with a basic underlying problem: the role of money in government.

It's wonderful to see young people supporting carbon F&D, and I hope that effort continues and is successful. However, after nearly 15 years of failing to get Congress to adopt a cost-free action to address climate change – an action based on conservative economic principles and yielding a progressive result by reducing wealth disparity – it should be clear that we have a fundamental problem with our democracy: special interests have undue sway in our government. The public knows this – they refer derisively to the “Washington swamp” of special interests.

Young people, indeed, all people, need to understand that they cannot solve the energy and climate problem without addressing the special interest problem in Washington. It's not only possible to address that age-old problem, doing so is the fastest way to make progress toward restoring a propitious climate. This discussion will need to be continued elsewhere. JEH argues in the penultimate chapter (Equal Rights and Opportunity) of unfinished *Sophie's Planet* that we need a third party in the United States that takes no money from special interests. Some concepts were discussed in three communications last December,¹⁰ especially on pages 31-32 of the first of these.

¹ Aljazeera, [‘Hottest summer ever’: Many Indian states under ‘severe’ heatwave](#), 29 April 2022.

² Khan, A., [South Asia pummelled by heatwave that hits 50C in Pakistan](#), PhysOrg, 13 May 2022.

³ Hansen, J., D. Rind, A. DelGenio, A. Lacis, S. Lebedeff, M. Prather, R. Ruedy and T. Karl, [Regional greenhouse climate effects](#), in *Preparing for Climate Change, Proceedings of the Second North American Conference on preparing for climate change*, 6-8 December 1988, Climate Institute, Washington, D.C. 1989.

⁴ Hansen J., [draft Chapter 29. 1989: The Whitehouse Effect](#), *Sophie's Planet*, Bloomberg, 2023.

⁵ Hansen, J., and M. Sato, 2016: [Regional Climate Change and National Responsibilities](#) *Environ. Res. Lett.* **11** 034009.

⁶ Hansen, J., [Can young people save democracy and the planet?](#) 8 October 2021.

⁷ Goodman, M.A., *National Insecurity: The Cost of American Militarism*, City Light Publishers, 464 pp., ISBN-10 0-87286-589-4, 2013.

⁸ Schwarz, J., \$10,000 invested in defense stocks when Afghanistan war began now worth almost \$100,000, *New York Times*, 16 August 2021.

⁹ Sachs, J., Our misguided ‘wars of choice,’ *Boston Globe*, 16 April 2017.

¹⁰ Hansen, J., December 3: [A Realistic Path to a Bright Future](#), December 14: ["Don't Look Up," the American Dream](#), and An Appeal, December 23: [November Temperature Update and the Big Climate Short](#).