

A Climate Chronology, 2023 entries

2023 (January)

Study concludes that even with 1.5 degrees Celsius warming, the planet will sustain momentous loss of its mountain glaciers; West Antarctic glacier and Greenland ice sheet also at risk

The Paris Agreement “stretch” policy goal is to limit warming to 1.5 degrees Celsius above pre-industrial levels. [2015 (December)] Glaciologists from Austria, Canada, France, Norway, Switzerland, Britain and the United States set about to determine what the impact on the world’s glaciers, excluding the Greenland and Antarctic ice sheets, would be at this level of warming. Publishing in the journal *Science*, they conclude that “all regions will experience considerable deglaciation at local scales with roughly half of the world’s glaciers by number projected to be lost by 2100, even if temperature increase is limited to +1.5°C. Based on the most recent climate pledges from COP26, global mean temperature is estimated to increase by +2.7°C, which would result in much greater glacier contribution to sea level rise [approximately 5 inches] and the near-complete deglaciation of entire regions including Central Europe, Western Canada and US, and New Zealand.” This is a substantially higher estimate than previous analyses.* In discussing the significance of this study, Chris Mooney in the *Washington Post* notes that “an estimated 1.9 billion people worldwide depend on glaciers for water.”** Meanwhile, researchers studying the Thwaites Glacier in the West Antarctic, the Earth’s widest glacier, have deployed an underwater robot to reveal that warming seas are carving deep crevasses in the underside of the glacier. They conclude that “collapse of Thwaites Glacier, which itself represents more than half a metre of global sea-level-rise potential, could also destabilize neighbouring glaciers that account for a further 3 m of future sea level rise.”*** And in April, a study published in *Earth Systems Data Science* will conclude that the polar ice sheets of Antarctica and Greenland together “now account for a quarter of all sea level rise – a fivefold increase since the 1990’s.” The researchers, funded by NASA and the European Space Agency, estimate that Earth’s polar ice sheets “lost 7,560 billion tonnes of ice between 1992 and 2020 – equivalent to an ice cube that would be 20 kilometres in height,” and that “the seven highest melting years have occurred in the past decade.”****Notes Elizabeth Kolbert, “In one particularly warm year—2019—Greenland shed four hundred and forty-four billion tons of ice; these tons contained enough water to flood the entire state of California to a depth of three feet.”*****

*David Rounce, et al., “[Global glacier change in the 21st century: Every increase in temperature matters.](#)” *Science*, Vol 379, Issue 6627, January 5, 2023.

**Chris Mooney, [“Half of Earth’s glaciers could melt even if key warming goal is met, study says.”](#) *Washington Post*, January 5, 2023.

***Britney Schmidt et al., [“Heterogeneous melting near the Thwaites Glacier grounding line.”](#) *Nature* 614, 471-478, February 16, 2023; Chris Mooney, [“Warming seas are carving into glacier that could trigger sea level rise.”](#) *Washington Post*, February 15, 2023.

****Press Release, [“Polar ice sheet melting records have topped during the past decade.”](#) Northumbria University, April 20, 2023;

Ines Otosaka et al., [“Mass balance of the Greenland and Antarctic ice sheets from 1992 to 2020.”](#) *Earth Systems Data Science*, volume 15, issue 4, April 20, 2023.

*****Elizabeth Kolbert, [“It’s Earth Day—and the News Isn’t Good.”](#) *The New Yorker*, April 22, 2023.

2023 (January)

A first contemporary analysis of the 1970’s assessments of climate change by Exxon scientists concludes that the research was spot-on, dramatically at odds with public denial

In the context of the discovery in 2015 of a trove of decades-old research by Exxon scientists on the reality of climate change* and subsequent investigations and lawsuits against the company for failing to disclose the known dangers of their products [see 2015, November], a report in *Science* analyzes the accuracy of the early Exxon research. The study, by Harvard historians of science Naomi Oreskes and Geoffery Supran, and Stefan Rahmstorf, head of Earth System Analysis at the Potsdam Institute for Climate Impact Research, concludes that “in private and academic circles since the late 1970s and early 1980s, ExxonMobil predicted global warming correctly and skillfully. Using established statistical techniques, we find that 63 to 83% of the climate projections reported by ExxonMobil scientists were accurate in predicting subsequent global warming. ExxonMobil’s average projected warming was $0.20^{\circ} \pm 0.04^{\circ}\text{C}$ per decade, which is, within uncertainty, the same as that of independent academic and government projections published between 1970 and 2007. The average ‘skill score’ and level of uncertainty of ExxonMobil’s climate models (67 to 75% and $\pm 21\%$, respectively) were also similar to those of the independent models. Moreover, we show that ExxonMobil scientists correctly dismissed the possibility of a coming ice age in favor of a ‘carbon dioxide induced ‘super-interglacial’; accurately predicted that human-caused global warming would first be detectable in the year 2000 ± 5 ; and reasonably estimated how much CO_2 would lead to dangerous warming.” Yet, the authors note, unlike academic and government scientists working to communicate what they knew about the risk of climate change, “ExxonMobil worked to deny it—including overemphasizing uncertainties, denigrating climate models, mythologizing global cooling, feigning ignorance about the discernibility of human-caused warming, and staying silent about the possibility of stranded fossil fuel assets in a carbon-constrained world.”** In September, the *Wall Street Journal* will issue a related investigative report after

obtaining summaries of documents turned over by Exxon’s lawyers to the New York Attorney General pursuant to its investigation into whether Exxon had misled investors about the risks of climate change. One of many revelations: “After a 2011 meeting, [Exxon CEO Rex] Tillerson’s chief of staff, William Colton, emailed colleagues about the CEO’s feedback on a draft disclosure about carbon emissions. Tillerson wanted the words ‘weather extremes and storms’ deleted. ‘His view was that even mentioning a possible connection between climate change and weather was possibly giving the notion more credibility than he would like,’ Colton wrote.” After the Attorney General narrowed the scope of the investigation, these documents were not made public.***

* Neela Banerjee, Lisa Song and David Hasemyer, [“Exxon: The Road Not Taken”](#), *Inside Climate News*, Sept. 15, 2015.

** Geoffery Supran, Stefan Rahmstorf, and Naomi Oreskes, [“Assessing ExxonMobil’s global warming projections.”](#) *Science*, Vol 379, Issue 6628, January 13, 2023; see also, Bill McKibben, [“Godalmighty, Exxon Knew Absolutely Everything.”](#) *The Crucial Years* newsletter, January 12, 2023; Nicholas Kuznetz, [“Exxon Accurately Predicted Global Warming, Years Before Casting Doubt on Climate Science.”](#) *Inside Climate News*, January 12, 2023.

***Christopher Matthews and Collin Eaton, [“Inside Exxon’s Strategy to Downplay Climate Change.”](#) *Wall Street Journal*, September 14, 2023.

2023 (January)

Investigation raises serious questions about the effectiveness of the world’s largest issuer of carbon offsets

Carbon offsets are investments that can be made by individuals, small businesses or large corporations to support efforts around the world to reduce carbon emissions, such as protecting forest resources, planting trees, or investing in renewable energy. Those investments are in turn claimed to reduce the carbon footprint of the purchaser in proportion to carbon emissions saved by the investment activity. There is much debate about whether such offsetting actually reduces emissions, and concern revolves around the accuracy of reported benefits of the investment projects.* The markets for these offsets are “voluntary,” in that they are not regulated by governments like carbon credits under cap-and-trade systems, and are estimated to represent about \$2 billion in investments currently, but to have the potential to grow much larger. And they are viewed as essential to meeting the \$12 billion commitment made by the world’s nations at the 2021 COP26 to protect and restore the world’s forests.** A nine month investigation undertaken by the *Guardian*, the German weekly *Die Zeit* and SourceMaterial, a non-profit investigative journalism organization, examined the Washington D.C. firm Verra, issuer of a verified carbon standard (VCS) that has issued more than one billion carbon credits and approves three-quarters of all voluntary offsets. The authors reviewed three scientific studies, two of which were peer reviewed, which studies used satellite images to check the

results of forest offsetting projects. Their conclusion was summarized: “Only a handful of Verra’s rainforest projects showed evidence of deforestation reductions, according to two studies, with further analysis indicating that 94% of the credits had no benefit to the climate. The threat to forests had been overstated by about 400% on average for Verra projects, according to analysis of a 2022 University of Cambridge study.” Verra strenuously disputed the conclusions, but will revise its rainforest protection standards.*** In July, the Rainforest Foundation UK will claim that three other verification schemes, the World Bank’s Forest Carbon Partnership Facility, the UNFCCC REDD+ Results system, and ART may misrepresent the benefits of offsets.****

*Fiona Harvey, [“Greenwashing or a net zero necessity? Climate scientists on carbon offsetting.”](#) *The Guardian*, January 18, 2023; see also, Brian Palmer, [“Should You Buy Carbon Offsets?”](#), Natural Resources Defense Council, May 11, 2022.

**Fiona Harvey, [“Carbon offsets are flawed but we are now in a climate emergency.”](#) *The Guardian*, January 18, 2023.

***Patrick Greenfield, [“Revealed: more than 90% of rainforest carbon offsets by biggest certifier are worthless, analysis shows.”](#) *The Guardian*, January 18, 2023; Verra, [“Verra Response to Guardian Article on Carbon Offsets.”](#) January 18, 2023; [“Verra Response to Guardian Article.”](#) March 10, 2023; Patrick Greenfield, [“Biggest carbon credit certifier to replace its rainforest offsets scheme.”](#) *The Guardian*, March 10, 2023.

****Victoria Schneider, [“Forest campaign group renews charge that carbon credit verification schemes are flawed.”](#) *Mongabay*, July 28, 2023.

2023 (January)

Study reveals human impacts in the Amazon rainforest vastly outpace natural processes

In one of many manifestations of the Anthropocene epoch [see 1922, Robert Lionel Sherlock], a study published in *Science* compared rates of anthropogenic and natural environmental changes in the Amazon, focusing on deforestation and carbon cycles. The report’s introduction underscores the global ecological importance of the Amazon: “The Amazon is the most species-rich subcontinental-scale ecosystem and is home to more than 10% of all named plant and vertebrate species, concentrated into just 0.5% of Earth’s surface area. The Amazon rainforest is also a critical component of the Earth climate system, contributing about 16% of all terrestrial photosynthetic productivity and strongly regulating global carbon and water cycles.” And the Amazon is critically imperiled: “A cumulative total of 17% of the original forest have already been cleared, and 14% replaced, by agricultural land use. After millions of years serving as an immense global carbon pool, under further warming the Amazon rainforest is predicted to become a net carbon source to the atmosphere. Some regions have already made the transition, with forest respiration and burning outpacing forest photosynthesis.” [see 2019 (November), 2020 (March, June), 2021 (March), 2022 (March)] The analysis was based on data compiled for the Science

Panel for the Amazon (SPA) Assessment Report, coauthored by 240 scientists from 20 countries. The conclusions are stark: “We found that rates of anthropogenic processes that affect Amazonian ecosystems are up to hundreds to thousands of times faster than other natural climatic and geological phenomena. These anthropogenic changes reach the scale of millions of square kilometers within just decades to centuries, as compared with millions to tens of millions of years for evolutionary, climatic, and geological processes. The main drivers of Amazonian habitat destruction and degradation are land-use changes (such as land clearing, wildfires, and soil erosion), water-use changes (such as damming and fragmenting rivers and increased sedimentation from deforestation), and aridification from global climate change. ...The Amazon is now perched to transition rapidly from a largely forested to a nonforested landscape, and the changes are happening much too rapidly for Amazonian species, peoples, and ecosystems to respond adaptively. Policies to prevent the worst outcomes are known and must be enacted immediately. We now need political will and leadership to act on this information. To fail the Amazon is to fail the biosphere, and we fail to act at our peril.”* The election of Brazilian President Luiz Inácio Lula da Silva in January offered hope for the needed political will, with his pledge to deliver zero deforestation by 2030. But by December it will be evident that progress has been limited because Brazil’s National Congress is controlled by a right-wing majority. Deforestation is projected to hit about 9,000 square kilometers in 2023. **

*James S. Albert, et al., [“Human impacts outpace natural processes in the Amazon.”](#) *Science*, Volume 379 Issue 6630, January 27, 2023.

**Meghie Rodrigues, [“Politics and the environment collide in Brazil: Lula’s first year back in office.”](#) *Nature*, December 21, 2023.

2023 (January)

New wind and solar cost less than all but one coal-fired power plant in the U.S.

In 2019, the thinktank Energy Innovations reported that more than 70 percent of coal plants were more expensive to operate compared to the alternative of building new wind or solar. In its latest analysis, only one U.S. coal plant is now cheaper than new wind or solar, bringing the share to 99 percent. This shift is in part the result of various incentives for renewables in the Inflation Reduction Act [2022 (August)]. The report concludes that “replacing coal plants with local wind and solar would also save enough to finance nearly 150 gigawatts of four-hour battery storage, over 60 percent of the coal fleet’s capacity, and generate \$589 billion in new investment across the U.S.”* As Dan Gearino comments for *Inside Climate News*, “the report’s estimates do not mean that the owners of the coal plants are losing money by

continuing to operate them. Indeed, many of the plants are profitable for a number of reasons, including state regulatory systems that allow the owners to pass all costs on to customers and policies from grid operators that allow the companies to ‘self schedule,’ which means the plants run even when there are less expensive options available on the grid. The larger point is that consumers could save billions of dollars if power plant owners would replace most of their coal plants with a mix of wind and solar power.”**

* Energy Innovation Policy and Technology LLC, [“Coal Cost Crossover 3.0: Local Renewables Plus Storage Create New Opportunities For Customer Savings And Community Reinvestment,”](#) January 29, 2023.

**Dan Gearino, [“New Wind and Solar Are Cheaper Than the Costs to Operate All But One Coal-Fired Power Plant in the United States,”](#) January 30, 2023.

2023 (February)

Antonio Guterres’ briefing to the U.N. General Assembly minces no words on climate

Observing that “We have started 2023 staring down the barrel of a confluence of challenges unlike any other in our lifetimes,” Secretary-General Guterres zeros in on climate:

“We must end the merciless, relentless, and senseless war on nature. (emphasis in original)

It is putting our world at immediate risk of hurtling past the 1.5-degree temperature increase limit and now still moving towards a deadly 2.8 degrees.

Meanwhile, humanity is taking a sledgehammer to our world’s rich biodiversity — with brutal and even irreversible consequences for people and planet.

Our ocean is choked by pollution, plastics and chemicals.

And vampiric overconsumption is draining the lifeblood of our planet — water.

2023 is a year of reckoning. It must be a year of game-changing climate action.

We need disruption to end the destruction.

No more baby steps.

No more excuses.

No more greenwashing.

No more bottomless greed of the fossil fuel industry and its enablers.

...

I have a special message for fossil fuel producers and their enablers scrambling to expand production and raking in monster profits:

If you cannot set a credible course for net-zero, with 2025 and 2030 targets covering all your operations, you should not be in business.

Your core product is our core problem.

We need a renewables revolution, not a self-destructive fossil fuel resurgence.”*

Bill McKibben observes: “Just to be clear, the U.N. Secretary-General is saying that the central problem with climate change is the fossil-fuel industry’s product, that the industry is immorally undermining climate action, and that, if it continues, it should be shut down. This is certainly the truth, but it too often goes unspoken.” After commenting on similar historic calls to action by Pope Francis and Al Gore, McKibben notes: “All of this straight talk and truth-telling is crucially important right now, not just because the world is enduring enormous and unnatural disasters but because these disasters coincide with a man-made flood of obfuscation. Much of that flood is the ‘greenwashing’ that Guterres decries—the efforts of big banks and oil companies to pretend that they’re making progress on climate when they’re not—and some of it is the strange wave of nonsense washing over us in ever greater quantities since Elon Musk’s acquisition of Twitter.” After posting on X formerly known as Twitter about the report in *Science* on Exxon’s early understanding of climate change and its risks [January, 2023], McKibben received “page after page” of hostile comments insisting the climate was cooling.**

*United Nations Secretary-General Antonio Guterres, [“Briefing to the General Assembly on Priorities for 2023.”](#) February 6, 2023.

**Bill McKibben, [“The U.N. Secretary-General’s Searing Message for the Fossil-Fuel Industry.”](#) *The New Yorker*, February 6, 2023.

2023 (February)

Study concludes feedback mechanisms need more attention in climate modeling; others postulate a dangerous social feedback loop

It has long been understood that feedback loops resulting from biological, chemical, or physical processes can accelerate warming driven by higher concentrations of greenhouse gases in the atmosphere. [(1957, Roger Revelle), (1975, Howard Wilcox), (1979, Jule Charney)] Scientists publishing in the journal *One Earth* examined 41 climate feedback loops and found 27 that increase warming but may not be fully accounted for in climate models. As reported by Bob Berwyn in *Inside Climate News*, study co-author William Ripple “said scientists generally understand the feedback loops individually, but that the models often overlook the cumulative effect all of them together might have over the next 50 to 80 years. ‘We are particularly concerned about several biological feedback loops, including permafrost thawing, forest destruction, loss of soil carbon and smoldering peatlands,’ Ripple said. ‘These feedbacks may contribute significantly to warming over the course of the century.’” While current estimates are that earth’s temperature would warm 2.7 degrees Celsius if countries meet their current emissions reduction targets, the study suggests that if some of the feedback loops accelerate, warming by 2100 could rise

to 4 degrees Celsius. The authors urge the Intergovernmental Panel on Climate Change to develop a special report focused on climate feedbacks and the consequences of their interactions and acceleration.* While climate feedback loops are generally understood to be biological, chemical, or physical, recent attention has addressed the risk of social, political, and economic feedback loops. A report published by Chatham House and the Institute for Public Policy Research, two London-based think tanks, warns of a “doom loop:” “The consequences of the crisis and the failure to address it [repairing storm damage, addressing public health emergencies] draw focus and resources from tackling its causes, leading to higher temperatures and ecological loss, which then create more severe consequences, diverting even more attention and resources, and so on.”**

*Bob Berwyn, [“Scientists Examine Dangerous Global Warming ‘Accelerators’”](#) *Inside Climate News*, February 17, 2024; William J. Ripple et al., [“Many risky feedback loops amplify the need for climate action.”](#) *One Earth*, Volume 6 Issue 2 p. 86-91, February 17, 2023.

** Laurie Laybourn, Henry Throp, and Suzannah Sherman, [“1.5°C – dead or alive? The risks to transformational change from reaching and breaching the Paris Agreement goal.”](#) Chatham House and Institute for Public Policy Research, February 16, 2023; Kristoffer Tighe, [“What’s a Climate ‘Doom Loop?’ These Researchers Fear We’re Heading Into One.”](#) *Inside Climate News*, February 17, 2023.

2023 (February)

In 2022 China permitted the highest number of new coal-fired power plants in seven years and four times higher than in 2021

China has made three major pledges to control its greenhouse gases over the last quarter century.

[(2007 June), (2014 November), (2020 September)] Nevertheless, a study by the Center for Research on Energy and Clean Air (CREA) and the Global Energy Monitor (GEM) determined that China granted permits for 106 gigawatts of capacity across 82 locations in 2022, the highest number in seven years and four times higher than in 2021. The *Washington Post* quotes Flora Champenois, a research analyst at GEM: “The speed at which projects progressed through permitting to construction in 2022 was extraordinary, with many projects sprouting up, gaining permits, obtaining financing and breaking ground apparently in a matter of months... China continues to be the glaring exception to the ongoing global decline in coal plant development.” *On a similar note, while China pledged at COP26 in 2021 to fund no new overseas coal plants, lack of transparency has made it impossible to confirm the fulfillment of that pledge.** China surpassed the United States as the world’s largest annual emitter of greenhouse gases in 2006, and is forecast to race by the United States as the largest historic producer in 2050. ***

*Christian Shepherd, [“China’s coal plant approvals highest in seven years, research finds.”](#) *Washington Post*, February 26, 2023;

Center for Research on Energy and Clean Air, [“China permits two new coal power plants per week in 2022.”](#) February 27, 2023.

**Chermaine Lee, China’s [“‘No New Coal Overseas’ Pledge Has a Big Catch.”](#) *Fair Planet*, December 14, 2022.

***Harry Stevens, [“The United States has caused the most global warming. When will China pass it?”](#) *Washington Post*, March 1, 2023.

2023 (February)

Americans’ carbon footprints leave residents of other countries in the dust; none more so than the wealthiest Americans

The *New York Times* prepared an analysis of an International Energy Agency report on per capita carbon dioxide emissions by income, demonstrating that “the wealthiest people in the United States have an astonishingly large climate footprint, far larger than rich people in wealthy, industrialized Europe and in fast-rising China.” The details: “The richest 10 percent of Americans, or those who make an average of \$233,600 a year, produces 56.5 tons of carbon dioxide emissions per person, per year on average, according to the I.E.A. analysis. That’s more than double the emissions of the richest 10 percent in Europe. It’s nearly double that of the richest 10 percent of Chinese. Everyone else in the United States has a big footprint, too, relative to their counterparts in Europe, China and India. For instance, the poorest 10 percent of Americans, those making \$2,500 a year on average, have a carbon footprint that’s almost as big as everyone in India, except India’s richest 10 percent. Likewise, the poorest 10 percent of Americans have a climate footprint larger than the poorest 30 percent of Chinese... And bear in mind that the so-called yacht class, the richest 0.1 percent of the population, are super polluters of another order. Their emissions are 10 times as much as the whole world’s richest 10 percent combined.”*

*Somini Sengupta, [“Climate Forward newsletter.”](#) *New York Times*, February 28, 2023; Laura Cozzi, Olivia Chen, Hyeji Kim, [“The world’s top 1% of emitters produce over 1000 times more CO2 than the bottom 1%.”](#) International Energy Agency, February 22, 2023.

2023 (March)

Study reveals record-high CO2 emissions from boreal fires in 2021

Boreal forests are those in the higher latitudes, including Canada, Alaska, Russia and other parts of Eurasia, which are adapted to withstand frigid temperatures year-round. With their abundant deciduous trees and conifers, they are critically important carbon sinks. In 2021, severe heatwaves and drought intensified the boreal fire

season. Noting that boreal forests are one of the most extensive and important habitats on Earth and that warming in the Arctic region is happening much faster than in the rest of the planet, a team of scientists from China, Europe, Australia and the United States set out to estimate the amount of carbon dioxide emissions from these fires. Their conclusion, published in *Science*: “Boreal fires, typically accounting for 10% of global fire carbon dioxide emissions, contributed 23% (0.48 billion metric tons of carbon) in 2021, by far the highest fraction since 2000.” In the past, studies have concluded that 80% of the carbon released by fires is taken up by vegetation in subsequent growing seasons; the remaining 20% remains in the atmosphere and contributes to the build-up of atmospheric CO₂. However, climate change may change that: “This increase in fire emissions poses a widening threat to climate, given that part of the emissions might not return to vegetation and soils because of postfire regrowth failure in a warming climate. Extreme fire events are more likely to occur with global warming in the future, which could place the boreal landscape in a frequently disturbed state and substantially suppress the stable storage of carbon. This positive climate–fire feedback exacerbates incomplete postfire recovery and resequentering of carbon after fires in subsequent growing seasons.”*

*Bo Zheng et al., [“Record-high CO₂ emissions from boreal fires in 2021.”](#) *Science*, Vol. 379 Issue 6635, March 3, 2023.

2023 (March)

Biden Administration draws fire for approving the Willow project in the Arctic Petroleum Reserve

President Biden ran on a courageous campaign pledge to ban “new oil and gas permitting on public lands and waters.”* The most controversial drilling project on the table when he took office was the Willow project, in the federally owned Arctic Petroleum Reserve-Alaska, where ConocoPhillips planned to spend \$8 billion to \$10 billion, more than any other oil project nationwide, on a lease acquired from the government in 1999. President Trump’s approval of the project was found “arbitrary and capricious” by the federal District Court in Alaska for its failure to consider the full scope of greenhouse gas emissions or dangers to wildlife, including polar bears. [2021 (June)] In late January, 2023, the Biden Administration released its environmental review, which recommended proceeding with a scaled down permit, reduced from five to three drilling platforms, with protections for birds, caribou and other wildlife. As reported in the *Washington Post*, the Alaska staff of the Bureau of Land Management estimated that the project “could produce between 576 million and 614 million barrels of oil over 30 years. That would be enough for this one project alone to cover nationwide oil consumption for 30 days. And the company

has previously said that its estimates are higher, as much as 3 billion.”** The Editorial Board of the *Wall Street Journal* writes: Willow will “create 2,500 mostly union construction jobs, and hundreds more long-term positions. It’s estimated to generate as much as \$17 billion in new revenue for the feds, the state of Alaska, and North Slope and Native communities... Willow should be easy to approve, especially given the world’s growing energy security [*sic*]. If Mr. Biden kills this project, either outright or on the sly, no one should believe another word he says about energy or oil prices.”*** On March 11, the Biden Administration gave final approval to the project, a politically fraught decision given the unanimous support for Willow from the Alaskan congressional delegation and the legislature, and the strenuous opposition of the nation’s environmental community. The administration pared the approval with a plan to restrict or prohibit oil and gas drilling across 16 million acres in the Alaskan Arctic, both onshore and in coastal waters.**** Comments Bill McKibben: “Here was a brand new project on the most remote and untouched corner of the nation, in a place already so damaged by climate change that its builders may have to refreeze the tundra before they can drill—and yet Biden could not bring himself to say no to the Alaska congressional delegation, nor to campaign advisors who were warning him that the price of gas would doubtless be a topic in the next campaign. He broke a clear campaign promise to say no; it was just too painful for him.”*****

*Juliet Eilperin and Dino Grandoni, [“Biden vowed to ban new drilling on public lands. It won’t be easy,”](#) *Washington Post*, November 19, 2020.

**Timothy Puko, [“Biden team gives nod to huge Alaska oil project, setting up climate fight,”](#) *Washington Post*, February 1, 2023.

*** Editorial Board, [“The Willow Oil Test for Biden,”](#) *Wall Street Journal*, March 1, 2023.

****Nicholas Kuznetz, [“Biden Approves ConocoPhillips’ Willow Project to Drill Oil in the Alaskan Arctic,”](#) *Inside Climate News*, March 14, 2023.

*****Bill McKibben, [“Just Say No,”](#) *The Crucial Years* newsletter, April 7, 2023. See also, on the oil and gas industry’s

“newly restored swagger,” Lisa Friedman, [Climate Forward newsletter](#), *New York Times*, March 14, 2023.

2023 (March)

Seniors organize demonstrations against major banks that finance fossil fuels

As reported by Marina Schaffler in the *Maine Monitor*, “On the first morning of spring, with temperatures hovering around freezing, a large flock of retirees descended like robins on a former farm field in Belfast, the site of a sprawling Bank of America office. They were greeting the new season with an urgent demand — that the bank stop funding fossil fuel projects, which endanger life on earth.” This and a demonstration in Portland, Maine were two of 102 events in 30 states and the District of Columbia on March 21. Seniors, among many others, protested at the

offices of Bank of America, Chase, Citi and Wells Fargo, banks that have collectively invested more than a trillion dollars since 2016 in fossil fuels. The message: scrap your credit cards in these banks and do business with regional institutions to put more resources into the local economy, “funds that could be used to accelerate adoption of heat pumps, solar panels and other measures to reduce fossil fuel dependency.”* The protests were organized in part by Third Act, founded by Bill McKibben. Observes McKibben: “Done right, protest also builds movement unity. So many groups came together—53 in fact—to pull off this giant day of action, from the very young to the very old. This is not the old-fashioned enviro movement, but one that understands the interplay of street action and congressional lobbying and brand pressure.”**

*Marina Schaufler, [“Mobilizing older Americans to combat the climate crisis,”](#) *Maine Monitor*, April 2, 2023.

**Bill McKibben, [“Rock On.”](#) *The Crucial Years* newsletter, March 25, 2023.

2023 (March)

The IPCC releases the final, “Synthesis Report,” for the Sixth Assessment

Since the Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations in 1988, it has issued six periodic assessments of climate science, the likely impacts of climate change, and the means of mitigating climate impacts. These reflect the collaborative work of thousands of scientists across the world, a quite unprecedented process in the history of science. The Synthesis Report for the Sixth Assessment (AR6) summarizes the key findings of previous reports in this assessment [August, 2021 (science); February, 2022 (impacts); April, 2022 (mitigation)]. Because these reports normally take six to eight years, as the *Guardian* points out, “that means AR6 is effectively the last IPCC report while it is still feasible – only just – to stay within 1.5C.”* The following passage from the Summary for Policymakers describes some conclusions of the Assessment, along with the level of confidence among the collaborating scientists on the reliability of those conclusions: “For any given future warming level, many climate-related risks are higher than assessed in [the Fifth Assessment], and projected long-term impacts are up to multiple times higher than currently observed (high confidence). Risks and projected adverse impacts and related losses and damages from climate change escalate with every increment of global warming (very high confidence). Climatic and non-climatic risks will increasingly interact, creating compound and cascading risks that are more complex and difficult to manage (high confidence).”** The *Washington Post* describes a key conclusion of the report:

“The world is likely to pass a dangerous temperature threshold within the next 10 years, pushing the planet past the point of catastrophic warming — unless nations

drastically transform their economies and immediately transition away from fossil fuels, according to one of the most definitive reports ever published about climate change.”*** The *Wall Street Journal* emphasizes challenges to avoiding that threshold: “A United Nations panel of scientists said there is a ‘feasible, but narrow pathway’ to avoid the worst effects of climate change, however to do so, the world’s nations must together cut greenhouse-gas emissions 60% by 2035 to limit warming to 1.5 degrees Celsius over preindustrial levels. That level of cuts would require a massive and rapid shift in the world’s energy supply that is under way in some countries, but has been stifled by the war in Ukraine, the global energy crisis and thirst for economic growth in countries like China and India.” **** Elizabeth Kolbert, writing in *The New Yorker* just one week after approval of the Willow project, echoes the pessimism: “Even under a best-case scenario, with global greenhouse-gas emissions declining both quickly and dramatically, ‘warming is *more likely than not* to reach 1.5° C,’ the report states. ...But to imagine at this point that the latest warning from the I.P.C.C. will spur action, when so many previous ones have failed to, requires not just hope but, it would seem, something close to delusion.” *****

*Fiona Harvey, [“What is the IPCC AR6 synthesis report and why does it matter?”](#) *The Guardian*, March 19, 2023.

**IPCC 2023, [Summary for Policymakers](#), p. 14, In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

***Sarah Kaplan, [“World is on brink of catastrophic warming, U.N. climate change report says.”](#) *Washington Post*, March 20, 2023.

****Eric Niiler, [“Time Is Running Out to Curb Climate Change, IPCC Report Says.”](#) *Wall Street Journal*, March 20, 2023.

*****Elizabeth Kolbert, [“The U.N. Issues a Final Warning on the Climate—and a Plan.”](#) *The New Yorker*, March 20, 2023.

2023 (March)

Focus evolves on environmental and social costs of minerals mining for green technology

It has become increasingly clear that mining for materials necessary for massive production of electric vehicles and other technologies to reduce greenhouse gas emissions is not without its own environmental as well as human costs. *The Guardian* reports that an investigation by the international wildlife charity Fauna & Flora, “adds to the growing controversy that surrounds proposals to sweep the ocean floor of rare minerals that include cobalt, manganese and nickel. Mining companies want to exploit these deposits – which are crucial to the alternative energy sector – because land supplies are running low, they say. However, oceanographers, biologists and other researchers have warned that these plans would cause widespread pollution, destroy global fish stocks and obliterate marine ecosystems.”* *The Energy Mix* reports that a “new report chalks out pathways for the United States to heavily reduce the amount of mined lithium it needs to decarbonize transportation

and sidestep ‘irreversible harms’ to water, air, and animal habitats—especially near Indigenous lands.”** Marx Itabelo Lwabanya, and James Huang argue in *Scientific American* that climate policies of the World Bank and President Biden “increase the demand for the raw materials to make green technology, particularly a key ingredient: the mineral cobalt. The [Democratic Republic of Congo] produces more than 70 percent of the world’s cobalt, which has to be mined through intensive labor efforts that often go unregulated. And while a World Bank report acknowledged greater transparency is needed in the mining industry to ensure economic equity, it did not discuss the vast health disparities currently being driven by policies like Biden’s that are meant to better the environment.”*** In discussing *The Limits to Growth* [1972] and the contemporary “degrowth” movement, Bill McKibben asks: “Shouldn’t we make an all-out push for electric vehicles, heat pumps, and cooktops, not to mention solar panels and wind turbines to supply the necessary electricity? The degrowth movement’s answer is, at the least, a muted no. A green-energy boom, the Canadian journalist Andrew Nikiforuk wrote, would come with ‘monstrous ecological costs,’ because of the mining for the minerals needed to produce and use electricity at the required scale. He cited the energy ecologist Vaclav Smil, who recommends that we return ‘to living standards of the 1960s’ so that we can ‘consume less, travel less, build less, eat less wastefully.’” ****

*Robin McKie, “Deep-sea mining for rare metals will destroy ecosystems, say scientists,” *The Guardian*, March 26, 2023; Flora & Fauna, [“Fauna & Flora Deep Sea Mining Report - update March 2023.”](#) March 27, 2023.

**Christopher Bonasia, [“U.S. can shift to EVs without widespread, destructive mining, report finds.”](#) *The Energy Mix*, February 10, 2023; Thea Riofrancos et al., [“Achieving Zero Emissions with More Mobility and Less Mining.”](#) Climate + Community Project, University of California Davis, January, 2023.

*** Marx Itabelo Lwabanya, and James Huang, [“Efforts to Slow Climate Change Could Inadvertently Create Humanitarian Crises.”](#) *Scientific American*, December 1, 2023; see also, Katharine Houreld and Arlette Bashizi, [“Despite reforms, mining for EV metals in Congo exacts steep cost on workers.”](#) *Washington Post*, August 4, 2023.

****Bill McKibben, [“To Save the Planet, Should We Really Be Moving Slower?”](#) *The New Yorker*, July 5, 2023.

2023 (April)

Biden administration announces proposed vehicle emission standards, estimated to

avoid nearly 10 billion tons of CO2 emissions

The announcement of the notice of proposed rulemaking projects wide-ranging impacts from the boldest approach to U.S. vehicle emissions in history. These rules are pollution controls issued under the Clean Air Act, as distinct from the fuel efficiency rules issued in 2021. [2021(December)] The rules once enacted “will accelerate the ongoing transition to a clean vehicles future and tackle the climate crisis. The proposed standards would improve air quality for communities across the nation, especially communities that have borne the burden of polluted air. Together,

these proposals would avoid nearly 10 billion tons of CO2 emissions, equivalent to more than twice the total U.S. CO2 emissions in 2022, while saving thousands of dollars over the lives of the vehicles meeting these new standards and reduce America's reliance on approximately 20 billion barrels of oil imports.”* Coral Davenport of the *New York Times* describes the historic impact of these rules: “The new rules would require nothing short of a revolution in the U.S. auto industry, a moment in some ways as significant as the June morning in 1896 when Henry Ford took his ‘horseless carriage’ for a test run and changed American life and industry.” Davenport explains how the rules will work to vastly increase the percentage of all-electric vehicles sold in the United States, which now stands at 5.8 percent of new cars and fewer than 2 percent of new heavy trucks: “The E.P.A. cannot mandate that carmakers sell a certain number of electric vehicles. But under the Clean Air Act, the agency can limit the pollution generated by the total number of cars each manufacturer sells. And the agency has set that limit so tightly that the only way manufacturers can comply is to sell a certain percentage of zero-emissions vehicles. Each model year that the rule is in effect, car companies will report to the federal government the average greenhouse emissions of all new cars sold. Companies that fall short of the standard could be penalized in different ways, including fines of billions of dollars.” ** The proposed rules now go out to public comment, finalization and undoubted litigation. The *Wall Street Journal's* Editorial Board's reaction suggests a rough road ahead: “The U.S. auto industry is nominally still privately owned, but it is slowly becoming a de facto state-directed utility. That's the meaning of the Environmental Protection Agency's proposed new vehicle-emissions standards Wednesday that will force-feed the production of electric vehicles, whether or not consumers want them.” ***

*U.S. Environmental Protection Agency news release, [“Biden-Harris Administration Proposes Strongest-Ever Pollution Standards for Cars and Trucks to Accelerate Transition to a Clean-Transportation Future.”](#) April 12, 2023.

**Coral Davenport, [“E.P.A. Lays Out Rules to Turbocharge Sales of Electric Cars and Trucks.”](#) *New York Times*, April 12, 2023.

***Editorial Board, [“Biden's EPA Remakes the Auto Industry.”](#) *Wall Street Journal*, April 12, 2023.

2023 (April)

The European Union approves the world's first carbon tax on imports

The EU has an Emissions Trading System, which requires manufacturers to buy permits for their carbon dioxide emissions. The costs of the permits raise the cost of EU goods in international markets, in comparison to goods from countries that don't impose fees on carbon emissions. To level the playing field and encourage carbon pricing mechanisms around the world, the EU created the Carbon Border Adjustment Mechanism, or CBAM, imposing a tariff on imports from countries that

don't impose carbon fees in the production of those imports. The tariffs will begin in October on steel and fertilizer and expand over time. As Manuela Andreoni writes in the *New York Times*, "It didn't get a lot of attention, but it's a big deal because these kinds of tariffs could be very effective in reducing the industrial carbon dioxide emissions that are heating the planet to dangerous levels. It's a potentially powerful incentive for countries to curb emissions. But it's also a risky move in some ways because it could disrupt global trade and have an outsize effect on poorer countries." * The *Wall Street Journal* Editorial Board warns that "trade is becoming the next battlefield in the climate wars and it will be a bloody one. Foreign companies and governments have raised concerns about the European carbon border tax, which imposes complex and costly compliance burdens and then imposes steep default tariffs on companies that don't play along. China and India are in the crosshairs of this border tax, although companies from any country that doesn't impose emissions taxes will have to pay. That includes U.S. firms." The editors conclude: "The European Union has a penchant for racking up firsts that should have stayed 'nevers' and the latest example is the world's first carbon tariff." **

*Manuela Andreoni, [Climate Forward newsletter](#), *New York Times*, April 25, 2023.

**Editorial Board, ["Carbon Tariff Wars Arrive."](#) *Wall Street Journal*, April 20, 2023.

2023 (April)

Supreme Court gives a green light to state and local lawsuits against fossil fuel companies in state courts

Commencing six years ago and inspired by revelations about Exxon's failure to disclose to the public its own science confirming the risks of climate change, numerous states and municipalities have initiated lawsuits for climate damages against fossil fuel companies including ExxonMobil, Shell, and Chevron, for money damages from climate change. They contend that the companies created public and private nuisances and violated state consumer protection statutes. The defendants have fought to transfer the cases to federal courts, concluding they would be a more favorable forum, and arguing that issues concerning greenhouse gases were "inherently federal." Thus far five federal circuit courts of appeal have turned down requests for transfer. On April 25, the Supreme Court denied, with only Brett Kavanaugh dissenting, petitions for review of decisions declining to transfer to federal court claims by Rhode Island, the cities of Baltimore, Honolulu, and Imperial Beach, California, and counties in California and Hawaii. The Biden administration had weighed in, supporting the plaintiffs' desire to stay in state courts and reversing the position taken by the Trump administration. The decision did not address the merits of the claims, and the likely next step will be litigating motions to dismiss the cases.*

*Emma Ricketts, [“Supreme Court Declines to Hear Appeals From Fossil Fuel Companies in Climate Change Lawsuits.”](#) *Inside Climate News*, April 25, 2023; Hilary Beaumont, [“‘Like a dam breaking’: experts hail decision to let US climate lawsuits advance.”](#) *The Guardian*, April 25, 2023.

2023 (April)

Extreme East African drought attributable to climate change, study finds.

Through 2020 and 2022 and continuing into 2023, East Africa sustained the worst drought in 40 years. As described by World Weather Attribution, an NGO dedicated to quantifying how climate change influences the intensity and likelihood of extreme weather events, “The drought has led to substantial harvest failure, poor pasture conditions, livestock losses, decreased surface water availability and human conflicts, leaving 4.35 million people in need of humanitarian assistance. At least 180,000 refugees from Somalia and South Sudan crossed into the drought-stricken areas of Kenya and Ethiopia.” Scientists from Kenya, Mozambique, South Africa, the United States of America, the Netherlands, Germany and the United Kingdom collaborated through World Weather Attribution to assess whether climate change significantly contributed to the likelihood of this massive and enduring drought. Their conclusions: “the combination of low rainfall and high evapotranspiration as unusual as the recent conditions would not have led to drought at all in a 1.2°C cooler world...In today’s climate the same event is now classified as an exceptional drought, with major crop and pasture losses and widespread water shortages. This change in drought severity is primarily due to the strong increase in evaporative demand caused by higher temperatures. Climate change has made events like the current drought much stronger and more likely; a conservative estimate is that such droughts have become about 100 times more likely.”*

*Joyce Kimutai, et al., [“Human-induced climate change increased drought severity in Horn of Africa.”](#) World Weather Attribution, April 27, 2023; Sarah Kaplan, [“Climate change caused catastrophic East Africa drought, scientists say.”](#) *Washington Post*, April 27, 2023.

2023 (May)

Biden Administration Department of Energy permit approval for a major new liquified natural gas export terminal in Alaska spurs concern about climate impacts

The permit is described by a DOE official who spoke on condition of anonymity to *Politico* as a “purely technical” permit which did not address the merits of the proposal. If otherwise approved, the permit would allow the export of liquified natural gas (LNG) from this facility on the south coast of Alaska to most countries

around the world. LNG is emerging as a contentious issue for the Biden administration, setting economic and diplomatic advantages against climate goals. As reported in *Politico*, “the country’s role as the world’s top natural gas producer has become a bright spot for the U.S. economy and a lifeline for allies in Europe and Asia, especially amid the disruptions caused by Russia’s war on Ukraine,” but “environmental groups point to estimates from the Energy Department that the project would spew the equivalent of 1.5 billion tons of carbon dioxide into the atmosphere over its 30-year lifetime, even if it uses carbon capture technology. That’s akin to burning more than 8 million rail cars full of coal.” * A week later, 44 congressional Democrats send a letter to the White House Council on Environmental Quality demanding greater scrutiny on how LNG gas projects impact climate change. They raise concerns about methane leakage during the transit process as well as environmental justice, noting that “Existing LNG infrastructure already has a disproportionate impact on Black, Brown, Indigenous, and poor communities; this will only be exacerbated with the addition of the proposed projects.”** The *Washington Post* reports that the letter comes “as the United States is poised to overtake Australia as the world’s biggest LNG exporter this year.”*** In September, Bill McKibben will publish an analysis of the climate risks of the rapid build out of LNG facilities in the *New Yorker*, described in his newsletter as “what might be the next—and perhaps the ultimate—big battle with the fossil fuel industry.” As McKibben relates, since the U.S. fracking explosion, the industry is “in an all-out sprint to get it to market as fast as they can, mostly by exporting it around the world. In the U.S., there are already seven giant LNG export terminals, and there are plans for at least twenty more, mostly along the Gulf of Mexico in Louisiana and Texas, which are close by the giant gas fields of the Permian Basin. If this buildout continues, and if you counted the emissions from this gas against America’s totals, it would mean that American greenhouse gas emissions would not have budged since 2005. Under the arcane rules of global carbon accounting, exported hydrocarbons don’t count against our total—they’re the problem of the country that eventually burns them (in this case mostly in Asia). But the atmosphere doesn’t care; once burned, the carbon quickly disperses around the globe, heating the entire planet.” **** McKibben cites peer reviewed research from scientists from Harvard, Duke and NASA concluding that the life-cycle climate impact of natural gas is at least as bad as coal.***** In October, Cornell University professor Robert Howarth will post an analysis, pending peer review, concluding that emissions from LNG exports, including leakage in transit, have substantially *more* climate impact than domestically produced coal. Energy In Depth, a project of the Independent Petroleum Association of America, will call Howarth an “activist researcher,” and criticize his “fast-and-loose updating and re-updating” of the analysis.*****

*Ben Lefebvre, “[Another big Alaska fossil fuel project gets Biden team’s blessing.](#)” *Politico*, May 1, 2023.

**[Letter](#) to Brenda Mallory, Chair, Council on Environmental Quality, from Jeffrey A. Merkley et al., May 8, 2023.

***Maxine Joselow, “[The Climate 202 Newsletter.](#)” *Washington Post*, May 8, 2023.

****Bill McKibben, [“It seems like the next big fight.”](#) *The Crucial Years* newsletter, September 25, 2023; Bill McKibben, [“The Biden Administration’s Next Big Climate Decision.”](#) *The New Yorker*, September 22, 2023. See also, Maxine Joselow and Timothy Puko, [“The next front in the climate fight: U.S. exports of natural gas.”](#) *Washington Post*, October 17, 2023.

*****Hiroko Tabuchi, [“Leaks Can Make Natural Gas as Bad for the Climate as Coal, a Study Says.”](#) *New York Times*, July 13, 2023; Deborah Gordon, et al., [“Evaluating net life-cycle greenhouse gas emissions intensities from gas and coal at varying methane leakage rates.”](#) *Environmental Research Letters*, volume 18, number 8, July 17, 2023.

*****Robert Howarth, [“The Greenhouse Gas Footprint of Liquefied Natural Gas \(LNG\) Exported from the United States.”](#) October 24, 2023, revised January 13, 2024; see also, Bill McKibben, [“A Smoking Gun for Biden’s Big Climate Decision?”](#) *The New Yorker*, October 31, 2023; Mandi Risko, [“Guess Who’s Back \(Back Again\): Researcher Once Again Relies on Debunked Research to Make Same Incorrect Lifecycle Emissions Claims.”](#) *Energy In Depth*, January 26, 2024.

2023 (May)

Four studies target the problem of methane leakage

Far too much of global warming in the short term is the result of completely avoidable leakage of methane, rather than carbon dioxide emissions from burning fossil fuels. [2016 (May, October, November); 2017 (May); 2018 (June, September); 2019 (August); 2020 (August); 2021 (May, September)]. And not enough attention has been paid to methane leakage from oil and gas facilities around the world. A *Guardian* report in March used satellite data to reveal that “More than 1,000 ‘super-emitter’ sites gushed the potent greenhouse gas methane into the global atmosphere in 2022.” The worst single leak was a leak of 427 tonnes an hour in August, near Turkmenistan’s Caspian coast, which spewed the pollution “at a rate equivalent to 67m running cars.”* The firm Kayrros was then commissioned by the *Guardian* for a follow-up investigation of two major oil and gas fields in Turkmenistan. Comments Antoine Rostand, the president of Kayrros, on the findings: “Methane is responsible for almost half of short-term [climate] warming and has absolutely not been managed up to now – it was completely out of control.” Together, the two fields released “emissions equivalent to 366m tonnes of CO₂ in 2022, more than the UK’s annual emissions, which are the 17th-biggest in the world.” Turkmenistan is the second biggest supplier of natural gas to China, after Australia.** Meanwhile a study in *Nature Energy* of the approximately 14,000 unplugged, non-producing wells in US Gulf of Mexico offshore waters, inland waters and wetlands estimates that it would cost \$30 billion to plug them to minimize the risk of uncontrolled leakage. If the current owners of these wells do not plug them, liability falls on the original owners, and the study found that “88% of outstanding [“plugging and abandoning”] liability in federal waters “is associated with wells currently or formerly owned by one of the large, financially stable ‘supermajor’ companies.”*** Lastly a study of municipal landfills across the United States concludes that far more needs to be done to control methane leakage from those facilities, which account for 14% of all U.S.

methane leakage according to the EPA greenhouse gas inventory. *Inside Climate News* reports: “In 2021, U.S. municipal waste landfills released 3.7 million metric tons of methane. That is equal to the annual greenhouse gas emissions of 66 million gas powered cars or 79 coal fired power plants, the EPA’s greenhouse gas equivalency calculator shows.” And those figures are likely a large underestimation. The study was led by the Environmental Integrity Project, which sued the EPA in 2022 for failing since 1988 to update its methods for assessing landfill emissions as required by the Clean Air Act, “despite knowing since at least 2008 that they were relying on flawed methods that tend to underestimate emissions.”**** [2023 (December)]

*Damian Carrington, [“Revealed: 1,000 super-emitting methane leaks risk triggering climate tipping points.”](#) *The Guardian*, March 6, 2023.

**Damian Carrington, [“‘Mind-boggling’ methane emissions from Turkmenistan revealed.”](#) *The Guardian*, May 9, 2023.

***Mark Agerton, et al., [“Financial liabilities and environmental implications of unplugged wells for the Gulf of Mexico and coastal waters.”](#) *Nature Energy*, 8, 536–547, May 8, 2023; Hiroko Tabuchi, [“Price to Plug Old Wells in Gulf of Mexico? \\$30 Billion, Study Says.”](#) *New York Times*, May 8, 2023.

****Phil McKenna and Amy Green, [“Federal Regulations Fail to Contain Methane Emissions from Landfills.”](#) *Inside Climate News*, May 18, 2023; Preet Bains, et al., [“Trashing the Climate: Methane from Municipal Landfills.”](#) Environmental Integrity Project, May 18, 2023.

2023 (May)

Biden Administration releases proposed rules for existing fossil fuel burning power plants, the nation’s second largest source of greenhouse gases

After being sent back to the drawing board by the Supreme Court in the highly controversial *West Virginia v. EPA* decision [2022 (June)], and following more than a decade of wrestling back and forth in the endeavor to regulate power plant greenhouse gas emissions [2012 (March), 2014 (June), 2015 (August), 2016 (February, October), 2017 (March, October), 2018 (August), 2019 (June)], President Biden’s EPA throws down a new ambitious, but still measured, gauntlet. As described by Timothy Puko in the *Washington Post*, “To bolster its chances in court, and ease any risk to reliability or consumers, the rules tighten emissions limits at each individual unit — a long-accepted approach under the Clean Air Act — and phase in gradually, with many of the most aggressive requirements coming only in the 2030s. The standards do not require specific types of technology, but instead set limits so stringent that fossil-fuel-burning plants would probably have to use new carbon-capture systems or switch to other fuels such as hydrogen to comply.”* Arianna Skibell notes in *Politico*: “No commercial power plants in the United States use carbon capture now, but EPA views the technology as ready to go... And Biden’s landmark climate law, the Inflation Reduction Act, offers generous tax credits for

companies that capture their carbon pollution. Still, there's no guarantee the proposal will survive the coming attacks from fossil fuel proponents. West Virginia Attorney General Patrick Morrisey, who led the charge against the Obama rule, said his office is prepared for the next fight.”** *Inside Climate News*' analysis notes: “Large categories of coal and natural gas power plants—those that are going to close soon, or are small, or only run intermittently—will not face new requirements at all...Large natural gas plants have until 2035 or 2038 to equip themselves with carbon capture and other technology to cut emissions 90 percent. That suggests the U.S. won't make it to Biden's goal of 100 percent carbon-free electricity by 2035 on this rule alone, even if it survives all of the challenges that the industry and states are preparing to launch.”*** An opinion by a Washington based energy lawyer William Scherman in the *Wall Street Journal* argues that reliance on unproven hydrogen and carbon capture technologies will lead to unreliable power: “We all hope for a cleaner energy future. But that will take time and thoughtful planning. It will take bipartisan support, not radical proposals. Whatever lofty goals the EPA has, they won't keep us warm at night when the heat goes off.” **** *Politico* reports that the EPA has so far received 17 permit applications for carbon capture projects, and has only processed two of them. It aims to transfer the permit approval process to the states, which may not be equipped to adequately review them for safety. “Some climate activists — who've long claimed that carbon capture is merely a way to perpetuate a fossil-fuel economy — say the lack of regulatory apparatus is a sign of rushed decision-making. And they say it could put low-income residents and communities of color at risk, despite the Biden administration's pledges to address historical disparities in how environmental burdens are distributed.” ***** [see 2018 (October), 2023 (August), 2023 (November) on carbon capture] The rules are open for public comment, possible revision, and undoubted litigation upon finalization.

*Timothy Puko, [“The U.S. is taking a giant step toward meeting its climate goal.”](#) *Washington Post*, May 11, 2023.

**Arianna Skibell, [“Can Biden's newest climate rule survive?”](#) *Politico*, April 24, 2023.

***Marianne Lavell and Nicholas Kuznetz, [“Biden Power Plant Plan Gives Industry Time, Options for Cutting Climate Pollution.”](#) *Inside Climate News*, May 11, 2023.

****William Scherman, [“The EPA Threatens to Turn Out the Lights.”](#) *Wall Street Journal*, May 18, 2023.

*****Ben Lefebvre and Zack Colman, [“A crucial climate technology provokes fears in oil country.”](#) *Politico*, May 16, 2023; see also, on hydrogen and ammonia as carbon-free fuels, Katherine Bourzac, [“Carbon-free fuels could have a dark side.”](#) *Science News*, November 15, 2023.

2023 (June)

State Farm will not accept applications for new insurance in California

Coming on the heels of astronomical global and U.S. insurance losses in 2021 and 2022 [2021 (December), 2022 (December)], the largest issuer of homeowners insurance in California announces it is pulling out because of “rapidly growing catastrophe exposure.” The *New York Times* reports that Michael Soller, a spokesman for the California Department of Insurance, “said the agency was working to address the underlying factors that have caused disruption in the insurance industry across the country and around the world, including the biggest one: climate change....But Tom Corringham, a research economist with the Scripps Institution of Oceanography at the University of California San Diego who has studied the costs of natural disasters, said that allowing people to live in homes that are becoming uninsurable, or prohibitively expensive to insure, was unsustainable. He said that policymakers must seriously consider buying properties that are at greatest risk, or otherwise moving residents out of the most dangerous communities.” * This follows an announcement that Allstate, the state’s fourth largest homeowners insurer, would stop issuing new policies, and later four smaller companies join the exodus.** Most large homeowners insurance companies have also pulled out of Florida.***

*Christopher Flavelle, Jill Cowan and Ivan Penn, [“Climate Shocks Are Making Parts of America Uninsurable. It Just Got Worse,”](#) *New York Times*, May 31, 2023.

**Dicon Hyatt, [“The Costs Of Climate Change Are Already Here: In Your Homeowners Insurance Bill.”](#) December 26, 2023.

***Ryan Mac, [“Allstate Is No Longer Offering New Policies in California.”](#) *New York Times*, June 4, 2023.

2023 (June)

Oregon federal trial judge accepts amended complaint in groundbreaking youth climate suit, *Juliana v. United States*, but the Biden Administration continues to resist

District Court Judge Ann Aiken, who had in 2016 denied a motion to dismiss this suit challenging the federal government’s failure to address climate change [2016 (April)] but whose decision was overruled in the 5th Circuit Court of Appeals [2020 (January)], approved the plaintiffs’ motion to amend their complaint. In the amended complaint, the plaintiffs dropped their claims for an injunction against federal policies that enable climate change, such as licensing oil and gas development, and limit their claims to a declaratory judgment that the failure of the federal government to effectively mitigate climate change is a violation of the Constitution. In approving the amended complaint Judge Aiken concluded, “It is a foundational doctrine that when government conduct catastrophically harms American citizens, the judiciary is constitutionally required to perform its independent role and determine whether the challenged conduct, not exclusively

committed to any branch by the Constitution, is unconstitutional.”* Julia Olson, lead counsel for the youth plaintiffs, stated: “Today’s ruling from Judge Aiken is our legal system working the way it should: a fair and well-reasoned application of the law in a vitally important constitutional case where children’s lives are at stake. These young people have a right to access their courts and, after several long years, finally have their evidence of climate harm caused by their own government—and how to stop it—heard in open court. Attorney General Garland should treat this like the urgent constitutional case that it is by litigating the case on its merits and presenting their arguments in the light of day at trial, rather than once again seeking to push this case into the dark corners of the shadow docket.”** The Biden Administration, however, will follow the strategies of the Trump Administration in seeking to delay or dismiss this suit, filing first a request for an extension of time to answer it, then a motion to stay proceedings pending a new petition for writ of mandamus to the 9th Circuit Court of Appeals.***

*Yale Environment 360, [“Youth Climate Lawsuit Against Federal Government Headed for Trial.”](#) E360 Digest, June 2, 2023.

**Press Release, [“Judge Rules in Favor of Juliana v. United States Youth Plaintiffs; Children’s Constitutional Climate Case Can Proceed to Trial.”](#) Our Children’s Trust, June 2, 2023.

***Our Children’s Trust, [“Juliana v. United States, Major Moments Timeline.”](#) accessed February 2, 2024.

2023 (June)

President Biden signs into law the Fiscal Responsibility Act of 2023, including the most substantive amendments to the National Environmental Policy Act since enactment in 1969

For the Biden administration, it was a Faustian bargain: accept language that might, depending on judicial interpretation, weaken environmental reviews of major oil and gas projects with climate related risks, to avoid a fiscal meltdown. The “FRA” completes a bipartisan agreement to suspend the public debt limit until 2025. The law firm of Perkins Coie notes that with the NEPA amendments built into the debt ceiling bill, “The FRA effectively codifies many of the regulations that the Council on Environmental Quality (CEQ) promulgated in 2020 during the Trump administration.” As summarized by Perkins Coie, “The law amends the basic requirements for an environmental impact statement (EIS) [under NEPA]. It provides that an EIS must consider the ‘reasonably foreseeable environmental effects of the proposed agency action’ and analysis of a ‘reasonable range’ of alternatives that are ‘technically and economically feasible’ and meet the purpose and need of the proposed action. ...As part of the alternatives analysis, the agency is also now required to consider ‘any negative environmental impacts of not

implementing the proposed agency action in the case of a no action alternative,’ which effectively emphasizes the benefits of the agency action by focusing on the negative effects of not implementing the proposed action...The Section 107 amendments also require that lead agencies prescribe procedures for project sponsors to prepare an EA or EIS under agency supervision.” * [1970 (NEPA), and redlined text in note] EarthJustice summarizes the impact of these and other NEPA changes built into the FRA: “For too long Republicans have used NEPA as a scapegoat for project delays, omitting their own complicity in leaving the agencies tasked with completing environmental reviews largely underfunded. This deal would codify provisions that Republicans hostile to NEPA have sought for years.”** On July 31, the Biden administration issued proposed rules for implementing the NEPA amendments. Public comment closed on September 29. Final regulations have not been issued as of year-end 2023.***

*Perkins Coie LLP, “[Substantive NEPA Amendments in the Debt Ceiling Bill.](#)” June 8, 2023; [Fiscal Responsibility Act of 2023](#), H.R. 3746, Title III, Sec. 321; [redline text showing original and 2023 changes.](#)

**Raul Garcia, “[What You Need to Know About the Debt Ceiling and Its Impacts on the Economy and the Environment.](#)” *EarthJustice*, May 31, 2023.

***Hannah Perls, “[Key Changes in CEQ’s Proposed Phase 2 Regulations Implementing NEPA.](#)” Environmental & Energy Law Program, Harvard Law School, August 23, 2023; updates will be posted on the [NEPA Environmental Review Requirements Regulatory Tracker.](#)

2023 (June)

The pursuit of fusion hits a long and rocky road

While a breakthrough in U.S. fusion research was acclaimed last year [2022 (December)], *Scientific American* reports that the world’s largest fusion project is in “big trouble:” “It could be a new world record, although no one involved wants to talk about it. In the south of France, a collaboration among 35 countries has been birthing one of the largest and most ambitious scientific experiments ever conceived: the giant fusion power machine known as the International Thermonuclear Experimental Reactor (ITER). But the only record ITER seems certain to set doesn’t involve ‘burning’ plasma at temperatures 10 times higher than that of the sun’s core, keeping this ‘artificial star’ ablaze and generating net energy for seconds at a time or any of fusion energy’s other spectacular and myriad prerequisites. Instead ITER is on the verge of a record-setting disaster as accumulated schedule slips and budget overruns threaten to make it the most delayed—and most cost-inflated—science project in history.” Journalist Charles Seife, director of the Arthur L. Carter Institute of Journalism at New York University, details delays, overruns, and concerns over employee safety in documents he received pursuant to the U.S. Freedom of Information Act. He concludes: “the project is now entering its third generation of

planning and construction, and its important experiments are at least another generation away. ITER has become the Gothic cathedral of our time: a beautiful but immensely complex structure that we pray will help us find salvation from our energy and climate woes.”*

*Charles Seife, [“World’s Largest Fusion Project Is in Big Trouble, New Documents Reveal.”](#) *Scientific American*, June 15, 2023; [ITER website](#).

2023 (July)

July 6 gives every appearance of being the hottest day in human history

The University of Maine’s Climate Reanalyzer website was one of the first unofficial sources to draw attention to the record breaking temperatures emerging around the world during that week.* State climatologist and UMaine assistant professor Sean Birkel, who built the Climate Reanalyzer in 2012, described to *The Climate Monitor* the major drivers of this unprecedented heat: “a sluggish atmospheric circulation, linked to record-high sea surface temperatures in the North Atlantic and the onset of an El Niño in the Pacific, is helping drive this increase. It's tied not just to the hot weather, but to humidity, wildfires and more.”** By early August, the Copernicus Climate Change Service will confirm that July was globally the hottest month on record.*** Bill McKibben, writing in *The New Yorker*, explains why many scientists believe July 6 was the hottest day *in human history*: “Since 1979, a global network of satellites, ocean buoys, and land stations has been recording average daily temperatures, measured two metres above the ground, around the world. We’re at the very start of what seems likely to be a major El Niño warming event; the previous global high temperature came at the height of the El Niño in 2016, when the average hit 16.92 degrees Celsius, or 62.45 degrees Fahrenheit. Estimates vary somewhat, but on July 3rd the average temperature reached 17.01 C, and three days later it hit 17.23 C, or 63.01 F. Scientists who calculate historic temperatures by examining proxy records, such as lake sediments or ice cores, believe that this may well be the hottest it’s been on Earth since at least the peak of an era known as the Eemian, a hundred and twenty-five thousand years ago, when rising temperatures pushed mastodons north from present-day Texas to the Yukon. This would mean that nothing even remotely resembling a human civilization has ever known a world this hot.”**** Professor Ivan Fernandez of the UMaine Climate Change Institute comments to *The Climate Monitor* in early August: “‘I would argue it's not as much of a concern that we broke a record, it's that we're breaking more records more frequently, which tells us the whole system is adrift.’ The upshot, Fernandez said, is

that Mainers should savor this week's cool summer temperatures while they last — because ‘we're on the cool end of the 21st Century.’”**

*Seth Borenstein and Isabella O'Malley, [“Earth hit an unofficial record high temperature this week – and stayed there.”](#) *APNews*, July 6, 2023.

**Annie Ropeik, [“UMaine's surprising role in recording July's extreme heat.”](#) *The Climate Monitor* newsletter, August 4, 2023.

***Nadeem Badshah, [“July was world’s hottest month on record, climate scientists confirm.”](#) *The Guardian*, August 8, 2023.

****Bill McKibben, [“Big Heat and Big Oil.”](#) *The New Yorker*, July 16, 2023.

2023 (July)

The Biden EPA launches three grant competitions to make \$27 billion available for green energy, particularly in disadvantaged communities

Maxine Joselow in the *Washington Post* calls the “green bank,” or Greenhouse Gas Reduction Fund, established by the Inflation Reduction Act [2022 (August)] “arguably one of the least understood and most impactful programs in the climate law.” * EPA administrator Michael Regan announced the first of the three grant competitions in June. “Solar for All,” is intended to facilitate residential solar for low income and working families: “For too long, overburdened communities on the front lines of the climate crisis have been left behind and locked out of clean energy investments and climate solutions. Thanks to President Biden’s Investing in America agenda, this historic boost in solar investments will advance millions of residential solar projects nationwide, protect people and the planet, deliver environmental justice, save families money, and create good-paying jobs. All communities deserve to participate in America’s growing clean energy economy and under this competition, we will bring more communities along, working together to build a healthier and cleaner future for all.”** Two remaining grant competitions were announced on July, as summarized by the *Washington Post*: “The \$14 billion National Clean Investment Fund will provide grants to two or three “national clean financing institutions,” which will partner with the private sector to finance tens of thousands of clean-energy projects, the EPA said. At least 40 percent of the funds will go to low-income and disadvantaged communities. The \$6 billion Clean Communities Investment Accelerator will provide grants to two to seven ‘hub nonprofit organizations’ that will provide funding and technical assistance to community lenders, the agency said. All of the funds will go to low-income and disadvantaged communities.” Political opposition and tight deadlines challenge the fulfillment of these programs. House Republicans have proposed to rescind nearly \$7.8 million from the green bank, and Rep. Gary Palmer (R-Ala.) has called it a “taxpayer-funded \$27 billion slush fund” that lacks accountability and oversight.”*

The Inflation Reduction Act requires the \$27 billion to be paid out by September, 2024, or returned to Congress.***

*Maxine Joselow, [“EPA unveils \\$20 billion to finance the fight against climate change.”](#) The Climate 202 newsletter, *Washington Post*, July 14, 2023.

**Environmental Protection Agency news release, [“Biden-Harris Administration Launches \\$7 Billion Solar for All Grant Competition to Fund Residential Solar Programs that Lower Energy Costs for Families and Advance Environmental Justice Through Investing in America Agenda.”](#) June 28, 2023.

***Maxine Joselow, [“The EPA is racing to spend \\$27 billion the GOP wants to repeal.”](#) The Climate 202 newsletter, *Washington Post*, July 5, 2023.

2023 (July)

Study concludes collapse of the AMOC current will come sooner than previous estimates

Publishing in the journal *Nature Communications*, Peter Ditlevsen and Susanne Ditlevsen, of the Niels Bohr Institute, University of Copenhagen, note that “The Atlantic meridional overturning circulation (AMOC) [2018 March, 2021 (February)] is a major tipping element in the climate system and a future collapse would have severe impacts on the climate in the North Atlantic region.” While the IPCC has estimated that full collapse will not come until the end of the 21st century under current emissions projections, the authors, with “statistical significance and data-driven estimators for the time of tipping,” “estimate a collapse of the AMOC to occur around mid-century under the current scenario of future emissions.” To be more precise, “we show that a transition of the AMOC is most likely to occur around 2025-2095 (95% confidence interval).” * The *Guardian* quotes lead author Peter Ditlevsen: “I think we should be very worried... This would be a very, very large change. The AMOC has not been shut off for 12,000 years.” **Chelsea Harvey, writing for *Climatewire*, discusses the pros and cons of the approach these researchers took in estimating the timing of the future collapse based on sea surface temperatures in one region of the North Atlantic, and concludes that “there’s some evidence that the models may be underestimating the AMOC’s weakening. But that doesn’t mean the new study overturns the narrative.” But there’s high concern about the global consequences of the current shutting down: “Many studies predict a significant cooling over parts of Europe, ...potentially by as much as 5 or 10 degrees Celsius. Tropical rain belts might shift their positions, causing some regions to experience more droughts and others to suffer more floods...the North Atlantic may see a major increase in rising seas. If the AMOC can’t ferry large volumes of water around the world, the ocean may absorb less carbon dioxide from the atmosphere. Parts of the deep ocean may receive less oxygen. Marine ecosystems could change in ways scientists are still trying to understand. In short, there could be dramatic

consequences. But it's still a matter of debate whether those looming alterations could happen within the next few decades."***

*Peter Ditlevsen and Susanne Ditlevsen, [“Warning of a forthcoming collapse of the Atlantic meridional overturning circulation.”](#) *Nature Communications*, volume 14, number 4254, July 25, 2023.

**Damian Carrington, [“Gulf Stream could collapse as early as 2025, study suggests.”](#) *The Guardian*, July 25, 2023.

***Chelsea Harvey, [“Is a mega-ocean current about to shut down? 4 things to know.”](#) *E&E News, Climatewire*, July 28, 2023.

2023 (August)

Analysis concludes “planting a trillion trees” is no solution to climate change

In 2021, House Committee on Natural Resources Ranking Member Bruce Westerman (R-Ark.) joined Minority Leader Kevin McCarthy (R-Calif.) and 70 other representatives to introduce the

“Trillion Tree Act,” concluding that “Despite incredible improvements in technology, trees are still the most large-scale, cost-effective and environmentally-friendly carbon sequestration devices we have.” * While this was a step forward in acknowledging the reality of climate change and the need for congressional action, new analysis challenges the assumption that such a program would be effective. Maxine Joselow, writing in the *Washington Post*, reports on an analysis by John Sterman, a professor at the MIT Sloan School of Management, and Andrew P. Jones, executive director of the nonprofit Climate Interactive, which concluded, using a global climate simulator called En-ROADS, that planting a trillion trees would prevent only 0.15 degrees Celsius (0.27 Fahrenheit) of warming by 2100, and sequester only 6 percent of the carbon dioxide that the world needs to meet the goal of the Paris Climate Agreement. The problem is the long lag time for the trees to reach maturity and sequester sufficient carbon.** The study has not been peer-reviewed. It did not attempt to assess the investment involved in keeping the trees alive, particularly in a more hostile climate.***

*Press release, [“Westerman Leads Bipartisan Introduction of The Trillion Trees Act.”](#) U.S. Congressman Bruce Westerman, April 19, 2021.

** Maxine Joselow, [“Republicans want to plant a trillion trees. Scientists are skeptical”](#), *Washington Post*, August 2, 2023; Climate Interactive, [“The Washington Post Shared Our Analysis of A Trillion Trees - Here’s What’s Behind the Numbers.”](#) August 2, 2023.

***Fergus O’Sullivan and Linda Poon, [“The Darker Side of Tree-Planting Pledges.”](#) *Bloomberg CityLab*, July 30, 2021.

2023 (August)

The Heritage Foundation’s “battle plan” for the first 180 days of a Republican presidency includes decimating climate regulations and programs

Lisa Friedman in the *New York Times* describes Project 2025, as a “sweeping strategy” devised by the conservative thinktank the Heritage Foundation [1993, 2017 (October)] where “climate and energy provisions would be among the most severe swings away from current federal policies.” The Heartland Institute [2000, 2012 (May), 2020 (January), 2020 (July)] and the Competitive Enterprise Institute [2004 (August), 2016 (November)] and dozens of other conservative groups collaborated with the Heritage Foundation to create a nearly 1,000-page plan with a \$22 million budget. The plan includes repealing the Inflation Reduction Act [2022 (August)], closing a Department of Energy office that has \$400 billion in loan authority to fund emerging green technologies, “shredding regulations to curb greenhouse gas pollution from cars, oil and gas wells and power plants, dismantling almost every clean energy program in the federal government and boosting the production of fossil fuels — the burning of which is the chief cause of planetary warming.” Friedman adds: “Notably, it also would restart a quest for something climate denialists have long considered their holy grail: reversal of a 2009 scientific finding at the Environmental Protection Agency [2009 (December)] that says carbon dioxide emissions are a danger to public health.”* Paul Krugman observes: “the political force of this drive, and the likelihood that there will be no significant dissent from within the G.O.P. if Republicans do take the White House, has a lot to do with the way science in general and climate science in particular have become a front in the culture war...As recently as the mid-2000s, Republicans and Democrats had similar levels of trust in the scientific community. Since then, however, Republican trust has plunged as Democratic trust has risen; there’s now a 30-point gap between the parties.”** A Washington Post/University of Maryland poll later this month will confirm that Americans are deeply divided — along partisan lines — on whether climate change is helping to drive extreme weather events.***

*Lisa Friedman, [“A Republican 2024 Climate Strategy: More Drilling, Less Clean Energy.”](#) *New York Times*, August 4, 2023; Paul Dans, Spencer Chretien, and Troup Hemenway, [“Project 2025: Presidential Transition Project.”](#) The Heritage Foundation, 2023.

**Paul Krugman, [“Climate Is Now a Culture War Issue.”](#) *New York Times*, August 7, 2023.

*** Amudalat Ajasa, Scott Clement and Emily Guskin, [“Democrats and Republicans deeply divided on extreme weather, Post-UMD poll finds.”](#) *Washington Post*, August 23, 2023.

2023 (August)

Biden administration Department of Energy announces \$1.2 billion to advance the development of the first two commercial-scale direct air capture facilities

Direct air capture (DAC) is a variant of carbon capture technology [2023 (May), power plant rules] that removes carbon dioxide from the ambient air, rather than directly from carbon emitting facilities. The grants will support two planned “Hub” facilities, in Texas and Louisiana. The DOE announcement states that this “will be the world’s largest investment in engineered carbon removal in history and each Hub will eventually remove more than 250 times more carbon dioxide than the largest DAC facility currently operating.” The project is “expected to remove more than 2 million metric tons of carbon dioxide (CO₂) emissions each year from the atmosphere—an amount equivalent to the annual emissions from roughly 445,000 gasoline-powered cars—and create 4,800 good-paying jobs in Texas and Louisiana.” The Hubs will provide for “meaningful community and labor engagement and contribute to the President’s Justice40 Initiative, which set a goal that 40% of the overall benefits of certain federal investments, such as climate and clean energy, go to disadvantaged communities that have been marginalized and overburdened by pollution and underinvestment.” DOE Secretary Jennifer Granholm states that this emerging technology is essential to meeting climate goals: “Cutting back on our carbon emissions alone won’t reverse the growing impacts of climate change; we also need to remove the CO₂ that we’ve already put in the atmosphere—which nearly every climate model makes clear is essential to achieving a net-zero global economy by 2050.”**Popular Science* reports that the Texas facility will also receive substantial investment and oversight from 1PointFive, a subsidiary of Occidental, “a hydrocarbon and petrochemical manufacturer long considered to be one of 100 companies responsible for an estimated 71 percent of global emissions”: “While undoubtedly a positive development in carbon sequestration efforts, 1PointFive’s origins illustrate the complicated landscape governments and climate advocates must deal with in the face of such steep environmental stakes.”** [See UN Production Gap Report, 2023 (November)]

*U.S. Department of Energy press release, [“Biden-Harris Administration Announces Up To \\$1.2 Billion For Nation’s First Direct Air Capture Demonstrations in Texas and Louisiana.”](#) August 11, 2023.

**Andrew Paul, [“The US is investing more than \\$1 billion in carbon capture, but big oil is still involved.”](#) *Popular Science*, August 15, 2024.

2023 (August)

Our Children’s Trust wins the first U.S. climate rights trial in Montana lawsuit

In a legal proceeding initiated in 2011, *Held v. Montana*, part of Our Children’s Trust’s long standing effort to bring legal accountability to government’s failure to mitigate climate change [2016 (April), 2020 (January)], sixteen young citizens of Montana went to trial in June 2023. Their complaint relied on language in the

Montana state Constitution that guarantees residents “the right to a clean and healthful environment,” and declares that the state and individuals are responsible for maintaining and improving the environment “for present and future generations.” They challenged, among other provisions of Montana law, the Montana Environmental Policy Act, which forbids the State from considering the impacts of greenhouse gases or climate change in their environmental reviews, as well as “the aggregate acts the State has taken to implement and perpetuate a fossil fuel-based energy system.”* The *New York Times* quotes Michael Gerrard, director of the Sabin Center for Climate Change Law at Columbia Law School: “There have been almost no trials on climate change... This is the first that will get into the merits of climate change and what needs to be done, and how the state may have to change its policies.”** As announced by Our Children’s Trust, “On August 14, in an historic first, Judge Seeley ruled wholly in favor of the 16 youth plaintiffs in *Held v. State of Montana*, declaring that the state of Montana violated the youth’s constitutional rights, including their rights to equal protection, dignity, liberty, health and safety, and public trust, which are all predicated on their right to a clean and healthful environment. The court invalidated as unconstitutional and enjoined Montana laws that promoted fossil fuels and required turning a blind eye to climate change. The court ruled the youth plaintiffs had proven their standing to bring the case by showing significant injuries, the government’s substantial role in causing them, and that a judgment in their favor would change the government’s conduct.” The state is appealing the decision to the Montana Supreme Court.*** The Court’s findings of facts in the 103 page ruling include 142 paragraphs detailing key events in the historic development of climate science, the current understanding of climate science and projections of our climate future, the health impacts on youth and children from a changing climate, the impacts of climate change on Montana’s natural environment, and specific health, social and economic impacts on each of the individual plaintiffs.*

* Montana First Judicial District Court, Rikki Held v. State of Montana, [Findings of Fact, Conclusions of Law, and Order](#), August 14, 2023, p. 2

**David Gelles, [“In Montana, It’s Youth vs. the State in a Landmark Climate Case,”](#) *New York Times*, March 24, 2023.

***Our Children’s Trust, [“Historic Trial Concluded June 20, 2023 – The Youth Won!”](#), [text of the closing argument in the trial](#);

See also, Celina Zhao, [“In Montana lawsuit, a climate scientist takes the stand,”](#) *Science*, June 20, 2023.

2023 (August)

The average sea surface temperature in the Gulf of Mexico for the week of August 14 is 88 degrees F, while Florida approves climate denial classroom videos

Bill McKibben sums up the Florida climate this summer: “On the list of crazy weather records this overheated summer, it’s possible that the single most extreme might have been a 101.1 Fahrenheit temperature measured by an ocean buoy at Manatee Bay in Florida in July. That appears to be the hottest temperature ever measured in the ocean; it’s in a murky and shallow stretch of the Keys, but across the entire Gulf coast temperatures are truly astounding. The average for the Gulf of Mexico this week is more than 88 degrees Fahrenheit, crushing the average for the date across the last three decades by two and a half degrees... Coral reef researchers were reporting ‘100% mortality’ at sites in the Keys.” McKibben notes the irony that the Florida Department of Education has become the first state in the nation to approve the use of classroom educational videos produced by the Prager University Foundation funded in large part by the fracking industry.* The foundation (“PragerU”) is not in fact affiliated with any university but describes itself as a “501(c)(3) nonprofit [which] offers a free alternative to the dominant left-wing ideology in culture, media, and education.”** *Climatewire* reports that “education experts say [PragerU videos] distort science, history, gender and other topics. And those researchers fear that the nation’s third-largest state has opened a door that will help spread the videos to classrooms in other states... PragerU’s videos use talking points common among global warming skeptics to frame climate science and policy. ... An eight-minute video, ‘Poland: Ania’s Energy Crisis,’ exemplifies how PragerU introduces climate denialism to children by subtly attacking established science and the people concerned about global warming. In the video, teenager Ania is concerned about climate change because of what she learned at school. Climate-denial talking points are introduced almost verbatim in the trusted voice of Ania’s mother and father.”***

*Bill McKibben, [“Teachable Moments Require... Teaching.”](#) *The Crucial Years* newsletter, August 14, 2023.

** [“What is PragerU?”](#)

***Scott Waldman, [“Florida schools ‘hijacked by the left’ turn to anti-climate cartoons.”](#) *E&E News, Climatewire*, August 7, 2023; PragerU, [“Poland: Ania’s Energy Crisis.”](#) July 19, 2023. See also, Jackie Flynn Mogensen, [“Florida Approved a PragerU Climate Cartoon for Schools. We Asked a Scientist to Fact-Check It.”](#) *Mother Jones*, August 18, 2023.

2023 (September)

Biden administration announces cancellation of 7 drilling leases in the Arctic National Wildlife Refuge, new protection of 13 million acres in the National Petroleum Reserve

Following controversial approval of the Willow project [2023 (March)], the Interior Department takes two steps to expand protected lands in Alaska. The seven leases had been approved by the Trump Administration, but suspended in June, 2021 citing “multiple legal deficiencies in the underlying record supporting the leases.” The proposal to protect, by new regulations, up to 13 million acres in the National Petroleum Reserve in Alaska (NPR-A) had been previewed at the time of the Willow approval. The proposed rule would establish an outright prohibition on any new leasing in 10.6 million acres, more than 40 percent of the NPR-A.* President Biden stated that “We have a responsibility to protect this treasured region for all ages...Canceling all remaining oil and gas leases issued under the previous administration in the Arctic Refuge and protecting more than 13 million acres in the western Arctic will help preserve our Arctic lands and wildlife, while honoring the culture, history, and enduring wisdom of Alaska Natives who have lived on these lands since time immemorial.”**The Editorial Board of the *Wall Street Journal* begs to differ, describing President Biden’s climate agenda as “the most lawless and economically destructive in history,” and faulting Interior Secretary Deb Haaland for criticizing the Trump Administration’s “insufficient analysis under the National Environmental Policy Act, including failure to adequately analyze a reasonable range of alternatives and properly quantify downstream greenhouse gas emissions.” “NEPA doesn’t require a climate analysis,” contends the Editorial Board: “The Administration has written new requirements into NEPA to scotch fossil-fuel projects.”*** NEPA, as amended by the Fiscal Responsibility Act [2023 June] requires federal agencies to “include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—(i)reasonably foreseeable environmental effects of the proposed agency action;(ii)any reasonably foreseeable adverse environmental effects which cannot be avoided should the proposal be implemented;(iii)a reasonable range of alternatives to the proposed agency action, including an analysis of any negative environmental impacts of not implementing the proposed agency action in the case of a no action alternative, that are technically and economically feasible, and meet the purpose and need of the proposal...”***

*U.S. Department of the Interior, [“Biden-Harris Administration Takes Major Steps to Protect Arctic Lands and Wildlife in Alaska.”](#) September 6, 2023.

**Lisa Friedman, [“Biden Administration to Bar Drilling on Millions of Acres in Alaska.”](#) *New York Times*, September 6, 2023.

***Editorial Board, [“Biden Freezes Alaskan Oil.”](#) *Wall Street Journal*, September 8, 2023.

**** National Environmental Policy Act of 1969, [Sec. 102, 42 USC 4332 \(C\)](#).

2023 (October)

Supreme Court rejects Republican-led states' challenge to Biden Administration Social Cost of Carbon in environmental reviews; Biden Administration expands SCC use

Eleven states led by Missouri had challenged the Biden Administration's Social Cost of Carbon (SCC) used by federal agencies to estimate the economic costs of greenhouse gas pollution [see 2013 (May), 2017 (March), 2018 (September), 2020 (July), 2021 (January, February)]. The Trump administration had slashed the SCC to around \$1 per metric ton, and the Biden administration increased it to around \$51 using the Obama administration's measure adjusted for inflation. The traditionally conservative 8th Circuit Court of Appeals had dismissed the suit, ruling that the states lacked standing to challenge the cost until they had specific projects that had been allegedly adversely impacted by the higher SCC in environmental reviews. The states brought a Petition for Writ of Certiorari to the Supreme Court, claiming "many different harms and injuries from the interim 'social costs' dramatic increase in the costs from emitting greenhouse gases, including harms to proprietary, sovereign, and procedural interests."* The Supreme Court denied the petition without explanation, in a decision that had largely been expected.** In September, President Biden had issued an executive order directing federal agencies to incorporate the SCC in their budgeting as well as procurement processes: "For over a decade, federal agencies have routinely applied SC-GHG [Social Cost of Greenhouse Gases] values when estimating the benefits and costs of regulations. Today, the Administration is announcing that the President has approved recommendations from the IWG [Interagency Working Group] on the expanded use of the SC-GHG for budgeting, procurement, and other agency decisions, including reaffirming its use for environmental reviews where appropriate."***

*State of Missouri et al. v. Joseph R. Biden Jr. et al., [Petition for Writ of Certiorari](#).

**Zack Budryk, ["Supreme Court passes on red state challenge to Biden 'social cost of carbon' rule."](#) *The Hill*, October 11, 2023;

Lesley Clark, Niina H. Farah, ["Why SCOTUS might stop Republican attacks on carbon metric."](#) *E&E News Climatewire*, July 11, 2023.

***The White House, ["FACT SHEET: Biden-Harris Administration Announces New Actions to Reduce Greenhouse Gas Emissions and Combat the Climate Crisis."](#) September 21, 2023.

2023 (October)

California Governor Gavin Newsome signs two unprecedented climate disclosure laws

The State of California has raced ahead of the Securities and Exchange Commission (SEC) in enshrining into law a requirement that companies disclose their greenhouse gas emissions and risks posed by climate change. The SEC proposed such rules in March 2022, and is still deliberating on the path to finalizing them. The Harvard Law School Environmental and Energy Law Program's Regulatory Tracker summarizes the need for such rules: "The impacts of climate change pose enormous risk to the U.S. financial system. These risks can be physical, such as damaged infrastructure and transportation networks due to increasingly severe weather events, wildfires, and sea-level rise, or transitional, such as investment values changing with underlying shifts in energy and climate policy or consumer demand. This climate-related risk results in financial risk for businesses and investors. At the same time, a growing number of companies are setting net-zero goals and other GHG emissions targets, but their reporting is too fragmented and inconsistent to be useful to investors and regulators. ...Concerned that voluntary climate disclosures do not adequately protect investors, the SEC determined that additional disclosure requirements are necessary to provide consistent, comparable information about climate risks in the financial markets." * Forging ahead faster than the SEC, California's Climate Corporate Data Accountability Act will require companies operating in California with annual revenues over \$1 billion to report their greenhouse emissions each year, not only direct ("Scope 1") emissions, but also, as phased in through 2030, "Scope 2 emissions" defined as "indirect greenhouse gas emissions from consumed electricity, steam, heating, or cooling purchased or acquired by a reporting entity, regardless of location," and "Scope 3 emissions": "indirect upstream and downstream greenhouse gas emissions, other than scope 2 emissions, from sources that the reporting entity does not own or directly control and may include, but are not limited to, purchased goods and services, business travel, employee commutes, and processing and use of sold products."** A related law, the Greenhouse Gases: Climate-related Financial Risk Act, would require companies with revenues exceeding \$500 million to disclose their climate-related financial risks and countermeasures.*** Although the legislation received major support from companies including Microsoft, Ikea U.S.A., Patagonia and Apple, Governor Newsome expressed reservations about implementing rules that are estimated to impact 10,000 companies doing business in California. As reported in *UtilityDive*, the Governor expressed concerns about meeting the deadlines in the bills, and the financial impact of the legislation. He stated that "his administration would work with the authors of both bills and the legislature to address these issues next year."

*Environmental and Energy Law Program, Harvard Law School, Regulatory Tracker, [“Financial Regulation, Climate Change, and Climate-related Risk Disclosure”](#)

**Legislature, State of California, [Senate Bill 253, Climate Corporate Data Accountability Act](#).

***Legislature, State of California, [Senate Bill 261, Greenhouse Gases: Climate-related Financial Risk Act](#).

****Zoya Mirza, [“California Gov. Newsom signs climate disclosure bills but worries about ‘overall financial impact.’”](#) *UtilityDive*, October 11, 2023.

2023 (October)

The International Energy Agency’s annual World Outlook Report predicts substantial progress in renewables by 2030, but not enough to keep warming below 1.5 °C.

Described as “the most authoritative global source of energy analysis and projections,” the report predicts “an energy system in 2030 in which clean technologies play a significantly greater role than today. This includes almost 10 times as many electric cars on the road worldwide; solar PV generating more electricity than the entire US power system does currently; renewables’ share of the global electricity mix nearing 50%, up from around 30% today; heat pumps and other electric heating systems outselling fossil fuel boilers globally; and three times as much investment going into new offshore wind projects than into new coal- and gas-fired power plants.” In sum, it concludes that in 2030 global use of fossil fuels will peak and then decline. These predictions are based on the current policy settings of governments. “If countries deliver on their national energy and climate pledges on time and in full, clean energy progress would move even faster. However, even stronger measures would still be needed to keep alive the goal of limiting global warming to 1.5 °C.” *

*Press release, [“The energy world is set to change significantly by 2030, based on today’s policy settings alone,”](#) International Energy Agency, October 24, 2023; International Energy Agency, [World Energy Outlook 2023](#), October 24, 2023. See also, Jillian Ambrose, [“‘Beginning of the end’ of fossil fuel era approaching, says IEA,”](#) *The Guardian*, September 12, 2023; but see a dissenting opinion: George Will, [“The fossil fuel era isn’t done yet, not by a long shot,”](#) *Washington Post*, November 10, 2023.

2023 (October)

Updated carbon budget analysis concludes that we will have only a 50/50 chance of keeping warming below 1.5 °C in six years.

The “carbon budget” is an estimate of the greenhouse gas emissions humans can afford to produce before the internationally agreed warming goal of 1.5 °C above pre-industrial times is exceeded. The latest update indicates that the budget continues to shrink. Researchers, publishing in *Nature Climate Change*, conclude: “the RCB

[remaining carbon budget] for a 50% chance of keeping warming to 1.5 °C is around 250 GtCO₂ as of January 2023, equal to around six years of current CO₂ emissions... Key uncertainties affecting RCB estimates are the contribution of non-CO₂ emissions [such as methane], which depends on socioeconomic projections as much as on geophysical uncertainty, and potential warming after net zero CO₂.”*As Damian Carrington reported in *The Guardian*: “Global emissions are expected to reach a record high this year of about 40bn tonnes. To retain the 50% chance of a 1.5C limit, emissions would have to plunge to net zero by 2034, far faster than even the most radical scenarios. The current UN ambition is to cut emissions by half by 2030 and reach net zero by 2050, although existing policies are far from delivering this ambition. If it was achieved, however, it would mean only about a 40% chance of staying below 1.5C, the scientists said, so breaking the limit would be more likely than not.”**

*Robin Lamboll et al., [“Assessing the size and uncertainty of remaining carbon budgets.”](#) *Nature Climate Change* 13, 1360-1367, October 30, 2023.

**Damian Carrington, [“Climate crisis: carbon emissions budget is now tiny, scientists say.”](#) *The Guardian*, October 30, 2024.

2023 (November)

James Hansen study dismisses the possibility of keeping warming under the 1.5°C Paris Agreement ceiling, even in the near future

Former NASA scientist James Hansen is no stranger to startling predictions that come true. He predicted in *Science* in 1981 (accurately) that the Northwest Passage would open in the 21st century as a result of the “Climate impact of increasing atmospheric carbon dioxide” [1981], and delivered riveting testimony before Congress during a hot summer in 1988, stating that “the greenhouse effect is already large enough to begin to affect the probability of extreme events such as summer heatwaves.” [1988 (June)] Hansen, now a director at the Earth Institute at Columbia University, teamed up with scientists around the world to publish a study concluding that “Under the current geopolitical approach to GHG emissions, global warming will likely pierce the 1.5°C ceiling in the 2020s and 2°C before 2050. Impacts on people and nature will accelerate as global warming pumps up hydrologic extremes. The enormity of consequences demands a return to Holocene-level global temperature.” * Hansen stated in a telephone interview with reporters: “The 1.5-degree limit is deader than a doornail... In the next several months, we’re going to go well above 1.5C [Celsius] on a 12-month average. ... For the rest of this decade, the average is going to be at least 1.5.”** About two weeks after publication of the study, preliminary data on global temperatures will conclude that, for November

17, the entire planet averaged more than 2°C (3.6 degrees Fahrenheit) above the preindustrial benchmark.***

*James Hansen, et al., [“Global warming in the pipeline.”](#) *Oxford Open Climate Change, Volume 3, Issue 1*, November 2, 2023.

** Kasha Patel and Shannon Osaka, [“Famed climate scientist has a new, dire prediction.”](#) *Washington Post*, November 2, 2023. See also, James Hansen, et al., [“How We Know that Global Warming is Accelerating and that the Goal of the Paris Agreement is Dead.”](#) newsletter, November 10, 2023; Chelsea Harvey, [“Earth Reacts to Greenhouse Gases More Strongly Than We Thought.”](#) *E&E News Climatewire*, November 3, 2023.

***Scott Dance, [“Earth passed a feared global warming milestone Friday, at least briefly.”](#) *Washington Post*, November 19, 2023.

2023 (November)

UN Emissions Gap report finds continued failure to progress toward Paris Agreement climate goals

Depressingly titled “Emissions Gap Report 2023: Broken Record – Temperatures hit new highs, yet world fails to cut emissions (again),” the annual report of the United Nations Environment Programme (UNEP) on progress in reducing global greenhouse gas emissions offers no more hope of warding off catastrophic climate consequences than the previous two reports [2022 (October), 2021 (October)]. Last year’s report concluded that nations’ strongest pledges would put the planet on a path to warm by 2.4C (4.3F) by the end of the century; this year upped that figure to 2.5C. “As things stand, fully implementing unconditional Nationally Determined Contributions (NDCs) [nonbinding pledges] made under the Paris Agreement would put the world on track for limiting temperature rise to 2.9°C above pre-industrial levels this century. Fully implementing conditional NDCs [nonbinding pledges that require international assistance to achieve] would lower this to 2.5°C.”*

*United Nations Environment Programme, [“Emissions Gap Report 2023: Broken Record – Temperatures hit new highs, yet world fails to cut emissions \(again\).”](#) November 20, 2023; see also Maxine Joselow, [“Three surprising findings in the latest U.N. emissions report.”](#) *The Climate 202* newsletter, November 20, 2023.

2023 (November)

UN Production Gap Report delivers another failing grade on governments’ policies to promote expansion of fossil fuels

The U.N. Environment Programme’s Production Gap report, prepared in collaboration with five other research and academic institutions, was initiated in 2019 to measure the misalignment between governments’ planned fossil fuel production and global production levels consistent with limiting global warming to 1.5°C or 2°C. [2019 (November)]. The findings in the current report include: “Taken together, government plans and projections would lead to an increase in global coal

production until 2030, and in global oil and gas production until at least 2050. This conflicts with government commitments under the Paris Agreement, and clashes with expectations that global demand for coal, oil, and gas will peak within this decade even without new policies”; “Given risks and uncertainties of Carbon Capture and Storage and Carbon Dioxide Removal, countries should aim for a near total phase-out of coal production and use by 2040 and a combined reduction in oil and gas production and use by three-quarters by 2050 from 2020 levels, at a minimum. The potential failure of these measures to become sufficiently viable at scale, the non-climatic near-term harms of fossil fuels, and other lines of evidence, call for an even more rapid global phase-out of all fossil fuels.” * [2023 (August), CDR; 2023 (May), CCS]

*United Nations Environment Programme, [“The Production Gap.”](#) November 8, 2023. See also the UNEP’s [“Adaptation Gap Report: 2023: Underfinanced. Underprepared – Inadequate investment and planning on climate adaptation leaves world exposed.”](#) November 2, 2023; Sara Schonhardt, [“Rich Countries Owe More Than Ever in Climate Adaptation Funding.”](#) *E&E News Climatewire*, November 2, 2023.

2023 (November)

The Fifth National Climate Assessment notes that U.S. emissions have fallen since peaking in 2007, but substantial cuts are required here and around the planet to avoid severe risks

The National Climate Assessment is a congressionally mandated interagency effort that “provides the scientific foundation to support informed decision-making across the United States.” The last report was the 2017 assessment under the Trump administration. [2017 (November)] The good news is that “As US emissions have declined from their peak in 2007, the country has also seen sustained reductions in the amount of energy required for a given quantity of economic activity and the emissions produced per unit of energy consumed. Meanwhile, both population and per capita GDP have continued to grow.... [W]ind and solar energy costs dropped 70% and 90%, respectively, over the last decade, while 80% of new generation capacity in 2020 came from renewable sources...Efforts to adapt to climate change and reduce net greenhouse gas emissions are underway in every US region and have expanded since 2018.” But “while US greenhouse gas emissions are falling, the current rate of decline is not sufficient to meet national and international climate commitments and goals. US net greenhouse gas emissions remain substantial and would have to decline by more than 6% per year on average, reaching net-zero emissions around midcentury, to meet current national mitigation targets and international temperature goals; by comparison, US greenhouse gas emissions decreased by less than 1% per year on average between 2005 and 2019....Global

greenhouse gas emissions from human activities continue to increase, resulting in rapid warming and other large-scale changes, including rising sea levels, melting ice, ocean warming and acidification, changing rainfall patterns, and shifts in timing of seasonal events. Many of the climate conditions and impacts people are experiencing today are unprecedented for thousands of years.” * In one important respect, this report is markedly different from its predecessors. *Inside Climate News* observes that “Previous assessments ...often approached the inequitable outcomes of the climate crisis as an afterthought, mentioning ‘social justice,’ ‘climate justice’ or ‘environmental justice’ just a little over a dozen times total in documents that were hundreds of pages long. By contrast, the Fifth National Climate Assessment discusses social, economic and health inequities throughout the entire report and even dedicates a chapter to “social systems and justice,” noting that societal factors, including historic racism, have shaped the climate reality experienced by many low-income families and communities of color today.” **

*A.R. Crimmins, et al., [Fifth National Climate Assessment](#), U.S. Global Change Research Program, Washington, D.C., November 14, 2023.

**Kristoffer Tigue, et al., [“Environmental Justice a Key Theme Throughout Biden’s National Climate Assessment,”](#) *Inside Climate News*, November 14, 2023.

2023 (November)

Scientists discover a way to convert carbon dioxide into “a powdery, harmless fuel that could be converted into clean electricity,” and can be stored safely for decades

It may sound too good to be true, but the report comes from a team of researchers from MIT and Harvard, led by MIT professor Ju Li, and is published in the journal *Cell Reports Physical Science*. Reported in *E&E News Climatewire*, as reprinted in *Scientific American*, the researchers “exposed CO₂ to catalysts and then electrolysis that turns the gas into a powder called sodium formate, which can be safely stored for decades...Researchers have previously turned CO₂ into fuels that required too much energy to make, or were difficult to store long term. The MIT process gets closer to an ambitious dream: turning captured CO₂ into a feedstock for clean fuel that replaces conventional batteries and stores electricity for months or years. That could fill gaps in the nation’s power grids as they transition from fossil fuels to intermittent solar and wind energy.” *Climatewire* quotes Li: “I think we have a big break here... I could leave 10 tons of this stuff to my granddaughter for 50 years.” The next step: “‘There is this valley of death,’ Li noted, using a term scientists often use to describe the difficult process of scaling up a laboratory solution into a commercial product.” Li is in discussions with commercial companies and

“exploring ways heavy industries might use it to meet company CO2 emission reduction goals.”*

*Zhen Zhang, et al., [“A carbon-efficient bicarbonate electrolyzer.”](#) *Cell Reports Physical Science*, Volume 4, Issue 11, November 15, 2023; John Fialka, [“Scientist Discover How to Convert CO2 into Powder That Can Be Stored for Decades.”](#) *E&E News Climatewire*, December 20, 2023.

2023 (November)

U.S. and China pledge to work together more closely to fight climate change

In a warm-up for the first meeting between President Biden and President Xi Jinping in a year fraught with increasing tensions, US and China climate envoys John Kerry and Xie Zhenhua appear to have found some common ground in California. The *Guardian* reports that in a joint statement they “pledged to make a success of a crucial UN climate summit starting at the end of this month in Dubai and recommitted to the 2015 Paris climate accord goals of holding global heating to ‘well below’ 2C, while pursuing efforts to limit the increase to 1.5C. ‘The United States and China recognise that the climate crisis has increasingly affected countries around the world...They will work together ... to rise up to one of the greatest challenges of our time for present and future generations of humankind.’... One of the most notable features in the climate statement was that both countries would commit to ‘economy-wide’ nationally determined contributions (NDCs) across all greenhouse gases, not just CO2. China has previously resisted the idea of specifying which parts of the economy would be covered by its climate pledges.”*

*Amy Hawkins, [“China and US pledge to fight climate crisis ahead of Xi-Biden summit.”](#) *The Guardian*, November 14, 2023.

2023 (November)

Oxfam releases report described in the *Guardian* as “the most comprehensive study of global climate inequality ever undertaken”

Some of the conclusions of *Climate Equality: A planet for the 99%*: “The richest 1 percent (77 million people) were responsible for 16 percent of global consumption emissions in 2019 —more than all car and road transport emissions. The richest 10 percent accounted for half (50 percent) of emissions. It would take about 1,500 years for someone in the bottom 99 percent to produce as much carbon as the richest billionaires do in a year. Every year, the emissions of the richest 1 percent cancel out the carbon savings coming from nearly one million wind turbines. Since the 1990s, the richest 1 percent have used up twice as much of the carbon we have left to burn

without increasing global temperatures above the safe limit of 1.5°C than the poorest half of humanity.” *

*Press release, [“Richest 1% emit as much planet-heating pollution as two-thirds of humanity.”](#) Oxfam International, November 20, 2023; Oxfam International, [“Climate Equality: A planet for the 99%.”](#) November 20, 2023; Jonathan Watts, [“Richest 1% account for more carbon emissions than poorest 66%, report says.”](#) *The Guardian*, November 19, 2023.

2023 (December)

UNFCCC Conference of Parties (COP28) meets in Dubai, U.A.E.

Arguably no previous COP has faced more formidable geopolitical challenges: energy and food security threats from the Russian invasion of Ukraine [2022 February]; emerging war in the Middle East; a reinvigorated U.S. Republican extreme right, aiming to recapture the White House for Donald Trump, setting its sights on a broad attack on climate policy and science education [2023 (August)]; years-long drought in Africa [2023 (April)] and ravages of record breaking storms and heat around the world [see 2023 weather recap, below]; science marching ahead with ever more dire data; and Mother Nature warning as clearly as she could about accelerating change. The meeting was undermined even before it began by revelations from the UK Centre for Climate Reporting that COP host country United Arab Emirates and conference chair Sultan Al-Jaber, president of the U.A.E. national oil company Adnoc, were circulating talking points to promote oil and gas deals at the meeting. Reports the *New York Times*, “It remains unclear how many of the talking points were ultimately raised at meetings. But the revelations threatened to make it even more difficult for negotiators to trust each other, and deflated hopes of progress before the summit even begins.”* A related disclosure by the Center for Climate Research showed “the UAE’s close ally, Saudi Arabia, hard at work on an Oil Development Sustainability Programme which involved hooking African and Asian nations on fossil fuels.”** Concern over COP27, where more than “600 lobbyists for petro-industrial interests dwarfed the delegations from many countries,” led to a new policy requiring disclosure of affiliation on name badges and public listings.*** More concern about conference leadership erupted when a video circulated of a live discussion with Mary Robinson, former UN Special Envoy for Climate, in which Al-Jaber stated that “There is no science out there, or no scenario out there, that says that the phaseout of fossil fuel is what’s going to achieve 1.5°C.”**** Then, former Trump White House climate adviser George David Banks, attending Dubai with a group of Republican lawmakers, “predicted in an interview that Trump would use a second term to again withdraw the United States from the Paris climate accord.”***** Nonetheless, COP 28 took some steps forward. Member states announced on the first day of the meeting an agreement on the

structure and initial pledges to the “loss and damage” fund approved at COP 27 in Egypt [2022 (November)]. The United Arab Emirates and Germany each pledged \$100 million to the fund; the U.S. committed \$17.5 million. *U.S. News & World Report* observes that “Despite being top contributors to global carbon emissions...China and India have not announced plans to contribute to the ‘loss and damage’ fund, and reportedly have argued they would qualify to receive funds as developing countries, according to the BBC.”***** Most remarked about, and perhaps indeed remarkable, is the conclusion of the summit, in overtime. As Elizabeth Kolbert reports in *The New Yorker*, Al Jaber submitted draft text under Article II A, where “nations were exhorted to take steps to reduce greenhouse-gas emissions, including ‘transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner.’ By this point, the session had already gone into overtime, and the new draft, dubbed the U.A.E. Consensus, was quickly adopted. Al Jaber declared the deal ‘historic,’ adding, ‘We have delivered a paradigm shift.’” Kolbert comments: “The most upbeat assessments held that the agreement would send a strong signal—to politicians, to investors, and to activists. ...But how is it possible that twenty-eight negotiating sessions were needed to agree on what has been self-evident all along, which is that dealing with climate change will require phasing out or transitioning away from fossil fuels? It is this question which brings us to possibility No. 2: ‘That this deal has been hailed as a landmark is more a measure of previous failures,’ is how James Dyke, the assistant director of the Global Systems Institute, at Britain’s University of Exeter, put it.”*****

*Manuela Andreoni, [“Using climate talks to sell fossil fuels.”](#) Climate Forward newsletter, *New York Times*, November 28, 2023.

**Bill McKibben, [“A Corrupted COP,”](#) *The Crucial Years* newsletter, November 28, 2023.

***Bob Berwyn, [“UN Adds New Disclosure Requirements For Upcoming COP28, Acknowledging the Toll of Corporate Lobbying,”](#) *Inside Climate News*, June 18, 2023.

****Mitchell Beer, [“‘No Science’ Linking Fossil Fuel Phaseout to 1.5°C target, Al Jaber Claims in ‘Ill-Tempered’ Video,”](#) *The Energy Mix*, December 3, 2023.

*****Maxine Joselow and Timothy Puko, [“Specter of second Trump term looms over global climate talks.”](#) *Washington Post*, December 11, 2023.

*****Julia Haines, [“What Countries Have Pledged to the ‘Loss and Damage’ Climate Change Fund,”](#) *U.S. News & World Report*, December 12, 2023.

*****Elizabeth Kolbert, [“What Did COP28 Really Accomplish?”](#) *The New Yorker*, December 13, 2023.

2023 (December)

Biden administration EPA releases final methane rules at COP28

More than three years in the making, and reflecting growing understanding of the outsized impact on climate change from methane leakage from oil and gas facilities [2023 (May), LNG and leakage studies], the rule is much tougher than the Obama

era regulation. The rule aims, the EPA states, “to prevent 1.5 billion metric tons of greenhouse gas emissions, and deliver billions of dollars in health and economic benefits.” Unlike the Obama regulation which set standards for only new sources, this regulation covers “hundreds of thousands of existing sources nationwide, promot[ing] the use of cutting-edge methane detection technologies...In 2030 alone, the expected reductions are equivalent to 130 million metric tons of carbon dioxide – more than the annual emissions from 28 million gasoline cars. The rule would achieve a nearly 80 percent reduction below the future methane emissions expected without the rule. These reductions are greater than what was projected for the 2022 and 2021 proposals, thanks to changes that strengthen provisions to limit wasteful, polluting flaring of natural gas and analytical updates that better capture the impacts of this rulemaking.”*As *Climatewire* explained the rule’s new approach to flaring: “Environmentalists cheered the final rule’s tougher stance on routine flaring. Last year’s draft allowed producers to continue the practice of burning off gas at oil wells if an engineer certified that it would be technically infeasible or unsafe to retrofit with the equipment needed to utilize the gas, transport it to market or reinject it. Flaring turns methane gas into CO₂, reducing the amount of heat it traps. But research shows that flares frequently malfunction, spewing methane into the atmosphere. The final rule includes a near-total ban on flaring at newer facilities except in emergencies. But it gives companies two years to retrofit their operations before the ban would take effect — a nod to industry concerns that an immediate ban would lead to a run on equipment. And it allows some older, low-emitting wells to continue to burn off gas.”** When *Scientific American* summarized this and President Biden’s most important other accomplishments on climate and environmental justice in 2023, the journal noted: “The durability of this progress made under Biden will depend in large part on how the 2024 election shakes out because Republican candidates have vowed to try to undo many of his efforts. But if all goes right, the country could still meet his goal of reducing U.S. emission by half.”***

*Press release, [“Biden-Harris Administration Finalizes Standards to Slash Methane Pollution, Combat Climate Change, Protect Health, and Bolster American Innovation.”](#) Environmental Protection Agency, December 2, 2023.

**Jean Chemnick, [“New EPA Methane Rule Will Slash Emissions from Oil and Gas,”](#) *E&E News/Climatewire*, December 4, 2023.

***Andrea Thompson, [“The Most Important Climate Stories of 2023 Aren't All Bad News,”](#) *Scientific American*, December 27, 2023.

2023 (December)

2023 is officially the hottest year on record

As reported in *Science*, “It comes as no surprise to anyone who sweated through it: 2023 was the hottest year in human history. Average surface temperatures rose

nearly 0.2°C above the previous record, set in 2016, to 1.48°C over preindustrial levels, the European Union’s Copernicus Climate Change Service reported today. ... The extreme conditions are a ‘dramatic testimony of how far we now are from the climate in which our civilization developed,’ said Carlo Buontempo, Copernicus’s director, in a statement.”* Just a sliver under, then, the “stretch” goal of the Paris Climate Agreement to limiting warming to under 1.5°C. In October, Ian Livingston in the *Washington Post* presented five charts that help readers grasp the enormity of this record-breaking year: globally, “no previous September was close to as warm as last month — which was 0.93 degrees Celsius above normal;” Miami had so far “registered 175 hours with a heat index — how hot it feels factoring in humidity — of 105 or greater. That’s more than three times the previous record;” by the end of the season in October, “more than 45 million acres in Canada had gone up in smoke, an area more than double the previous record;” “global oceans have run incomprehensibly warm for most of the year” (Livingston cites a July article reporting that “The North Atlantic has baked in record daily warmth every day since early March. With the average sea surface temperature in this region now approaching 77 degrees Fahrenheit, as hot as it’s ever been and more than 2.5 degrees above average, the North Atlantic has warmed almost beyond the most extreme predictions of climate models.”); total area of global sea ice, critical to keeping the planet’s heat in check, “has descended to its lowest level in the satellite record.”** The warming has had “cascading effects” for the indigenous communities and wildlife across the Arctic.*** In July, the *Washington Post* reports, “China set an all-time high of nearly 126 degrees Fahrenheit, while Death Valley hit 128 degrees, two shy of the highest reliably measured temperature on Earth. Phoenix experienced a record-breaking 19th consecutive day at or above 110 degrees Tuesday. And in the Middle East, the heat index reached 152 degrees, nearing — or surpassing — levels thought to be the most intense the human body can withstand.”**** In August, Hawaii sustained one of the deadliest wildfires in US history, climate change turning a lush state into a “tinder box.”***** The NOAA annual analysis of billion-dollar U.S. weather and climate disasters concludes: “The cost of the 19 severe storm events in 2023 was \$54 billion, setting a new record for costliest year on record for that peril (previous record: \$44 billion in 2011). The most expensive disaster of 2023, the \$14.5 billion drought and heatwave that affected much of the South and Midwest, ranked as the nation’s seventh-costliest drought since 1980. Billion-dollar events now account for over 85% of the total U.S. losses for all weather-related disasters; this fraction was just 75% in 1980-2000.”*****

*Paul Voosen, [“2023 was the hottest year on record—and even hotter than expected.”](#) *Science* news, January 9, 2024; see also *Science* Special Issue [“An Unhealthy Climate.”](#) vol. 381 issue 6665, 1386-1407, September 26, 2023.

**Ian Livingston, [“Earth’s climate shatters heat records. These 5 charts show how.”](#) *Washington Post*, October 24, 2023; Tim Meko and Dan Stillman, [“Ocean temperatures are off the charts. Here’s where they’re highest.”](#) *Washington Post*, July 28, 2023.

*** Rick Thoman, Matthew L. Druckenmiller, Twila A. Moon, [“From Wildfires to Melting Sea Ice, the Warmest Summer on Record Has Had Cascading Effects across the Arctic.”](#) *Scientific American*, January 10, 2024.

****Scott Dance, [“The heat index reached 152 degrees in the Middle East — nearly at the limit for human survival.”](#) July 18, 2023.

***** Christopher Flavelle and Manuela Andreoni, [“How Climate Change Turned Lush Hawaii Into a Tinderbox.”](#) *New York Times*, August 14, 2023.

*****National Oceanic and Atmospheric Administration, [Billion-Dollar Weather and Climate Disasters](#), March 8, 2024; Jeff Masters and Bob Hensen, [“U.S. billion-dollar weather disasters set an all-time record in 2023, with 28.”](#) *Yale Climate Connections*, January 9, 2024.