

# The renewed climate change agenda

by Ronald J. Bee



Firefighters spray down flames on the side of Interstate 210 in Sylmar, California, on January 19, 2021. Dozens of fires ignited as high winds and low humidity spread throughout the state. (JOSH EDELSON/AFP/GETTY IMAGES)

**T**he challenges of addressing global climate change in the 21st century remain essentially the same as in the 20th: how should or can we reduce human-made greenhouse gas emissions worldwide to prevent damaging the planet upon which we live and depend? In 1957, Doctors Roger Revelle and Charles David Keeling of the Scripps Institution of Oceanography began measuring median global carbon dioxide (CO<sub>2</sub>) levels, the most prevalent of greenhouse gases, at the Mauna Loa Observatory in Hawaii. That ongoing tracking, now maintained by Keeling's son, Ralph F. Keeling, shows that median global temperatures continue to rise, mirroring the increasing levels of CO<sub>2</sub> in our atmosphere. The original scientific measurements informed, if not jump-started, the 1992 Rio Earth Summit, which created the UN Framework Convention on Climate Change (UNFCCC) to prevent "dangerous" interference in the climate system.

In 2020, however, the world came to a forced standstill due to the Covid-19 pandemic. This outbreak also temporar-

ily lowered world greenhouse gas emissions. According to the journal *Nature*, which analyzed data from the Global Carbon Project, emissions decreased by 6.4% in 2020. The United States accounted for 13% of that total mostly because of the decline in cars and trucks on the road, ships at sea, and planes in the air. Aviation, in fact, proved the most affected by lockdowns and travel restrictions. Emissions in that sector fell by 48% when compared to 2019.

Why does this matter? Covid-19's drastic effect on

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the economic growth of nation-states made the air cleaner but created more unemployment—always a source of instability for both democratic and authoritarian governments. The pandemic serves as a bell-weather for the global challenge of mitigating human-made greenhouse gas emissions. As more individuals received the vaccine and went back to work, economies have begun to bounce back—along with increasing emission levels.

The long goodbye of the pandemic's effects points to the difficulties of squaring shorter-term economic needs with longer-term environmental protection. Fossil fuels have both enabled economies to prosper and increased greenhouse gas levels in the 20th and 21st centuries. Creative entrepreneurs like Bill Gates, Elon Musk, and others have visions for ways to square the circle with greener technologies. Politicians know that plentiful jobs, low interest rates, and low inflation rates prove key to winning elections. To achieve that, each candidate usually relies on their own political party platforms as guideposts. Democrats and Republicans have fundamentally disagreed on basic approaches to climate change, with extremes in both parties ranging from dismantling the fossil fuel economy immediately or else the world ends within a decade, to underscoring the remaining uncertainties of climate change science, calling them a collective hoax promoted by socialists to overthrow capitalism. Each side has slipped into their respective trenches, tossing epithets across a no-man's land of reconciliation. One has either become a "Climate Denier" or a "Socialist."

The ideological divide has almost taken on the doomsday vs. "don't worry be happy" dimensions of the threat of nuclear war during the Cold War (1947–62). Those who argued for dis-

armament to prevent nuclear Armageddon then squared off with counterparts in government who embraced nuclear deterrence as the only way to prevent the same outcome. One can argue that we have seen a certain cross-over effect in terms of the climate debate. The Bulletin of the Atomic Scientists, while still maintaining the nuclear doomsday clock (now at 100 seconds to midnight), has devoted more and more of its articles to addressing the threats of global climate change. For example, most of the Bulletin's articles in its July 2021 issue focused on recent incidents mandating more focused climate action: from the June record-high temperatures of 111°F in Seattle, Washington, and 112°F in Portland, Oregon, (40% above normal) to implicating rising seas in the Surfside, Florida, apartment building collapse. Is the issue of climate change an "existential threat" like global thermonuclear war (which has not happened) or can we take reasonable measures over time to mitigate the negative consequences for life on earth? In life, science, and politics, however, the word "reasonable" remains open to interpretation.

If extreme political differences have stymied progress, extreme weather events at both ends of the thermometer have kept us focused. Summers have become warmer and winters colder. The California fires of 2020—nearly 10,000 of them—torched more than 4.2 million acres of forest and killed 33 people, the worst year in California's history. The fires in the golden state have continued in July and August 2021. South Lake Tahoe went under mandatory evacuation as the Caldor fire approached, filling the resort with choking smoke. Governor Gavin Newsome declared a state of emergency when the Dixie and Fly fires in Butte and Plumas counties combined, having destroyed over 700,000 acres by the end of August. Sixteen thousand people went under evacuation orders. To the north, the Bootleg fire in southern Oregon burned over 400,000 acres, an area the size of Portland, Seattle, Sacramento, and New York City combined.

The fires have not limited them-

selves to North America. In Russia's northeastern Siberia, 200 fires have defied firefighters, floating smoke that has drifted to Alaska. A heatwave across Greece in early August brought unprecedented fires and threatened to shut down the electrical grid. At the same time, 100 fires burned in Turkey as its president declared parts of five provinces "disaster areas." Italy had to remove tourists from beaches via helicopter as flames trapped them with the Mediterranean Sea at their backs.

As CNN has reported, "Wildfires are becoming larger and more intense, and they are happening in places that aren't used to them." What science can help explain this higher number of more intense infernos? According to the National Oceanic and Atmospheric Administration (NOAA), 2020 proved the second hottest year on earth in the past 140 years. Nineteen of the warmest years on record have occurred since 2000. NOAA also tracks droughts across the United States. Not surprisingly, where extreme drought occurs on its map, wildfires usually follow. According to the July 20, 2021, Drought Monitor, much of the Western United States finds itself in either "extreme drought" (D-3) or "exceptional drought" (D-4).

On the other extreme, an unprecedented three-week "Great Texas Freeze of February 2021" threw Texans accustomed to much warmer weather into chaos. Dallas-Fort Worth had a low of 4°F, with a 14°F high, causing the National Weather service to advise avoiding outside activities if possible. Nearly 4 million homes and businesses lost power due to rolling blackouts and utility outages. Power outages normally occur in the hot summer months, like they did during the 2020–21 fires in California due to overuse of air-conditioning, or in this case, the utility, Pacific Gas and Electric Company (PG&E), worried about limiting the liabilities of downed power lines (PG&E filed for bankruptcy due to lawsuits over fire-causing accidents and poor maintenance). How could this happen in the case of Texas during the winter? Rising global temperatures do

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not always generate heat. Sometimes one sees the exact opposite effect due to abrupt changes in atmospheric pressure which can change normal air flow patterns. The Texan deep freeze also shut down over 3 million barrels a day of oil refining which supplies more than 60% of the East coast oil supply. Gas prices skyrocketed as supplies went dead.

In early 2021, changes in the polar vortex, large areas of low pressure normally found around the earth's poles, sent waves of freezing Arctic air across several continents, with the following Texas-like international results:

- In Asia, spot prices for liquid natural gas (LNG) rose 1,700% from the 2020 lows, which in turn increased European gas prices to 12-year highs

- The United Kingdom's national grid issued emergency appeals for generator use as wholesale electricity prices rose to \$1,367 per megawatt hour

- China experienced the lowest temperatures since 1966, which spiked consumer demand for electric heat, as well as disrupted LNG delivery due to frigid weather

- Japanese utilities asked consumers to cut back on power consumption

- Sweden had the largest single-day snowfall since 2012, leaving grids disabled and customers without power. The Swedish government made utility companies pay for hotel rooms so that Swedes would not freeze to death.

- In Iran and Pakistan, natural gas shortages triggered rolling blackouts in the face of frigid temperatures.

Germany and Belgium faced "floods of death" in the torrential downpours of July 2021, with over 100 dead and 1,300 missing. In any extreme weather event, and in particular floods, vulnerable citizens and those with disabilities face extreme dangers. On the banks of the Rhine River, in the German town of Sinzig, 12 residents in a disability care facility drowned when they became trapped overnight. As the heavy rains and flash floods spread to Northern France, the United Kingdom, the Netherlands, Luxembourg, and Switzerland, Western Europeans learned about "Bernd," a low-pressure vortex



*This photo taken on July 26, 2021, shows rescuers searching inside the subway, which was flooded following heavy rains in Zhengzhou, in China's central Henan province. (AFP/GETTY IMAGES)*

that remained stagnant, continuously circling over Europe. Scientists from the World Weather Attribution group studied the rainfall data and concluded that rising global temperatures made the deadly German floods "up to nine times more likely."

On July 12, 2021, a month's full of rain fell on London, paralyzing many streets and shutting down sections of its Underground rail system. Deadly mudslides have occurred in India, and massive flooding has drenched New Zealand, Nigeria, and Iran. On July 22, in Zhengzhou, Central China, panicked passengers in subways clung to ceiling handrails as a flash flood rose to their necks, in what Chinese officials have called rainfall volumes as occurring "once in a thousand years."

On August 21, 2021, in Waverly, Tennessee, emergency crews searched through shattered homes, floating cars, and tangled debris looking for about a dozen people missing from a record-breaking torrential downpour that unleashed floods killing 22 people or more. Seventeen inches of rain fell in a 24-hour period, taking out roads, cell-phone towers, and telephone lines.

Why have these unprecedented deadly inundations happened? One can resort to basic 17th-century science, and in particular, the laws of gravity,

to provide a plausible answer. "What goes up must come down," a phrase coined by Sir Isaac Newton at Cambridge University, also relates to rainfall. As the polar ice caps and glaciers melt, as many scientists have noted, that water flows back into the oceans. Higher atmospheric temperatures create more evaporation. As global median temperatures rise, this process not only produces more clouds, but also more intense storm systems. The more the ice melts, the higher sea-levels will rise. The more the atmosphere heats up, we see more evaporation of the oceans. As fires destroy trees, also known as "carbon sinks," because they store carbon from the atmosphere, less carbon gets absorbed. This cycle and process has repeated itself in a way whereby dryer climates have become dryer, and wetter climates even wetter. In the case of Bernd, the German Weather Service (Deutscher Wetterdienst) concluded the rainfall became so bad because "Bernd was surrounded by high pressure systems and was therefore unable to move on."

Regarding glaciers, one has worried scientists more than others: the ice shelf that keeps West Antarctica's Pine Island Glacier intact. This huge river of ice has started to melt and break up faster than anticipated. "The floating ice shelf,"



reports the journal *Science Advances*, “acts like a cork in the bottle for the fast-melting glacier and prevents its much larger ice mass from flowing into the ocean. That ice shelf has retreated by 12 miles between 2017 and 2020.” The 160-mile river of ice, should it melt, “holds enough water to raise global sea-levels by more than 19 inches.”

While scientists remain uncertain if warmer ocean temperatures, sea-level rise, and increased storm activity will lead to more hurricanes, they have concluded that recent hurricanes have shifted poleward and have become more intense. According to the Center for Climate and Energy Solutions, “The changing patterns of tropical storms (a shift northwards in the Atlantic) could put much more property and human lives at risk.... [M]ore recent work shows a trade-off between intensity and frequency—that as warmer temperatures bolster hurricane intensity, fewer storms form.

For those in these stronger hurricane’s paths, massive flooding has created devastating conditions. Hurricane Harvey (August 2017), Irma (September 7, 2017) and Maria (September 20, 2017) caused over \$300 billion in damage to Texas, Louisiana, and Puerto Rico alone. According to the RAND Corporation Homeland Security Operation Analysis Center, Hurricanes Irma and Maria (Category 5 and 4) destroyed 100% of Puerto Rico’s grid, 95% of its cellular sites, 43% of its wastewater plants, and caused 40,000 landslides, making 97% of the roads impassable. Moreover, Puerto Rico has suffered a series of earthquakes in 2019–20 as well as the Corona Virus-19 pandemic of 2020–21.

Hurricane Florence (Category 4, September 2018) created 35 inches of rain in North Carolina and flooded 5,100 homes. In 2019, damaging slow-moving storms included Hurricane Barry (Category 1, Louisiana, \$600 million in damage), Dorian (Category 5, Bahamas, Southeast United States, and Canada, \$4.6 billion in damage), and Tropical Storm Imelda (Texas and Louisiana, \$2 billion in damage). The 2019 Atlantic hurricane season proved the

fourth above-average damaging season since 2016. To date, Hurricane Katrina (2005, Category 5, Louisiana) remains the most expensive in terms of property damage (\$168 billion). On August 29, 2021, the 16th anniversary of Katrina, Hurricane Ida struck the Gulf Coast. Over a million citizens lost power in New Orleans. Ida tied with Hurricane Laura from last year, and the Last Is-

land Hurricane of 1856 as Louisiana’s most powerful storm ever recorded. The damage continued as the storm traveled inland to the Northeast, ravaging New Jersey and New York. On September 7, President Biden surveyed the damage which left at least 67 hurricane-related deaths across eight states, warning that we have reached “code red” on addressing climate change.

## The winds of political change on climate in the United States

The United States has witnessed a sea-change in Presidential politics, and with it, a renewed focus on addressing the threats of climate change. In 2016, the election of Donald J. Trump brought with him a basic executive branch belief that the climate change movement proved fundamentally counter-productive to “Making America Great Again.” President Trump’s first appointment as Secretary of State, Rex Tillerson, the former CEO of ExxonMobil, signaled to the world America had pivoted toward national energy independence based upon “Making Oil, Gas, and Coal Great Again.” Tillerson’s replacement, Mike Pompeo, carried forward the same strategy for the rest of Trump’s term. This required withdrawing from the Obama-era Paris Climate Agreement of 2015, which Trump announced on June 1, 2017. During the Trump era, the United States became the leading world exporter of oil and gas.

In that vein, Mr. Trump supported the development of two major big oil initiatives:

- The Canadian-U.S. Keystone pipeline is designed to bring up to 35 million gallons of oil daily some 1,200 miles from the oil sands of Western Canada to Steele City Nebraska. Once there, the crude would travel southwards through other pipelines to reach American refineries on the Gulf Coast; and

- The auctioning of oil and gas leases for drilling rights to the Alaskan Arctic National Wildlife Refuge. In early January of 2021, before Joe Biden’s inauguration, the Trump administra-

tion sold the rights to just over 550,000 acres on 11 tracks of land, netting \$14.4 million dollars. A 2017 law authorized the government to sell the rights to another several hundred thousand acres by 2024.

The November 3, 2020, presidential election of Joe Biden brought with it a promise to rejoin the Paris Agreement of 2015, and stop both the building of the Keystone pipeline as well as any proposed drilling in the Arctic National Wildlife Refuge. As these stances suggest, President Biden has distinctly different—if not polar opposite—views on climate compared to former President Trump (see box).

Where do Americans stand on climate change? According to an April 2021 Morning Consult poll, half of American voters now believe “the climate threat is critical,” up 10 percentage points from 2017 and up 6 points from 2019. The share of Democrats who view the threat this way, the study shows, “increased most substantially since 2017, jumping 16 points to 75%.” Three in five voters expressed that the United States should be in the Paris Agreement; about one out of five said it should not. Mr. Biden took advantage of these growing numbers of the climate-concerned electorate to win his election, and now has set up an ambitious array of climate-related initiatives to help bring greenhouse emissions under control.

According to Jennifer Marlon at the Yale School of the Environment, we are more likely to interpret weather events through political lenses than scientific



ones. “The signal of climate change is difficult for people to notice against the noisy background of day-to-day and seasonal changes in weather.... We do not simply use our senses to record information and our surroundings and daily events—we interpret those events and filter them through our emotions, memories, culture, and in the case of weather and climate, our politics.” What this may simply mean is that democratic presidents—from Bill Clinton to Barack Obama to Joe Biden—have seen climate action as more key to their political constituencies than Republican ones—George H.W. Bush, George W. Bush, and Donald Trump. Towing the party line for politicians also means speaking to what their constituents see as priorities. Professor Marlon further notes that only 22% of Republicans agree that they have experienced global warming compared to 60% of Democrats.

Worldwide, according to the Pew Research Center, “majorities in most surveyed countries say global climate change is a major threat to their nation.” About 20% believe climate change represents a minor threat to no threat at all. Moreover, most citizens in advanced economies say they would change the way they live and work to combat the effects of global warming.

The Media and Climate Change Observatory (MeCCO), a consortium based at the University of Colorado, monitors 127 sources across television, radio, and newspapers in 59 countries and seven worldwide regions. They produce monthly newsletters relaying the incidence of weather and climate-related stories. In 2021, there have been 40% more stories worldwide on extreme weather events compared to 2020. MeCCO’s June 2021 summary reported a New York Times essay by Michael Mann and Susan Joy Hassol: “In the old days we would escape the summer by heading north—to the Adirondacks in the East or to the cool, forested Pacific Northwest in the West. But this is not your grandparents’ climate.” With fires ablaze in the United States and Canada—300 fires in British Columbia, and another 130 in North-

Presidents Trump vs. Biden on Climate Change		
Issue:	President Trump	President Biden
<b>The Climate Change Threat</b>	It’s a hoax	It’s a national emergency
<b>The Paris Agreement of 2015</b>	Withdrew in 2017	Rejoined in 2021
<b>New Pipelines and Arctic Drilling</b>	Supported both	Stopped both
<b>Energy Priorities</b>	More U.S. coal, oil, and gas	No carbon in the power grid by 2035
<b>Housing and Climate</b>	No change	Weatherize 2 million homes; Build 1.5 million green homes; subsidize poor
<b>Transportation Priorities</b>	Improve roads, airports	\$2 trillion for R&D to get to zero emissions (net zero) by 2050; Increase numbers of electric cars

western Ontario—what used to serve as a holiday refuge from the heat have become flaming no-go zones. Numerous countries and regions have noticed the trend and have devised specific policy initiatives which they hope will help mitigate these negative effects of climate change.

### Biden climate initiatives

On January 27, 2021, President Biden signed executive orders to “tackle the climate crisis at home and abroad while creating good-paying union jobs and equitable clean energy future, building modern and sustainable infrastructure, restoring scientific integrity, and evidence-based policy-making across the federal government.” Therein, the president committed to center the climate crisis squarely within U.S. foreign policy and national security considerations. The executive order affirmed the intention of implementing—and building upon—the Paris Agreement of 2015, which first means delivering upon shorter-term global greenhouse gas emission reductions to enable the goal of attaining a net-zero by 2050.

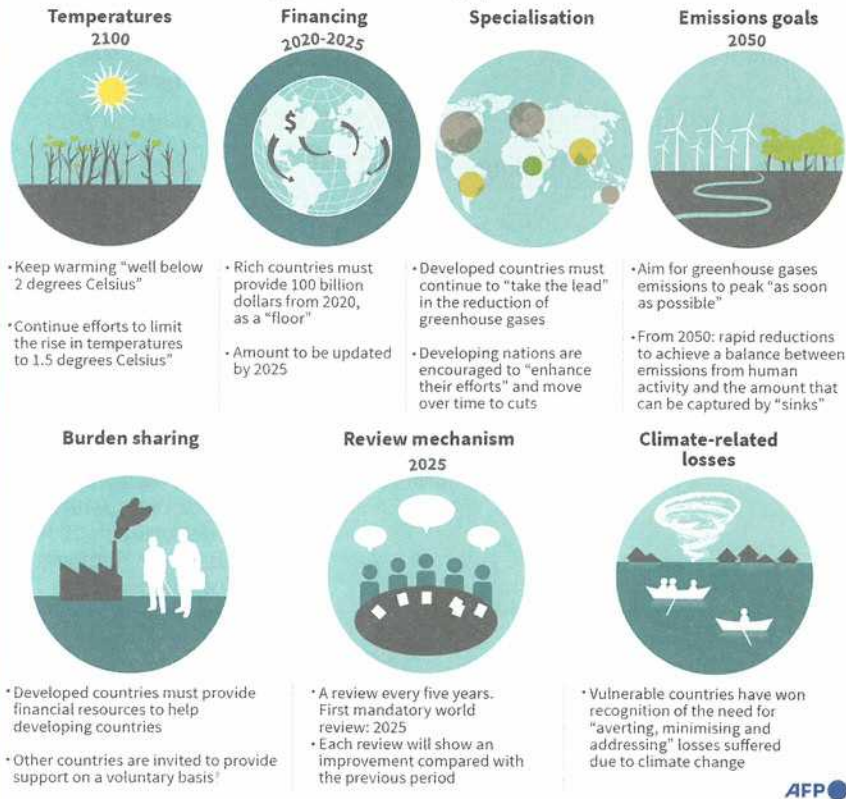
President Biden further instructed the Director of National Intelligence (DNI) to prepare a National Intelligence Estimate (NIE)—the American intelligence community’s most authori-

tative and dedicated written assessment of national security issues—on climate change. The president further tasked the U.S. Department of State (DoS) and all related agencies “to develop strategies for integrating climate considerations into their international work.”

Domestically, the order calls for the creation of jobs “in construction, manufacturing, engineering, and the skilled trades” so that every federal investment in infrastructure reduces climate pollution, accelerates clean energy, and will tie the permitting process directly to these goals. The president directed that conservation of at least 30% of American lands and oceans by 2030 be accompanied with a process of “stakeholder engagement.” To that end, Mr. Biden announced the establishment of a Civilian Climate Corps initiative to “put a new generation of Americans to work restoring public lands and waters, increasing reforestation, increasing carbon sequestration in the agricultural sector, protecting biodiversity, and improving access to recreation.” A new Whitehouse Environmental Justice Interagency Council will help coordinate a government-wide mandate “to develop programs, policies and activities to address the disproportionate health, environmental, economic, and climate impacts on disadvantaged



## The Paris climate agreement: key points



communities." Moreover, the executive order calls for a "Justice40 Initiative," which aims to deliver 40% of the federal government's investment to disadvantaged communities while tracking performance through an Environmental Justice Scorecard.

On Earth Day, April 22, 2021, President Biden convened a two-day virtual leader's summit on climate. The summit convened leaders of 17 of the world's leading economies and greenhouse gas emitters. The President revealed the U.S. intention to keep the median rise of global temperature to 1.5°C by 2030. Mr. Biden, Vice President Kamala Harris, Special Envoy for Climate John Kerry, and National Climate Adviser Gina McCarthy represented the United States. In his opening remarks, Biden reiterated his intent to create green jobs to clean up oil, gas, and coal plants, to build more electric cars and a network of 500,000 miles of electric fueling stations as part of America's "nationally determined contribution" (NDC) to upholding the Paris Agreement of 2015. Yet Biden underscored that the United

States represents only 15% of the world's GHG emissions. "All of us, all of us—and particularly those who represent the world's largest economies—we have to step up."

With a view toward the November 2021 26th annual meeting of the UN Framework Convention on Climate Change (UNFCCC, Conference of the Parties, COP 26) in Glasgow, the virtual meeting meant to send several signals: the gathering fulfilled a campaign promise to elevate American leadership on climate, it revealed America's NDC (50% from 2005 levels by 2030), and encouraged others to work with the United States to embrace innovation and investment in new, greener technologies to mitigate human-made GHG emissions.

■ Chinese President Xi Jinping restated China intended to peak its emissions by 2030 and would reach carbon neutrality by 2060.

■ Canadian Prime Minister Trudeau pledged to reduce Canada's GHG emissions 40-45% by 2030.

■ Japanese Prime Minister Yoshihide

Suga shared that Japan will cut emissions 46% below 2013 levels by 2030.

■ The launch of a Net Producers Forum between the energy ministries of the United States, Canada, Norway, Qatar, and Saudi Arabia.

■ A Greening Government Initiative co-chaired by the United States and Canada to review and implement green procurement strategies net-zero supply chains for government buildings and vehicle fleets.

■ A bilateral United States-India Clean Energy Agenda 2030 Partnership intended to build upon similar agreements to review the best ways to finance climate initiatives with Japan and Australia to form a Quad Climate Working Group.

■ The United States and the United Arab Emirates (UAE) will create an Agricultural Innovation Mission for Climate to enhance low-carbon growth food security.

■ A Global Climate-Smart Infrastructure Program led by the U.S. Trade and Development Agency (USTDA) connecting American industry to energy and transportation infrastructure in emerging markets.

A major challenge to meet the ambitious international goals will involve both public and private financing and investment. Especially with the global economic downturn created by Covid-19 and its variants, how much deficit spending can national economies—let alone the global economy—afford, especially one reliant on fossil fuels which has in general provided cheaper energy than its renewable alternatives? Or are we being penny-wise and pound foolish? Can we sustain a global economy that relies less—or not at all—on oil, gas, and coal? Do we really have a choice as the incidence of fires, the freezes and the floods continue to accelerate in intensity? The Biden administration has made a commitment to invest in a greener future, but it cannot happen overnight, it cannot happen alone, and the envisioned retooling of industry, infrastructure, and transportation will prove very painful for many.

On the financial side, the U.S. government has released an International Climate Finance Plan wherein the U.S.



Agency for International Development (USAID) will play a key role. The U.S. International Development Finance Corporation (DFC) aims to set aside at least one-third of all new investments in climate-linked activities. Over the next five years, the Millennium Challenge Corporation (MCC) will provide 50% of its program funding to reducing GHGs. The Treasury Department will seek to mobilize World Bank and other regional development bank funding for the same purpose. By 2024, the Biden administration aims to have the U.S. Congress authorize double the annual climate finance expenditure to developing countries that was spent during the second half of the Obama era (2013–16).

### The U.S. Green New Deal

On February 7, 2019, a group of Democratic Congressmen and Congresswomen led by Ms. Alexandria Ocasio-Cortez (D-NY) of the House and Mr. Ed Markey (D-MA) of the Senate introduced a non-binding resolution (H.Res.109) entitled, “Recognizing the duty of the Federal Government to create a Green New Deal. (GND)” The GND aims, in its essence, due to the immediate climate threats to health and safety: to unravel and replace the fossil fuel economy in the United States; to guarantee “a family-sustaining wage to everyone”; and provide all Americans with “high quality health-care, housing, economic security, clean water, clean air, and healthy food, while addressing social systemic exclusion and injustice.”

According to the Council on Foreign Relations, the GND represents “a broad and sometimes vague aspiration to rapidly mobilize American government, society, and industry to create a sustainable low-carbon future. For supporters, such an effort represents a last chance to avoid the worst consequences of catastrophic climate change. For detractors, it’s a financially profligate proposal concerned more with traditional left-wing economic policies than environmental necessity.”

President Biden, by his early executive actions, has embraced the “green” portion of the H. Res. 109 regarding the

threat of climate change representing “a direct threat to the national security of the United States.” The other half of the “New Deal,” which aims to redistribute national wealth, remains more politically divisive—let alone expensive—in the wake of post-Covid-19 public spending to provide vaccines, pay-out unemployment and stimulus checks, and rebuild the American economy with grants to small and large businesses. The American Action Forum initially estimated the total cost of GNP to be between 53 and 92 trillion dollars. Mr. Biden may decide to slay one dragon at a time and begin by tackling the climate change beast that has set the Western United States and the Mediterranean on fire. Alternatively, when Democrats introduce a Green New Deal budget, the president does have a “climate change first” green-only fall-

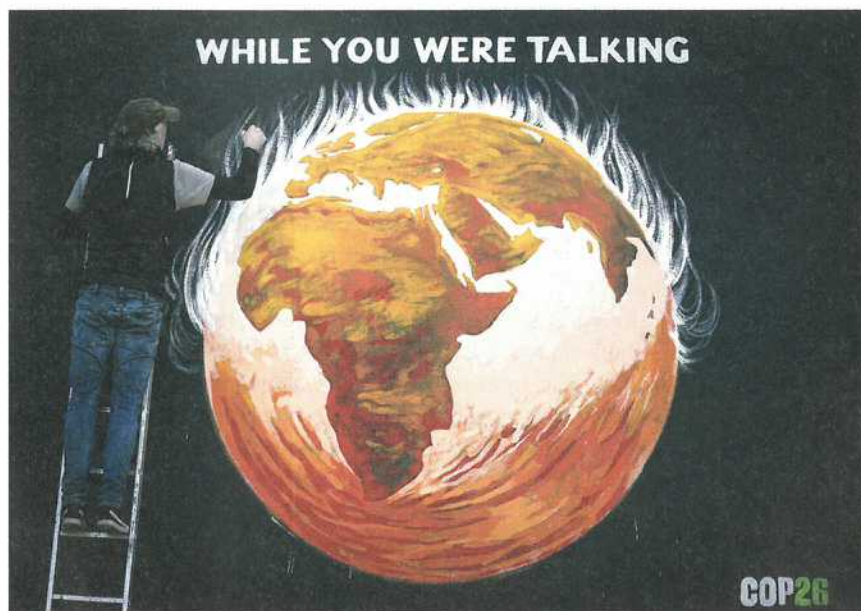
back option when that high figure runs into rough waters with Republicans.

By November of 2021, through hard-fought negotiations, Congress reduced an initial \$3.5 trillion budget resolution to \$1.75 trillion for the Biden “Build Back Better” domestic blueprint. The new budget still represents the largest U.S. investment in addressing climate change in U.S. history. The bill sets aside \$555 billion dollars to cut carbon emissions by including tax credits for businesses and consumers. The legislation will make it easier to buy electric cars, install solar panels, retrofit buildings, and manufacture wind-turbines and other energy-efficient equipment. As a nod to Republican objections, however, the bill does not specifically target reforming the energy sector—including the coal, oil and gas industries.

## Issues and challenges for the UN COP26 meeting in autumn 2021

The UN’s Inter-Governmental Panel on Climate Change (IPCC), in its August 2021 report, set an urgent tone. The report concluded unequivocally that the current climate crisis stems directly from human activities. Hundreds of the world’s top scientists have coldly and clearly made the anthropogenic link to our warming planet

and its dire consequences. The report spells out that carbon dioxide levels in the atmosphere have reached their highest level in two million years. The last time we saw heating this fast—at least 2,000 years ago, and probably 100,000 years ago.” It will require, “immediate, rapid and large-scale reductions” in emissions to prevent



Justice and Peace artist Greg Mitchell completes his climate-crisis themed mural that depicts the Earth on fire and reads ‘While you were talking,’ on the side of St John’s Church on Princes Street, Edinburgh, to coincide with Cop26 in Glasgow. (JANE BARLOW/PA IMAGES/GETTY IMAGES)



### Weather vs. Climate Change: A Glossary

**WEATHER:** Day-to-day temperature, rain, and other conditions such as wind.

**CLIMATE:** Weather observed over multiple decades for a defined location, including the globe. For example, NOAA measures a climate normal over specific 30-year periods for locations in the United States.

**CLIMATE VARIABILITY:** How weather varies over multiple weeks or years from the long-term average.

**CLIMATE CHANGE:** Occurs when the long-term climate shifts, without an apparent return to a previously identified normal.

worsening effects. Thus far, 90% of the world's regions have been affected by drought, heatwaves, and flooding. Professor David Reay, at the University of Edinburgh, put it this way, "It's clear that every extra ton of CO<sub>2</sub> emitted today is pushing us into a minefield of effects tomorrow."

The Paris Agreement has called for commitments to keep warming well below 2.0 degrees Celsius, with a global target of 1.5°C. According to Scientific American, in an opinion by Rebecca M. Peters, "Temperatures have already risen 1.2°C since pre-industrial levels, resulting in devastating floods, fires and droughts reflected in distressing daily headlines. Every increment of warming beyond 1.5°C will result in increasingly destructive and costly repercussions, particularly for the most vulnerable communities and countries in low-income and small island states." Ms. Peters argues that "The International Energy Agency (IEA) needs to make that goal [of keeping below 1.5°C] the centerpiece of its World Energy Outlook." The IEA, a Paris-based autonomous inter-governmental organization formed in the wake of the 1973–74 oil crisis, currently has a mission of "shaping a secure and sustainable energy future for all."

At the Glasgow COP 26 summit, concluded on November 13, 2021, world leaders made the following agreements:

■ A first-time compromise agreement on "drawing down" the use of coal. India argued for this language instead of "phasing out" this widely used fossil fuel. No specific targets, however, were reached. Many nations, including the United States, subsidize the drilling for and mining of fossil fuels, as these industries create national wealth and jobs. To counter the effects of climate change, activists argue such government subsidies must stop. Strong language to that effect, however, did not enter into the final documents of Glasgow.

■ The nearly 200 countries present agreed to come back in a year to announce their national commitments to reducing greenhouse gases. This indicates a nervousness about the rapid increase in emissions, and will keep the biggest emitters on notice. Before, countries would have had five years to divulge their plan. No agreement was reached, however, on how to verify member-state reductions, let alone create an enforcement mechanism to ensure compliance.

■ On September 28, 2021, the United States and the EU announced a joint initiative to reduce methane gases, which constitute up to 30% of all greenhouse gases (CO<sub>2</sub> being the prominent of GHGs). Leaders in Glasgow signed onto the pledge which aims to reduce global methane emissions by 30% to 2020 levels by 2030. Considered the "low-hanging fruit" of emissions, this assumes everyone will voluntarily meet these targets. It is worth noting that neither Russia nor China, two of the world's top methane emitters, attended COP26. Moreover, the high-hanging fruit of CO<sub>2</sub> emissions did not get addressed in a way that either youth activists—who protested in the streets of Glasgow—or concerned scientists—who wrote the IPCC warnings—would consider satisfactory to address the threat.

Speaking of trees, British Prime Minister Boris Johnson and Prince

Charles led an initiative at Glasgow whereby 100 nations agreed to stop destruction of the world's forests. Deforestation takes away key plants that take carbon out of the atmosphere and store it. Without trees, carbon is released back into the atmosphere. While a noble goal, a country widely known for deforestation of the Amazon, Brasil, did not even show up at COP26.

Developing nations did not receive specific assurances on how they will be compensated for the climate damage created by the industrialized countries, let alone monies to help them adapt to future climate damages.

All told, keeping below 1.5°C will not prove easy to meet by 2030, let alone achieving net zero by 2050. If we look at how Covid-19 and the global lockdown affected GHG emissions—only slightly lower due to less transportation use—the challenge becomes apparent. And as economies began to recover from Covid-19, emissions rose again. Transportation, according to the Environmental Protection Agency (EPA), remains the largest source of GHG (29%). The other sources include electricity production (25%), industry (23%), commercial and residential (13%), and agriculture (10%). For decarbonization to have any chance to work, all sources of emissions require mitigation.

Moreover, the global pandemic made it harder to coordinate international climate efforts. The UN parties to the Climate Convention had not met since December 2019 in Madrid. Virtual meetings took place during the last three weeks in the Spanish capital. Technical and logistical glitches, however, marred progress and as did political differences. The UNFCCC postponed the 2020 Conference of the Parties (COP) until Glasgow 2021 to accommodate dealing with Covid-19 as well as use the time to mend fences between differing factions. As a result, COP 26 made progress on some issues noted above, but fell short of the necessary international political will needed to reach the Paris Agreement goals.



### Achieving decarbonization

If, as IPCC scientists recommend, we must immediately make rapid and large-scale reductions in greenhouse gas emissions, this will collectively require using all the tools and innovations at our disposal to transform our current fossil-fuel economy into a more renewal one. The Biden initiatives provide funding for new technologies at home and abroad. Foreign Policy Analytics, an independent research division of *Foreign Policy* magazine, has produced a series of reports on the status of key technologies for deep decarbonization of the grid.

**Wind and Solar Power:** Seventy-six percent of greenhouse gas emissions derive from the energy sector, and eighty-four per cent of energy production still comes from coal, oil, and gas. Wind and solar power, however, have made great strides over the past decade. In 2019, for example, these two renewable sources of energy accounted for 80% of new capacity installed worldwide. Yet, according to the IEA, wind and solar power combined only to account for 10% of today's global entire energy mix. New capacity is not supplying current demand fast enough. For this to happen, according to the journal, *Joule*, governments must focus on providing more carbon-free electrical power. "Pushing to near-zero emissions requires replacing the vast majority of fossil-fueled power plants or equipping them with carbon capture and storage (CCS)." Lithium-ion batteries, with flexible demand, can smooth out the daily variability of wind and solar power, but they to date cannot store enough power to meet overall longer-term demand. New battery technologies and chemistries show some promise but remain unproven.

**Hydrogen:** According to the Center for Climate and Energy Solutions, hydrogen holds the promise to fulfill both low-carbon energy and transportation needs. "It can be burned to generate heat or passed through a fuel cell to create electricity in a chemical conversion process." Three car companies—Toyota, Honda, and Hyundai—



Photovoltaic solar panels and wind turbines, San Geronimo Pass Wind Farm, Palm Springs, California. (IMAGE SOURCE/ALAMY)

each produce a hydrogen fuel vehicle. Pathways to produce hydrogen include higher and lower carbon alternatives. Hydrogen only exists in compounds. The primary method for making hydrogen involves the heating of natural gas, which produces methane, a significant greenhouse gas byproduct. Yet if one combines this process with carbon capture technology, emissions diminish. Electrolysis, another lower-emission method, uses electricity to make pure streams of hydrogen and oxygen from water. This process, however, currently costs double that of the primary method of making hydrogen. As production capacity and improved technologies develop, experts believe that the cost of electrolysis will go down by as much as 70%.

**Nuclear Power:** The current generation of nuclear power plants have encountered four main problems: storage of nuclear waste, nuclear melt-down accidents, high cost, and long construction times. Long memories of nuclear power plant disasters in Chernobyl, Ukraine, (1986) and Fukushima, Japan, (2011) have made many countries wary to rely on nuclear energy at all. Yet France has successfully used their nuclear power to provide 75% of its national energy needs. Nuclear power does not generate greenhouse gases. Most proponents have argued that a fourth generation of nuclear power plants can both avoid the four main headaches connected to current reactors while helping decarbonize the planet.

Small modular reactors (SMR) use multiple small reactors with a passive cooling system to create the same

power as a large reactor at less cost and no chance of meltdown. SMRs still use uranium, however, and the disposal of nuclear waste remains an issue. Molten salt reactors (MSR) use liquid salt as a coolant and have 30% more efficiency than water-cooled plants—yet they, too, generate nuclear waste. Travelling wave reactors (TWR) use depleted Uranium-238, thus producing 80% less radioactive waste. Moreover, this technology aims to use a "once-through fuel cycle" that eliminates safety issues as well as proliferation concerns connected to the reprocessing of spent fuel. Bill Gates has invested "several hundred million dollars" into developing this approach in a new venture called TerraPower. In Gate's book, *How to Avoid Climate Disaster*, he argues that "The only solution I could imagine was to make clean energy so cheap that every country would choose it over fossil fuels."

China and Canada have invested in developing reactors that use thorium instead of uranium as fuel. Thorium, more plentiful than uranium, also has the added benefit that it can't be split or reprocessed to create nuclear chain reactions—which cause safety and nuclear waste issues in reactors and can facilitate nuclear explosions in military weapons. Jim Hansen, a former NASA scientist and climate change guru, has concluded, "The time has come for those who take the threat of global warming seriously to embrace the development and deployment of safer nuclear power systems."

**Transportation:** Cars, buses, trucks, trains, ships, and airplanes have traditionally relied upon the gas-fueled



combustion-engine to propel us to our destinations. Natural gas, biofuels and fuel-efficiency standards have helped reduce GHGs slightly. To reach zero-emissions by 2050, however, will require a total transformation of the transportation industry and the fossils fuels they rely upon worldwide. Whether or not we reach that goal, some entrepreneurs have tried to help. One successful innovator, Elon Musk, has created three companies—SpaceX, Tesla, and Solar City (now Tesla Energy)—with his vision to reduce global warming through sustainable energy production and consumption, and mitigating the risk of human extinction by creating a colony on Mars. Musk has also proposed a high-speed train system called the Hyperloop for both passenger and freight transport that could travel at airline speeds.

Hal Harvey, Robbie Orvis, and Jeffrey Rissman, in their book, *Designing Climate Solutions: A Policy Guide for Low-Carbon Energy*, note that “vehicle electrification policies can contribute at least 1% of cumulative emission reductions to meet a two-degree target through 2050. Although 1% does not seem like much, electric vehicles (EVs) have other benefits: they prove three-times more efficient than gasoline cars—59% to 62% of the energy converts into power to turn the wheels compared to gas cars’ 17% to 21%. This efficiency means they cost less to operate—one dollar buys 43 miles, about one-fourth the cost of powering a 2016 gas-powered passenger car. EVs have far fewer moving parts (typically without a radiator or transmission) so they need less maintenance. On the downside, EVs still cost more than gas or diesel vehicles, and they need access to recharging stations—not always easy for families that lack access to electricity in a garage or on the street. And when faced with providing food on the table, and struggling in a post-covid economic turnaround, buying a more expensive car won’t be in the cards. Buses, trucks, and motorbikes can all be electrified—again, if communities and states want to invest in expanding charging station access. For developing countries

like China and India, among the largest emitters, the biggest concern about EVs remains their cost.

Forty-five states and the District of Columbia provide tax breaks and other incentives for buying either hybrid or electric vehicles. These as well as federal incentives also exist for installing solar panels on our homes. Subsidies, rebates, and carbon taxes/fees altogether encourage EV ownership by businesses and consumers. Officials have tried reducing bridge tolls and providing free

electricity to recharge your EV at public charging stations. For example, the San Francisco-Oakland Bay Bridge toll is \$6.00 during commute hours for most cars but EVs and carpools cost only \$2.50—providing a \$900 a year savings. One can ask if such measures profoundly matter or merely chip away at the periphery of a much larger, rolling boulder. Can and will they collectively make enough of a difference to counter the negative effects of climate change on a global level?

## The heat of the moment: humanity’s challenge

**I**n a 1931 address to students at the California Institute of Technology, Nobel Laureate Albert Einstein advised, “It is not enough that you should understand about applied science in order that your work may increase man’s blessings. Concern for man himself and his fate must always form the chief interest of all technical endeavors...in order that the creations of our mind shall be a blessing and not a curse to mankind. Never forget this in the midst of your diagrams and equations.” Ninety years after this speech, scientists have signaled an alarm to warn humankind about the dangers of a warming planet for our collective fate.

Their measured scientific opinions have sought to inform and prompt global political will to act. To reverse the effects of climate change—let alone prevent future ones—will prove hard among a host of competing day-to-day and longer-term priorities. Covid-19 generated a second front of environmental war—requiring immense resources for vaccines and creating strains on our emergency medical services infrastructure. Those most vulnerable suffered the worst outcomes. So, too, have extreme weather events affected the frail with higher mortality rates in the wake of heat, cold, and torrential downpours. We will have to battle on both fronts, but can we find the technical equivalent of a global vaccine for climate change?

As the evidence mounts through

fires and floods, winter freezes, intensified hurricanes and heatwaves, our changing climate has become for many, a higher matter of national security, and even a critical matter of public health. More than 200 medical journals—including the *New England Journal of Medicine* and the *British Medical Journal*—recently made an unprecedented joint statement urging world leaders to cut emissions to avoid “catastrophic harm to health that will be impossible to reverse.” The statement, building on the August 2021 IPCC report’s conclusions, provides more ammo to international negotiators to put climate change at the top of the global agenda.

“In the past 20 years,” the statement reads, “heat-related mortality among people over 65 years of age has increased by more than 50%.” Climate change requires “the same kind of funding and focus that the Covid-19 pandemic received.” Dr. Eric Rubin, editor in chief of the *New England Journal of Medicine*, described the document as “more of a call to action than an obituary for the planet.”

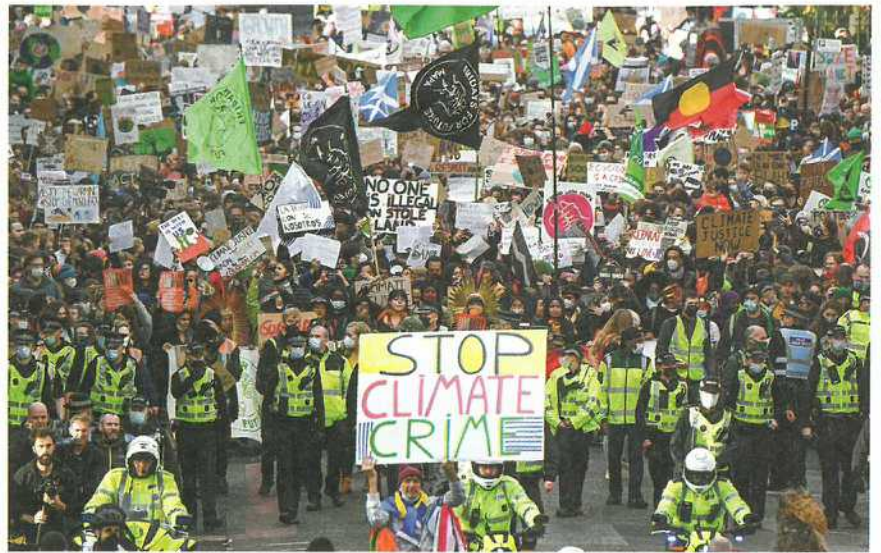
Are we up to the task? Can we hedge our international bets to improve our environment for current and future generations? According to Foreign Policy Analytics, about 70% of today’s emissions belong to countries that have made net-zero commitments under the 2015 Paris Agreement. The recent report, however, signaled that “tangible policy actions to those ends continue



to fall short.” An article in *Foreign Affairs* by Alice Hill entitled “The United States Isn’t Ready for the New Phase of Climate Change,” goes even further to argue our national strategy to adapt to extreme weather has fallen short. Focusing on emissions alone will not repair the damage already done today, let alone those likely to occur tomorrow from future fires, freezes, and floods. If the most advanced economy in the world has not prepared properly, with 15% of global emissions, what about the remaining countries responsible for 85% of the world’s greenhouse gases?

For two years, in the late 1990s, this author served as a co-director of the University of California Roger Revelle Program on Climate Science and Policy. We brought distinguished climate scientists to the UNFCCC Conference of the Parties meetings to discuss their research. The group included world-renowned researchers from the Scripps Institution of Oceanography at UC San Diego, from other campuses of the University of California, Woods Hole, Massachusetts, and several distinguished British and German institutions. The scientists quickly realized that the questions coming their way after public presentations always had more to do with politics than science, more with political will than scientific measurements of CO<sub>2</sub>, melting glaciers and sea-rise, climate modeling, air quality, and the effects of a global median rise in temperature for ocean chemistry, biodiversity, and public health.

To this day, the term “climate change” has become such a heated political term in the United States and elsewhere that it has stymied progress, funding, and ultimately practical solutions to improving the environment. One approach in conflict resolution involves reframing the debate to identify common stakes in the game. Most everyone across the political aisle agrees that air pollution and bad water affects human health negatively and that the government must play a major role in reducing both threats. The Air Pollution Control Act of 1955 provided the first federal legislation to conduct research on bad air quality. The Clean Air



Demonstrators join the Fridays For Future march on November 05, 2021, in Glasgow, Scotland. Day Six of the 2021 climate summit in Glasgow focused on youth and public empowerment. (JEFF J MITCHELL/GETTY IMAGES)

Acts of 1963 and 1970 provided laws on controlling it. Congress has amended the Clean Air Act many times to address new circumstances. The U.S. Environmental Protection Agency (EPA) opened its doors in December 1970 to implement the legislation. Can we acknowledge that global conditions now affect national air quality to the point that we must address it?

Concern about water quality in the United States prompted even earlier legislation. In 1948, Congress passed the Federal Water Pollution Control Act. Later this led to sweeping amendments in 1972 which gave the EPA authority to regulate the pollutants released into our waters by industry while setting water quality standards. This law also delegated the EPA to deal with “nonpoint source pollution,” meaning excess fertilizers, herbicides, insecticides from residential areas, toxic chemicals like oil, grease and runoff chemicals from energy production, salt from irrigation practices and acid drainage from abandoned mines. Do we now not face a global nonpoint source pollution that affects national water quality which we must redress?

Constant fires threaten our nation’s air quality. Persistent flooding jeopardizes our water purity. The two together, whether they originate from state-wide, nationwide, or global sources,

require our collective attention if we want to secure a healthier future for our sons, daughters, and their families. We must acknowledge that fossil fuels have helped create the wealth and prosperity we have enjoyed thus far. We must also face the fact that non-renewable energy has, according to many of our best scientists, created a sharpening dual-edged sword. We should look to leverage real events in the air and on the ground to transform how we do and fuel our daily business. It does not have to happen overnight, but we can use the recent climate events as impetus to hedge our bets soon. As Stephen Hawking, the brilliant British author, cosmologist, and theoretical physicist once said, “Intelligence is the ability to adapt to change.”

In the heat of the moment, if we don’t adapt to climate change, we may soon face more uncomfortable perils. The Economist, in its July 2, 2021, issue poignantly editorialized that we will soon have “no safe place” in a 3°C future. The cover hosts a graphic of two penguins sitting on a wingback chair floating in the ocean, watching a TV depicting the world ablaze. Alternatively, we can all—7.8 billion of us—start making reservations on Elon Musk’s space shuttle to Mars. He’s likely to need a bigger spaceship. All aboard?



## discussion questions

1. According to an April 2021 poll, the number of Americans concerned about climate change has increased in recent years. What can we attribute this rise in concern to?
2. Democratic presidents are much likelier to make combating climate change part of their platform than Republican presidents are. Why is the issue of climate change more of a political issue than a scientific one?
3. How has President Biden incorporated tackling climate change into his foreign policy agenda?
4. The transition to green energy will be economically difficult for many. How can this transition be made so as to avoid massive job loss and economic hardship?
5. There are multiple decarbonization options that are present, such as wind power, solar power, and hydrogen to name a few. Which of these is the best option to pursue?
6. To what extent does cost remain the biggest factor in the way of combatting climate change? How can this be countered?

## suggested readings

David Remnick and Henry Finder, eds., *The Fragile Earth: Writing from the New Yorker on Climate Change*, 541 pp. New York: HarperCollins Publishers, 2020. With an introduction by Elizabeth Kolbert, this anthology of writings from the popular magazine addresses three topics: "A Crack in the Ice: How We Got Here," "Hell and High Water: Where We Are," and "Changing the Weather: What We Can Do Now."

Bill Gates, *How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need*, 257 pp. New York: Alfred A. Knopf, 2021. Gates, a technologist, business leader and philanthropist, argues that every country must change its ways because virtually every activity in modern life involves the release of greenhouse gases. His new venture TerraPower aims to produce a fourth-generation nuclear power plant to provide cheap energy while reducing emissions.

Ashlee Vance, Elon Musk: *Tesla, SpaceX, and the Quest for a Fantastic Future*, 402 pp. New York: HarperCollins Publishers, 2015. A bestselling biography of the man and entrepreneur who would go to Mars, just in case we cannot turn the negative effects of climate change around. He is also responsible for producing the popular Tesla electric cars.

Marc Shaus, *Our Livable World: Creating the Clean Earth of Tomorrow*, 310 pp. New York: Diversion Books, 2020. A cogent summary of the challenges and opportunities before us to tackle climate change, including the related implications of Covid-19. He proposes bold solutions such as solar cells capable of storing energy, smart highways that charge electric vehicles, indoor farming, bioluminescent vines to replace streetlights, and jet fuel created from landfill trash.

Greta Thunberg, *No One is Too Small to Make a Difference*, 106 pp. New York: Penguin Books, 2019. A collection of speeches made by a young woman who as a 15-year-old decided not to go to school to protest the climate crisis, inspiring millions of other students to go on strike to do the same. Her impassioned speech at the 2019 UN Climate Summit and her follow-up street protests at COP26 in Glasgow admonished the older generation for handing hers a global environmental disaster.

Alex Epstein, *Fossil Future: Why Global Human Flourishing Requires More Coal, Oil, and Natural Gas—Not Less*, 480 pp., Portfolio Press, 2022. The best-selling author of *The Moral Case for Fossil Fuels*, Goldstein throws cold water on the effects of a warming planet by arguing that the benefits of fossil fuels will continue to outweigh their side-effects—including climate impacts—for generations to come.

**Don't forget to vote!**

**Download a copy of the ballot questions from the Resources page at [www.fpa.org/great\\_decisions](http://www.fpa.org/great_decisions)**

**To access web links to these readings, as well as links to additional, shorter readings and suggested web sites,**

**GO TO [www.fpa.org/great\\_decisions](http://www.fpa.org/great_decisions)**

**and click on the topic under Resources, on the right-hand side of the page.**



# GREAT DECISIONS

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## The renewed climate change agenda

### Acronyms and abbreviations

**UNFCC**- United Nations Framework Convention on Climate Change

**NOAA**- National Oceanic and Atmospheric Administration

**PG&E**- Pacific Gas and Electric Company

**LNG**- Liquid Natural Gas

**Bernd**- German Weather Service

**MeCCO**- Media and Climate Change Observatory

**DNI**- Director of National Intelligence

**NIE**- National Intelligence Estimate

**DoS**- U.S. Department of State

**NDC**- Nationally Determined Contribution

**COP 26**- Conference of the Parties

**UAE**- United Arab Emirates

**USTDA**- U.S. Trade and Development Agency

**USAID**- U.S. Agency for International Development

**DFC**- Development Finance Corporation

**MCC**- Millennium Challenge Corporation

**GND**- Green New Deal

**GNP**- Gross National Product

**IPCC**- Inter-Governmental Panel on Climate Change

**IEA**- International Energy Agency

**GHG**- Green House Gases

**EPA**- Environmental Protection Agency

**CCS**- Carbon Capture and Storage

**SMR**- Small Modular Reactor

**MSR**- Molten Salt Reactor

### Glossary

**Greenhouse Gases**- Gases that trap heat in the atmosphere and warm the planet

**Gavin Newsome**- American Politician serving as the 40th governor of California since January 2019. He is a member of the Democratic party and previously served as the lieutenant governor of California

**Carbon Sink**- Anything that absorbs more carbon from the atmosphere than it releases

**Center for Climate and Energy Solutions**- Environmental nonprofit organization based in Arlington, Virginia. Works closely with politicians to promote policy that combats climate change

**Paris Climate Agreement**- International treaty on climate change, adopted in 2015. Its aim is to help member countries adapt to the effects of climate change

**Keystone Pipeline**- Oil pipeline system in Canada and the United States. On January 20, 2021 President Biden signed an executive order cancelling the project

**Pew Research Center**- Nonpartisan American think tank based in Washington, D.C.



**Green New Deal-** Proposal that calls for public policy to address climate change

**Deforestation-** Clearing, destroying, or otherwise removal of trees through deliberate, natural, or accidental means

**Fossil Fuels-** Natural fuel such as coal or gas

**Electrolysis-** Technique that uses direct electric current to drive a chemical reaction

**Clean Air Act-** United States' primary federal air quality law, intended to reduce and control air pollution nationwide