HOUSE SELECT COMMITTEE ON THE
CLIMATE CRISIS

Solving the Climate Crisis 2022:

Key Accomplishments and Additional Opportunities

MAJORITY STAFF REPORT

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117TH CONGRESS

PREPARED BY MAJORITY COMMITTEE STAFF PURSUANT TO H.RES.8

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DECEMBER 2022

Dedicated to the memory of *Representative A. Donald McEachin (D-VA)*

October 10, 1961—November 28, 2022

He brought environmental justice to the heart of Congress and was an inspiration to us all.

Preface

The climate crisis is unmistakably here, fueled by rising global temperatures and heat-trapping pollution. Climate disasters are putting America's security and stability at serious risk and threatening our economy, our way of life, and our communities. The crisis is no longer a distant threat. Higher costs, harsh impacts, and greater injury and loss of life are upon us now. This summer, brutal heat waves shattered more than 7,000 daily temperature records across the United States. Persistent drought is quickly drying up our vital lakes and rivers, while wildfires like the Dixie Fire and the Camp Fire have unleashed unprecedented levels of destruction across the West. Massive floods have destroyed the homes and livelihoods of countless Americans. And climate-fueled storms like deadly Hurricane Ian, the costliest storm on record for the State of Florida, which joins the growing list of severe storms – Katrina, Sandy, Harvey, Ida, Maria – whose names are now synonymous with destruction.

Given the growing costs of these catastrophes, House Democrats have used the power of our majority to take bold action to solve the climate crisis. Led by Speaker Nancy Pelosi, Democrats have delivered on our pledge to reduce heat-trapping pollution in a way that creates good-paying American jobs, bolsters domestic manufacturing of clean technologies, reduces energy costs for families and businesses, invests in historically disadvantaged communities, and firmly positions the United States to remain the global leader of the 21st century. That includes this year's passage of the Inflation Reduction Act, the largest clean energy and climate investment in U.S. history, putting the United States on a path to reduce heat-trapping pollution by roughly 40% by 2030; the Bipartisan Infrastructure Law, which makes communities more resilient to droughts, wildfires, supercharged storms, floods, heat waves, and other extreme weather events; and the CHIPS and Science Act which empowers America's industries to produce the semiconductor chips that are essential to our clean energy transition.

Solving the climate crisis is hard work, but the results already are encouraging – and the opportunities are exciting. Thousands of manufacturing jobs are popping up in states like Kansas, Kentucky, North Carolina, and Alabama, where companies are racing to produce the batteries and technologies that will power our economy. In states like Michigan and Ohio, the auto industry is investing billions to empower American workers to build the electric vehicles of the future. Utilities are increasingly adding wind and solar to their energy mix, taking advantage of their affordability and boosting America's energy independence. And millions will breathe cleaner air thanks to zero-emission school buses, clean postal trucks, and investments that put families over polluters.

In this report, the majority staff of the Select Committee lays out the progress made over the past years to address the climate emergency and fulfill the recommendations in our 2020 Climate Crisis Action Plan, which provided a roadmap for Congress to build a clean energy economy. In addition to key accomplishments, the report lays out opportunities for additional action. And as the 117th Congress draws to a close, it provides a reminder that the fight for climate action must continue – guided by science, rooted in justice, and powered by American workers.

Introduction

Innovations and solutions to solve the climate crisis are as urgently necessary today as they were in 2019 when Speaker Nancy Pelosi created the Select Committee on the Climate Crisis and directed the committee to deliver policy recommendations to start solving the climate crisis. The recent Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report makes clear that the next few years are critical to limit warming.[1] Thankfully, progress begets progress – the landmark new laws passed by the Democratic-led 116th and 117th Congresses make enormous progress in moving America closer to our climate goals and a "net zero" future – and provides a basis to go further.

As Speaker Pelosi stated, the Select Committee's work was not intended to be just an academic endeavor, but to guide major climate legislation across the committees to make informed recommendations and deliver on our moral obligation to children and future generations. The 117th Congress's historic Inflation Reduction Act (IRA), Bipartisan Infrastructure Law (BIL), and CHIPS and Science Act together contain hundreds of recommendations laid out in the Select Committee's June 2020 majority staff report, *Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America.*

Described as the "most detailed and well-thought-out plan for addressing climate change that has ever been a part of U.S. politics,"[2] the 2020 Climate Crisis Action Plan was developed after consulting with hundreds of stakeholders, scientists, and advocates across America, and conducting numerous fact-finding hearings on and off Capitol Hill. The Action Plan's robust set of policy recommendations for ambitious climate action was intended to serve as the framework for comprehensive congressional action, with a focus on satisfying the scientific imperative to reduce carbon pollution as quickly and aggressively as possible, while also making communities more resilient to the impacts of climate change and building a durable and equitable clean energy economy.

After releasing this unprecedented framework for climate action, the Select Committee has focused on turning as many of the Plan's 715 policy recommendations into legislation and then. As of December 2022, out of the 715 total recommendations in the Climate Crisis Action Plan, 436 passed the House and 314 were signed into law.[3]

These policies span the whole of American life and our economy: from investing in critical infrastructure and manufacturing, to restoring healthy habitats that strengthen community resilience, to deploying affordable clean energy that lowers costs and creates good-paying jobs. Building on the Energy Act of 2020, which authorized important research on climate solutions, the IRA, BIL, and CHIPS and Science Act of the 117th Congress are ground-breaking pieces of legislation that will guide climate action for the next decade. And we are pressing for meaningful climate action through the last days of the 117th Congress.

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[1] IPCC, "Climate Change 2022: Mitigation of Climate Change," 2022.
[2] David Roberts, "House Democrats just put out the most detailed climate plan in US political history" *Vox*, June 30, 2020.
[3] House Select Committee on the Climate Crisis, "Tracking Our Progress," Last Updated August 17, 2022.

Despite the incredible progress made, the costly climate crisis still rages. The United States faced 35 "billion-dollar" extreme weather and climate-related disaster events in 2021 and 2022, with a cumulative price tag of more than $180 billion in direct economic losses alone.[4] The climate crisis did not spare other nations and regions, whether unleashing record-setting deadly heat waves in Europe, causing massive flooding in Pakistan that displaced millions, Nigeria's worst flooding in a decade, and worsening drought in Kenya, Ethiopia and Somalia increasing food insecurity and leaving millions of children malnourished.[5] Without action, the science points toward continued global catastrophe. In fact, the United Nations Secretary General Antonio Guterres referred to the IPCC Sixth Assessment Report as a "code red for humanity," pointing to its dire findings on some of the irreversible trends set in motion by climate change.[6] However, the IPCC concluded that it is still technologically possible to halve global climate pollution by 2030 and warned that global climate pollution must peak by 2025 in order to avoid the worst devastation.[7]

Government action alone cannot meet the scope and potential devastation of climate crisis. This is why the targeted actions of the federal government designed to spur private investment are crucial to unleashing, expanding, and deploying the technologies necessary to respond to the challenge of our lifetimes. New challenges also spurred on the Select Committee to tackle solutions for the rising costs of energy due to exposure to volatile fossil fuel prices and limit the leverage of petrodictators in light of Russia's invasion of Ukraine and the ongoing war.

With these scenarios in mind, it is crucial that Congress continues to push for a clean energy economy that supports a healthy, resilient, and just America. The past four years have seen prodigious changes to the nation and the world, creating an unparalleled opportunity to comprehensively address these challenges. Doing so will have a tremendous positive impact on the lives of millions of Americans, lowering grocery store prices, slashing energy and fuel bills, creating good-paying jobs, fostering economic growth, advancing environmental justice, and improving public health. With all of these considerations in mind, the Select Committee presents this report, *Solving the Climate Crisis 2022: Key Accomplishments and Additional Opportunities*, building on and supplementing the recommendations included in the Climate Crisis Action Plan to capture what we have accomplished and what remains for future Congressional action to solve the climate crisis.

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[4] National Centers for Environmental Information, "Summary Stats | Billion-Dollar Weather and Climate Disasters," *National Oceanic and Atmospheric Administration*, 2022.
[5] Diana Mandiá, "Record heatwaves drive EU's July excess deaths to 2022 high," *Reuters*, September 16, 2022; United Nations, "Pakistan floods: Six month wait for water to recede, warn relief agencies," *UN News*, September 20, 2022; United Nations, "Millions at risk in flood-hit Nigeria; relief chief highlights hunger in Burkina Faso," *UN News*, October 21, 2022; Jefferson Kahinju, "Northern Kenya faces hunger crisis as drought wipes out livestock," *Reuters*, October 4, 2022.
[6] United Nations, "IPCC report: 'Code red' for human driven global heating, warns UN chief," *UN News*, August 9, 2021.
[7] IPCC, "Climate Change 2022: Mitigation of Climate Change," 2022.

Set an Ambitious National Goal to Cut Carbon Pollution

Set an Ambitious National Goal to Cut Carbon Pollution through Lower Cost Clean Energy

Setting an ambitious national goal to cut carbon pollution is an essential step in making progress toward climate targets. The April 2022 Intergovernmental Panel on Climate Change (IPCC) report on mitigation highlighted that global emissions must peak no later than 2025 to limit global warming to 2°C or less.[8] Fortunately, the IPCC report also determined that it is technologically possible to reduce global emissions by 50% by 2030 and meet this goal.

Progress toward reducing carbon pollution has occurred at many different levels. The Biden-Harris Administration rejoined the Paris Agreement and pledged to reduce U.S. greenhouse gas (GHG) pollution 50-52% below 2005 levels by 2030, making a commitment to climate action at the federal level. Independent analysis by three groups of outside experts, the Rhodium Group, Energy Innovation, and the REPEAT Project, all found that cumulatively, the Energy Act of 2020, the Bipartisan Infrastructure Law (BIL), and the Inflation Reduction Act (IRA), puts the United States on a path to reducing GHG pollution by 40% by 2030.[9] All three groups also found that through a combination of additional executive branch, state and local government, and private sector action, the United States could cut climate pollution in half by 2030.

States, cities, and businesses continue to establish ambitious climate pledges. Climate Action Plans have been released or are being developed in 33 states, and 24 states have adopted specific climate pollution targets, including ones that have significant fossil fuel resources like New Mexico, Montana, and Louisiana.[10] These pledges demonstrate widespread support for climate action.

Despite these positive trends, climate pollution continues to increase in the atmosphere.[11] Recent events are also unsettling global energy markets in ways that could impact emissions. Energy costs have risen across the board due to pandemic-related supply chain challenges and Russia's invasion of Ukraine. More countries are investing in expanded natural gas infrastructure that could lock in climate pollution for longer, and U.S. exports of Liquefied Natural Gas (LNG) are increasing. Geopolitical tensions could also limit possibilities for global cooperation.

In these circumstances, the case for U.S. leadership is stronger than ever, both to achieve global net-zero emission by 2050 at the latest and to begin to lower climate pollution levels in the atmosphere in the second half of the century.

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[8] Intergovernmental Panel on Climate Change (IPCC), "The evidence is clear: the time for action is now. We can halve emissions by 2030," press release, April 4, 2022.

[9] John Larsen et al., "A Turning Point for U.S. Climate Progress: Assessing the Climate and Clean Energy Provisions in the Inflation Reduction Act," *Rhodium Group*, Aug. 12, 2022; Megan Mahajan et al., "Updated Inflation Reduction Act Modeling Using the Energy Policy Simulator," *Energy Innovation*, Aug. 23, 2022; Jesse Jenkins et al., "Preliminary Report: The Climate and Energy Impacts of the Inflation Reduction Act of 2022," *REPEAT Project*, August 2022.

[10] Center for Climate and Energy Solutions, "State Climate Policy Maps," Accessed December 9, 2022.

[11] NOAA, "Carbon dioxide now more than 50% higher than pre-industrial levels," *U.S. Department of Commerce*, June 3, 2022.

Key Accomplishments

- As part of rejoining the Paris Climate Agreement, President Biden has pledged to reduce U.S. GHG pollution 50-52% below 2005 levels by 2030. Together the Energy Act of 2020, the BIL, and the IRA sets the country on a path to reducing GHG pollution by 40% below 2005 levels by 2030.

Opportunities for Future Congressional Action[12]

- Building on sector-specific standards, infrastructure investments, investments to advance environmental justice, and help for communities in economic and energy transition:
    - Establish a national goal now to achieve net-zero GHG emissions by no later than 2050;
    - Direct the President to set ambitious interim targets for 2030 and 2040 and frontload emissions reductions as much as possible;
    - Develop a strategy for climate restoration and net-negative greenhouse gas emissions for the second half of the century; and
    - Direct the National Academies of Science, Engineering, and Medicine to continually assess the country's progress toward meeting these climate goals; assess distributional impacts, including the impacts of climate policy on the cumulative effects of multiple pollution sources in environmental justice communities; and identify policy recommendations to remedy any unintended distributional impacts.

[12] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Pillar 1: Invest in Infrastructure to Build a Just, Equitable, and Resilient Clean Energy Economy

The 117th Congress delivered historic infrastructure investments to lift communities across America with a renewed commitment to justice, equity, and resilience. In the years ahead, Congress should establish sector-specific standards for the power, transportation, buildings, and industrial sectors, keep investing in cost-saving innovations, and ensure a just and equitable clean energy transition.[13] Congress should ensure quick and effective implementation of the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) and confirm that the climate investments reach the communities that need them most. Congress should also ensure continued appropriations for the Energy Act of 2020 and the CHIPS and Science Act.

Build a Cleaner and More Resilient Electricity Sector

Reducing harmful carbon pollution from the electricity sector is a top priority because it will enable clean electrification of transportation, buildings, and some industrial processes; it is the linchpin of economy-wide decarbonization. Technologies to decarbonize the power sector are commercially available and, as clean energy deployment increases, the costs of clean energy and some storage technologies will continue to decline. The 117th Congress made major investments in energy efficiency and clean energy in the BIL, the CHIPS and Science Act, and the IRA, setting the stage for further deployment and cost declines. These bills built on the bipartisan accomplishments in the Energy Act of 2020. In fact, the Energy Act of 2020 was the foundation for many of the historic BIL investments in clean energy demonstrations.[14]

President Biden also provided leadership by announcing a goal of a carbon-pollution-free electricity sector by 2035. Towards that end, President Biden made a commitment for the federal government to procure 100% carbon pollution-free electricity on a net annual basis by 2030, including 50% 24/7 carbon pollution-free electricity.[15] The Biden-Harris Administration's Department of Energy (DOE) has also prioritized clean energy research with ambitious initiatives like the Earthshot Initiatives, including for Long Duration Storage, Enhanced Geothermal, and Floating Offshore Wind. On the regulatory side, in 2022, the Nuclear Regulatory Commission announced its intent to issue a final rule certifying NuScale Power's small modular reactor (SMR) design as the first to be approved for use in the United States.[16] The DOE also reinitiated the consent-based siting process for consolidated interim storage of spent nuclear fuel.[17] Getting ahead of new challenges, the Biden-Harris Administration issued the first comprehensive framework to minimize impacts from cryptocurrency mining, which is energy-intensive and can stress electric grids, increase climate and local air pollution as well as

[13] David Roberts, "At last, a climate policy platform that can unite the left," *Vox*, July 9, 2020; Rajat Shrestha et al., "Federal Policy Building Blocks to Support a Just and Prosperous New Climate Economy in the United States," *World Resources Institute*, September 12, 2022.
[14] Department of Energy, "Bipartisan Infrastructure Law Programs at Department of Energy," accessed December 9, 2022.
[15] Office of the President, Executive Order 14057, "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability," December 8, 2021.
[16] Nuclear Regulatory Commission, "NRC To Issue Rule Certifying NuScale Small Modular Reactor," news release, July 29, 2022.
[17] Office of Rep. Mike Levin, "Department of Energy Awards Funding Rep. Mike Levin Secured to Advance Consent-Based Storage of Nuclear Waste," press release, September 20, 2022.

water and noise pollution.[18] The investments the 117th Congress made in energy efficiency and clean energy complement the Biden-Harris Administration's existing legal authority and actions to address climate change. These investments should lower the cost of compliance with climate and clean air standards like stronger National Ambient Air Quality Standards.

Despite these positive trends, challenges remain. Pandemic-related supply chain problems, solar tariffs, and the Russian invasion of Ukraine have driven up energy costs across the board, including in the electricity sector, the transportation sector, in buildings, and for use in industry and manufacturing. The case for energy efficiency and clean energy is even stronger due to the increase in energy prices caused by the unprovoked war in Ukraine and related disruptions to global energy markets. The war also has underscored the need for the federal government to use all its available tools to enhance American energy security, including through procurement of clean energy. To that end, in June 2022, President Biden invoked the Defense Production Act for solar energy components, transformers and grid components, heat pumps, insulation, and electrolyzers, fuel cells, and platinum group metals.[19] In the IRA, the 117th Congress provided $500 million for this effort, which should help increase deployment and lower costs.

An emerging challenge arises from the Supreme Court raising the possibility of constraints on executive authority by invoking a new "major questions" doctrine in *West Virginia v. EPA.* Specifically, the Supreme Court held that the Environmental Protection Agency (EPA) could not issue greenhouse gas (GHG) regulations for power plants requiring "beyond the fence line" approaches like generation shifting because in their view that would be a highly consequential power that Congress needs to expressly authorize. Going forward, "inside the fence line" approaches like increasing energy efficiency likely would not raise any concerns under the new doctrine but would yield much fewer emissions reductions.

Transmission and Grid Resilience

One of the major challenges going forward is upgrading and expanding the electric grid. In the past, it has taken as long as a decade to develop new transmission lines but there are some recent indications that some regions are making advances. For example, in July 2022, the Midcontinent Independent System Operator (MISO) approved a plan that will help build transmission sufficient to connect 53 gigawatts of renewable energy and storage.[20] Federal agencies have made progress as well. There are ongoing Federal Energy Regulatory Commission (FERC) rulemakings on transmission planning and cost allocation, and interconnection queues as well as an ongoing FERC-National Association of Regulatory Utility Commissioners (NARUC) Joint Task Force on Transmission. DOE also created a new Grid Deployment Office.

Despite these developments, the overall pace of transmission development needs to dramatically increase to meet the scale of the climate crisis. The 117th Congress provided investments and incentives for electric vehicles and electric appliances through the BIL and the IRA. Clean

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[18] The White House, "Fact Sheet: White House Releases First-Ever Comprehensive Framework for Responsible Development of Digital Assets," September 16, 2022.

[19] Department of Energy, "President Biden Invokes Defense Production Act to Accelerate Domestic Manufacturing of Clean Energy," press release, June 6, 2022.

[20] Ethan Howland, "MISO board approves $10.3B transmission plan to support 53 GW of renewables," *Utility Dive*, July 26, 2022.

electricity must be accessible for these electric technologies or else there is a risk of forfeiting much of the potential climate benefits.[21] The 117th Congress made major investments to help finance transmission, but underlying challenges relating to planning, cost allocation, interconnection queues, and siting remain.[22] New challenges include developing offshore wind transmission on the Atlantic Coast and a transmission backbone for floating offshore wind off of the Pacific Coast after the Department of the Interior announced the first lease sale for offshore wind for areas off central and northern California and continues work towards identifying potential offshore wind energy leasing areas in federal waters off the coast of Oregon.[23] In some parts of the country, state-based power generation and transmission planning and deployment authorities hinder access to lower cost clean energy to the detriment of ratepayers who bear the rising cost of fossil fuels, dirty air, and other environmental harms. To ensure all of the energy efficiency and clean energy investments made by the 117th Congress lower energy costs, create jobs, and reduce harmful carbon pollution, upgrading and expanding the electric grid with renewable and energy efficient resources remains a top priority going forward.

Moreover, the salience of the climate resilience and reliability argument for transmission has only increased during the last two years. Tragically, the February 2021 Texas Freeze killed almost 250 people and underscored the critical importance of interconnectedness and robust transmission between regions.[24] Requiring minimum transfer capabilities between transmission planning regions could help.

Wildfires in the Western United States also have highlighted the need for electric transmission infrastructure to be resilient to climate impacts and to be maintained appropriately so they do not cause wildfires. Advanced transmission technologies, including sensor and software solutions, like dynamic line ratings and topology optimization software, and hardware solutions, like advanced power flow controllers and advanced conductors can help improve grid resilience and reduce emissions at the same time.[25] The 117th Congress made significant investments in these technologies in the BIL, which builds off of the Energy Act of 2020 in this regard. Additionally, innovative technologies are being developed to reduce the risk of wildfire. More broadly, energy regulators need to address the energy-water nexus and the reinforcing feedback loop of climate change and drought. The Energy Act of 2020 funded research and development (R&D) to respond to challenges from the energy-water nexus.

Distributed energy resources (DERs) like rooftop solar, backup storage, and demand response are an important complement to upgrading and expanding the electric grid because they increase grid flexibility, allowing greater integration of renewable energy, and because they help with

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[21] Princeton University, "Electricity Transmission is Key to Unlock the Full Potential of the Inflation Reduction Act," *Rapid Energy Policy Evaluation and Analysis Toolkit*, September 2022.

[22] Bicameral letter urging the Federal Energy Regulatory Commission (FERC) to accelerate the transition to clean energy by improving transmission planning, August 18, 2022.

[23] Department of the Interior (DOI), "Biden-Harris Administration Announces First-Ever Offshore Wind Lease Sale in the Pacific," press release, October 18, 2022; DOI, "Oregon Activities," accessed December. 9, 2022.

[24] Patrick Svitek, "Texas puts final estimate of winter storm death toll at 246," *Texas Tribune*, updated January 3, 2022.

[25] Letter from Reps. Kathy Castor (D-FL), Sean Casten (D-IL), and Paul Tonko (D-NY) and Sens. Tina Smith (D-MN) and Martin Heinrich (D-NM) to the Honorable Richard Glick, Chairman, Federal Energy Regulatory Commission, March 24, 2022.

community resilience and help lower energy bills. Net metering policies need to be maintained at the state level to help accelerate emissions reductions because they are a powerful incentive for rooftop solar deployment. Without them, the ability to realize the full climate benefits of the IRA, the BIL, and the Energy Act of 2020 will be limited. At the federal level, since many distributed energy resources and demand response technologies are commercially available today, they should be deployed more broadly with modernized market design to maximize energy efficiency. Wholesale power markets generally need to be expanded to ensure that clean power is delivered where it is needed most, as recent grid challenges in California highlight.[26] The electric grid and the natural gas pipeline system are dependent on each other and both systems are vulnerable to climate impacts and cybersecurity threats. The 117th Congress made major investments in grid resilience in the BIL and advanced policy to address the relationship between the bulk electric system and the natural gas pipeline system. Increasing the resilience and reliability of electric sector infrastructure remains a priority for Congressional action and should garner bipartisan support.

Equitable Access to Clean Energy and its Economic Benefits

Equitable access to cheaper, cleaner energy is important because high energy costs have a disproportionate impact on low- and moderate-income Americans who spend a greater percentage of their income on energy bills. To that end, the 117th Congress made major investments in energy efficiency and clean energy targeted towards increasing equitable access. As described elsewhere in this report, the Biden-Harris Administration has also committed through its Justice40 Initiative, to ensuring that 40% of the benefits of key infrastructure investments are targeted towards disadvantaged communities. Congress should ensure effective implementation of that initiative through oversight and appropriations. In addition, DOE's DER initiatives, including a national target of powering 5 million homes with community solar by 2025 are also important for ensuring access to clean electricity.[27]

Beyond access to clean electricity, communities across the country would benefit from the jobs and economic development opportunities related to clean energy. Many of the tax incentives in the IRA include bonuses for the use of prevailing wages and apprenticeships and for domestic content. The BIL also applied prevailing wage requirements to many investments. Additional investments in workforce development, including a focus on expanding and improving registered apprenticeships, are needed.

Given the urgency of deploying clean energy infrastructure to meet near-term climate goals, a comprehensive strategy for efficient, effective permitting is required. As discussed elsewhere in this report, the strategy should help address the legacy of environmental racism in developing infrastructure while responding to the barriers the clean energy industry is confronting in their efforts to develop climate solutions. To that end, in November 2022, the House Sustainable Energy and Environment Coalition released a policy brief on permitting reform for the clean

[26] Ivan Penn, "Dodging Blackouts, California Faces New Questions on Its Power Supply," *The New York Times*, September 25, 2022.

[27] Department of Energy, "DOE Sets 2025 Community Solar Target to Power 5 Million Homes," press release, October 8, 2021.

energy future with two pillars: transmission reform and increased community engagement in the permitting process.[28]

The 117th Congress also provided major investments for tribal access to clean energy in the BIL and the IRA. However, tribes face a number of challenges in fully accessing these investments and deploying clean energy on tribal lands. They have limited capacity to apply for grants and can sometimes struggle to meet reporting requirements or to re-apply for grants every year. Cost share rules also present a barrier to tribal participation. For some small, remote tribes, limited access to electricity and the internet poses additional hurdles. Tribes sometimes cannot cover the costs to annually recertify equipment installers. Other tribes have proposed clean energy projects that are stuck in interconnection queues. The federal government is required to prioritize power purchases from tribes, but the lack of grid capacity is an obstacle. Congress should find creative solutions to advance clean energy and economic development on tribal lands consistent with U.S. trust responsibilities.

Key Accomplishments

Energy Efficiency and Clean Energy

The BIL provided important funding for energy efficiency and clean energy, including:

- $3.5 billion for the Weatherization Assistance Program, which will help reduce energy bills for low-income Americans and improve health and safety;
- Reauthorization of, and $550 million for, the Energy Efficiency and Conservation Block Grant Program, which will enable state and local governments, tribes, and territories to develop and implement strategies to save energy, including in the transportation and building sectors, thereby reducing fossil fuel pollution and cutting costs;
- $250 million for states through the Energy Efficiency Revolving Loan Fund Capitalization Grant Program, which will enable states to support energy efficiency building audits, retrofits, and upgrades;
- A new $6 billion Civil Nuclear Credit Program to keep existing nuclear power plants online and save thousands of jobs; and
- Funding for clean energy research, development, demonstration, and deployment (RDD&D) that was authorized in the Energy Act of 2020.

The CHIPS and Science Act authorized historic clean energy RDD&D, including:

- Established a Foundation for Energy Security and Innovation at DOE to foster partnerships between government, industry, startups, and outside funding organizations to increase funding opportunities from the private sector, accelerate commercialization of technologies, and provide workforce training in energy security and innovation fields;
- Authorized new clean energy technology transfer programs that expand and enhance the activities of the DOE Office of Technology Transitions, including a national incubator program, a university clean energy technology prize; and
- Research and development on both nuclear fusion and nuclear fission technologies.

[28] House Sustainable Energy and Environmental Coalition, "SEEC releases Policy Brief on Permitting Reform for the Clean Energy Future," press release, November 21, 2022.

The IRA provided major incentives for and investments in energy efficiency and clean energy, including:

- Extended and expanded clean energy tax credits for renewable sources like solar, onshore and offshore wind, geothermal, and hydropower, plus a new incentive to keep existing nuclear energy power plants online so they will continue to produce electricity without climate pollution (the individual tax credits transition into technology-neutral clean electricity tax credits);
- A new Investment Tax Credit (ITC) for energy storage and microgrid technology and expanded ITC eligibility for interconnection costs for distributed solar projects;
- A new direct pay option for non-profit organizations, rural cooperatives, state or local governments, tribal governments, Alaska Native Corporations, and the Tennessee Valley Authority for most clean energy tax credits (some clean energy tax credits are also transferrable);
- Bonuses for high road labor and domestic content standards in key clean energy tax provisions, which will help incentivize prevailing wages, apprenticeships, and using domestic content;
- Approximately $11.7 billion for the DOE Loan Programs Office (LPO) to facilitate issuing new loans, which increases the loan authority in LPO's existing loan programs by roughly $100 billion, specifically:
    - $3.6 billion in credit subsidy and provides an additional $40 billion of loan authority for the Title 17 Innovative Clean Energy Loan Guarantee Program (Section 1703 of the Energy Policy Act of 2005);
    - $5 billion for a new loan program, the Energy Infrastructure Reinvestment (EIR) Program (Section 1706 of the Energy Policy Act of 2005), to help repurpose or replace energy infrastructure that has ceased operations and to improve the efficiency of operating energy infrastructure, with a total loan authority of $250 billion;
    - $75 million for the Tribal Energy Loan Guarantee Program to facilitate up to $20 billion in loan authority; and
    - $3 billion in credit subsidy to support roughly $40 billion in loan authority for the Advanced Technology Vehicles Manufacturing (ATVM) Direct Loan Program and removes the $25 billion cap;
- $9.7 billion for rural electric cooperatives to purchase and deploy clean energy and $1 billion for loans under the Rural Electrification Act, including for energy storage projects;
- $87 million for the Low Emission Electricity Program to educate consumers, and provide technical assistance to industry, state, and local governments, on reducing climate pollution from electricity generation and use, with set-asides for disadvantaged communities; and
- $500 million for DOE to use the Defense Production Act to increase manufacturing of heat pumps and critical minerals processing.

The Energy Act of 2020 included 15 bipartisan bills that spur comprehensive clean energy research, development, demonstration (RD&D), and commercialization activities, including:

- Rebates for energy efficient transformers;

- Over $7.5 billion in authorized funding for research to advance renewable energy technologies like wind, solar, geothermal, and water power, including:
    - Reauthorizes an RD&D program on wind energy technologies, including onshore, distributed, and offshore wind technologies and their grid integration;
    - Reauthorizes an RD&D program on solar energy technologies, including photovoltaics, concentrating solar power, solar heating and cooling, and solar grid integration;
    - Reauthorizes DOE's geothermal energy RD&D activities, including enhanced geothermal research, additional geothermal demonstration projects, and expansion of the DOE's Frontier Observations for Research in Geothermal Energy (FORGE) program; and
    - Reauthorizes DOE's marine and hydropower energy RD&D activities, including guidance for emerging research priorities such as pumped storage hydropower technologies; and
- Substantial programs to accelerate the development of energy storage, including $15 million for establishing an energy storage and microgrid grant and technical assistance program.

Transmission and Grid Resilience

The BIL provided significant investments in transmission and grid resilience, building on the Energy Act of 2020. BIL investments include:

- $65 billion for power and grid infrastructure, including $25 billion for grid resilience;
- $3 billion for Smart Grid Investment Matching Grant Program;
- $2.5 billion Transmission Facilitation Program to help finance high-voltage transmission lines;
- $500 million over 5 years for the Western Area Power Administration's power purchase and transmission activities;
- $250 million for rural and municipal utility advanced cybersecurity grant and technical assistance program;
- $50 million for modeling and assessing energy infrastructure risk and an advanced energy security program to secure energy networks; and
- Improved siting for priority transmission lines.

The IRA also provided substantial investments in transmission and grid resilience, including:

- $2 billion to build electric transmission projects that are in the national interest;
- $760 million to help facilitate siting of electric transmission;
- $100 million to support interregional and offshore wind electricity transmission planning, modeling, and analysis, all of which will help connect more abundant and affordable renewable energy; and
- A new ITC for energy storage and microgrid technology and expanded ITC eligibility for interconnection costs for distributed solar projects.

The Energy Act of 2020 reauthorized DOE's RD&D activities related to electric grid operation and technologies, including grid planning, modeling, controls, and grid integration.

Equitable Access to Clean Energy and its Economic Benefits
The BIL provided funding to expand access to clean energy, building on the Energy Act of 2020. BIL investments include:

- $1 billion for energy improvement in rural and remote areas;
- $250 million for the Rural and Municipal Utility Advanced Cybersecurity Grant and Technical Assistance Program;
- Investments in tribal electrification and energy; and
- Funding for workforce development, with $10 million for Career Skills Training and $10 million for Building, Training, and Assessment Centers.

The IRA provided major investments to expand equitable access to clean energy, including:

- $27 billion for the Greenhouse Gas Reduction Fund for nonprofit, state, and local climate finance institutions that will finance the rapid deployment of zero-emission technologies, with more than half of these investments going to low-income and disadvantaged communities;
- $9.7 billion for rural electric cooperatives to purchase and deploy clean energy; $2 billion for the Rural Energy for America Program, which provides loans and grants to agricultural producers and rural small businesses for renewable energy systems or to make energy efficiency improvements, and $1 billion for loans under the Rural Electrification Act, including for energy storage projects;
- $87 million for the Low Emission Electricity Program to educate consumers, and provide technical assistance to industry, state, and local governments, on reducing climate pollution from electricity generation and use, with set-asides for disadvantaged communities; and
- Provides for offshore wind leasing in the waters of the U.S. territories.

Opportunities for Future Congressional Action[29]

- Develop a transmission strategy to meet the increased electric load from electrification of vehicles, buildings, and some industrial processes necessary to reach climate goals. This will require improved coordination with states, which have jurisdiction over intrastate transmission lines and distribution lines. Core elements include: 1) Conduct proactive transmission planning and broad cost allocation for both regional and inter-regional transmission lines; 2) Clear out interconnection queues by eliminating disproportionate participant funding and broadly allocating costs to all beneficiaries; 3) Authorize FERC to site priority inter-state high-voltage transmission lines, without needing DOE to designate corridors first;* 4) Provide an Investment Tax Credit for transmission and create a high-voltage direct current backbone to support a national supergrid; 5) Develop a national offshore wind transmission plan and siting strategy; and 6) Deploy more advanced transmission technologies.
- Develop a strategy to more efficiently permit clean energy infrastructure while ensuring community input and environmental protection.*
- Fix supply chain constraints for grid-scale storage.*

[29] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Pass a Clean Electricity Standard now to achieve net-zero emissions in the electric sector by no later than 2035. Establish national energy efficiency targets and incorporate the goal of clean electrification into all energy efficiency programs.
- Support EPA efforts to develop robust regulations for criteria air pollutants and GHG pollution from power plants.*
- Direct FERC and the North American Electric Reliability Corporation (NERC) to establish reliability standards for the electric grid that incorporate climate impacts. Address the vulnerabilities associated with the interdependence of the bulk electric system and the natural gas system.*
- Expand and connect energy markets in the Western United States to ensure greater access to clean energy to boost grid resilience.* Modernize wholesale power markets to ensure a level playing field for clean energy and to accelerate deployment of DERs.
- Increase federal funding to help deploy DERs to enhance community resilience. Streamline permitting of DERs and develop analytical tools to help electric power providers deploy DERs. Encourage states to require utilities to expand community solar and consider deploying non-wires alternatives.
- Provide more funding for low-income solar energy.
- Authorize federal agencies to enter into contracts for zero-carbon electricity for up to 40 years and enable federal agencies to serve as anchor tenants in community solar projects.
- Simplify grant application and reporting requirements, provide additional technical assistance and funding for tribal clean energy capacity building, eliminate cost share requirements for tribes, provide additional federal investment to ensure universal tribal access to electricity and the internet, and consider establishing a transmission preference for tribal clean energy projects.*
- As described in the 2020 Climate Crisis Action Plan, Congress should direct FERC to use its existing authorities to conduct a rulemaking that would review energy, reliability, and capacity market reforms that would better integrate renewable energy, battery storage, storage-as-transmission, hybrid resources, distributed energy resources, and demand response in wholesale power markets. At a minimum, FERC should ensure that renewables and storage are eligible to participate in all ancillary services markets, reduce self-scheduling of generators, and make demand more responsive to price. In addition, Congress should hold hearings and pass legislation to modernize the Federal Power Act to reflect changes in market structure and the need to incorporate climate change impacts on power sector rules and regulations.*
- Continue investing in clean energy RDD&D, especially to reduce the soft costs (non-hardware costs like permitting, financing, and installation) of clean energy deployment and to advance nuclear fusion technologies.*
- Continue to pursue a legislative solution to America's nuclear waste problem, which should include consent-based siting for any permanent repository for nuclear waste.
- Ensure adequate oversight of the authorizations made in the IRA, BIL, CHIPS and Science Act, and Energy Act of 2020.*

Build a Cleaner and More Resilient Transportation Sector

The transportation sector is now the largest source of U.S. climate pollution, having recently overtaken the electricity sector. The strategies to reduce pollution in this sector – more efficient

vehicles, cleaner fuels, and reduced vehicle miles traveled (VMT) – will save costs and provide public health benefits for everyone. The slow vehicle turnover rate is a major challenge since there are only a few vehicle lifecycles between now and 2050. Outdated roadway design and transit underfunding are also key barriers. For heavy-duty and off-road transportation, additional innovation in cleaner technologies will be needed.

Transportation infrastructure is heavily exposed to extreme weather and climate impacts, such as rising temperatures and more intense rainfall, that can affect the reliability and capacity of transportation systems. To prepare the nation's transportation systems for long-term climate resilience, the federal government needs to continue to invest in upgrades and repairs to existing assets and ensure that the siting and design of new transportation infrastructure advances resilience to climate impacts.

Passenger Vehicles and Smart Transportation Policies

There are exciting developments in the light-duty electric vehicle (EV) sector, including improved battery performance, more EV models available for sale at lower cost, and new milestones in fast charging EV technologies.[30] As a result, more EVs were sold in the United States in 2022 than ever before.[31] These trends have enabled policymakers to set new targets. California and New York plan to phase out sales of new passenger cars with internal combustion engines by 2035.[32] California's motor vehicle standards are the highest in the country, and federal law should allow the flexibility for states to adopt the same standards. Currently the Clean Air Act allows states with nonattainment areas to adopt California's motor vehicle standards, but all states should have this option. The EPA should also continue to issue California its Clean Air Act waivers. The Biden-Harris Administration is also enabling faster transition to EVs by using the federal government's procurement power: President Biden announced a commitment to procure 100% zero-emission vehicles by 2035, including 100% zero-emission light-duty vehicles by 2027.[33] Bold Zero Emission Vehicles targets and climate pollution standards would help accelerate the transition to clean vehicles.

The 117th Congress helped accelerate these changes through the IRA's incentives for EVs, the BIL's investments in EV charging, and the CHIPS and Science Act investments in semiconductor chips, which are critically important for EVs. These legislative achievements build on the Energy Act of 2020, which provided important authorizations for sustainable transportation research. Expanding educational resources and outreach for access to purchasing EVs is important to make sure that all Americans can take advantage of the EV tax credits and charging infrastructure investments. To meet climate goals, policies are also needed to support transit options and reduce VMT and provide travelers with clean, reliable, and affordable transportation that go beyond the car. The 117th Congress provided the largest investment in

[30] Colin McKerracher et al., "Electric Vehicle Outlook 2022," *BloombergNEF*, 2022; Pranshu Verma, "Soon electric vehicles could charge faster than your iPhone," *Washington Post,* August 27, 2022.
[31] Peter Johnson, "Here's how US electric vehicle sales by maker and EV model through Q3 2022 compare," *Electrek*, October 18, 2022.
[32] California Air Resources Board, "California moves to accelerate to 100% new zero-emission vehicle sales by 2035," *State of California*, August 25, 2022; Governor Kathy Hochul, "Governor Hochul Drives Forward New York's Transition to Clean Transportation," *New York State,* September 29, 2022.
[33] The White House, "FACT SHEET: President Biden Signs Executive Order Catalyzing America's Clean Energy Economy Through Federal Sustainability," December 8, 2021.

transit in history as well as new funding for the Low- and No- Emission Bus Program with the BIL. The pandemic led to widespread familiarity with videoconferencing technology and remote work, which has the potential to reduce VMT and business air travel.

Despite this progress, challenges remain. Pandemic-related supply chain problems and the war in Ukraine have driven up vehicle and fuel costs across the board, while increased interest rates could slow new EV sales. At the same time, rapid adoption of EVs is creating demand-side constraints due to supply bottlenecks and surging prices. Similar trends have impacted public transit as ridership has yet to fully return to pre-pandemic levels, straining transit agency budgets. Continued funding for transit will likely be needed, and it should be expanded to help improve access to green spaces, public recreation opportunities, and nature (i.e., "transit to trails").[34] States will continue to be important partners on decarbonizing transportation since many decisions about using federal funds are made at the state level and planning and zoning take place at the state and local level as well. By enabling bikeable and walkable communities, supporting transit, and foregoing unneeded highway capacity expansions that worsen congestion, federal and state policy could both reduce pollution and improve safety. The Supreme Court's new constraints on executive authority discussed in the electricity section could also impact transportation policies.

Heavy-Duty Trucks and Buses

Providing clean alternatives for the country's bus and truck fleet is challenging, but technologies are commercially available and transitioning to clean buses and trucks is a high priority due to environmental justice concerns about air pollution from conventional technologies. The 117th Congress provided major investments in clean municipal and school buses through the BIL and the IRA. In fact, in September 2022, due to high demand for electric school buses, especially among low income, tribal, and other disadvantaged communities, EPA announced it would nearly double rebate funding for clean and electric school buses to $1 billion in the first year of BIL funding.[35] Electric trucks have made major technological strides in both cost and range and the deployment of high-speed superchargers will spur further innovation and usage.[36] Clean hydrogen and other clean fuels could also help to reduce climate pollution from the freight sector. The efforts of the 117th Congress build on the Energy Act of 2020's authorization of research on sustainable transportation technologies.

Still, much more innovation is needed to provide clean alternatives, especially for heavy-duty trucks. For this reason, long-distance transportation is a focus of global innovation efforts launched in 2021, including Mission Innovation 2.0, the Breakthrough Agenda, and the First Movers Coalition, a new platform for companies to harness their purchasing power and supply chains to create early markets for climate solutions.[37]

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[34] American Public Transportation Association, "Public Transportation Ridership Rises to More than 70 Percent of Pre-Pandemic Levels," September 28, 2022.
[35] U.S. Environmental Protection Agency, "Biden-Harris Administration Will Double Clean School Bus Rebate Awards to Nearly $1 Billion," news release, September 29, 2022.
[36] Amol Phadke et al., "Why Regional and Long-Haul Trucks are Primed for Electrification Now," *Lawrence Berkeley National Laboratory*, March, 2021.
[37] Mission Innovation, "Mission Innovation launches a decade of clean energy innovation to accelerate achieving the Paris Agreement Goals," news release, June 2, 2021; Race to Resilience, "The Breakthrough Agenda," *UNFCCC*,

Rail

Rail provides an alternative for on-road long-distance transportation for both passengers and freight. According to the 2019 U.S. Department of Energy Data Book, Amtrak is 47% more energy efficient than traveling by car and 33% more energy efficient than domestic air travel on a per-passenger-mile basis. Traveling on the electrified Northeast Corridor system emits 83% less climate pollution than driving and up to 73% less than flying.[38] Freight railroads account for 28% of freight volume but just 0.6% of total U.S. climate pollution, according to EPA data, and just 2.1% of transportation-related climate pollution.[39]

The 117th Congress provided $66 billion for passenger and freight rail in the BIL, including the single largest investment in passenger rail since the creation of Amtrak. Unfortunately, due to the pandemic, passenger rail traffic declined and has not yet recovered.[40] To maximize the climate benefits of rail, collaboration with Amtrak and freight rail owners and operators, further development of greenhouse gas emissions inventories, and continued federal investments in rail efficiency and electrification will be needed.

Additional investments to bolster the climate resilience of the existing rail system to climate impacts like coastal erosion, rising sea levels, and storm surge will also be needed. More access to rail is needed overall, including connections to green spaces and national parks, and the development of more regional and national transportation hubs. To do this, policies must address the challenges that have stymied the development of inter-city rail.[41] Finally, there is also an opportunity to co-locate transmission lines along railroad rights-of-way, providing another way to address the need to expand the grid.

Aviation and Maritime

Off-road transportation, including aviation and maritime, provide some of the toughest decarbonization challenges. The federal government is taking steps to address aviation pollution. The 117th Congress provided investments for Sustainable Aviation Fuel (SAF) infrastructure in the BIL and incentives for SAF in the IRA. SAF production – including the growing, sourcing, and production of feedstocks from renewable and waste resources – opens new economic opportunities for farmers, while also providing co-benefits to reduce environmental harms. The Energy Act of 2020 also authorized research in sustainable transportation technologies, including bioenergy technologies. In addition, in 2021, EPA finalized commercial aircraft climate pollution standards, which implemented the 2016 International Civil Aviation Organization (ICAO) agreement for the first-ever climate pollution standards for airplanes.

2022; Office of the Spokesperson, "Launching the First Movers Coalition at the 2021 UN Climate Change Conference," press release, *U.S. Department of State*, November 4, 2021.

[38] Stacy C. Davis and Robert G. Boundy, "Transportation Energy Data Book: Edition 40," *Oak Ridge National Laboratory*, managed by UT-Battelle for the U.S. Department of Energy, updated June 2022; Amtrak, "Travel Green with Amtrak," *National Railroad Passenger Corporation*, 2022.

[39] Office of the Secretary of Transportation, "Pocket Guide to Transportation," *U.S. Department of Transportation*, 2019; "The Positive Environmental Effects of Increased Freight by Rail Movements in America," *Association of American Railroads*, June 2020.

[40] Raphaëlle Chapuis et al., "Boosting passenger preference for rail," *McKinsey & Company*, August 1, 2022.

[41] Ralph Vartabedian, "How California's Bullet Train Went Off the Rails," *New York Times*, October 9, 2022.

Despite this progress, challenges remain. Aviation emissions declined during the early part of the pandemic but rebounded as people emerged from lockdowns. Aviation emissions continue to grow quickly. To help address the problem, the Biden-Harris Administration helped launch the First Movers Coalition to create early markets for climate solutions, including for aviation.

To address maritime transportation pollution, the 117th Congress also invested in clean ferries and port electrification through the BIL and provided further investments in port electrification in the IRA. The International Maritime Organization established mandatory measures to reduce climate pollution from international shipping that will need to be enforced and ramped up. Unfortunately, pandemic-related supply chain challenges drove up the costs of maritime shipping and costs are only now returning to pre-pandemic levels. This makes it more challenging to reduce the sector's carbon pollution. To help address this challenge, the United States and Norway launched the Green Shipping Challenge.[42]

Domestic Manufacturing of Clean Vehicles

The 117th Congress provided major investments in domestic manufacturing of climate solutions through the BIL, the CHIPS and Science Act, and the IRA. Significant private sector investments in U.S. manufacturing of EVs, EV batteries, and EV chargers are helping to ensure that workers and communities benefit from the transition to cleaner vehicles. Since President Biden took office, companies announced investments of more than $36 billion in U.S. EV manufacturing and $48 billion in batteries in states across the country.[43] However, pandemic-related supply chain challenges, COVID-19 lockdowns in China, and the war in Ukraine have driven up the costs of raw materials including critical minerals and metals. Continued federal incentives and investments for domestic clean vehicle supply chains will be needed.

Transportation Infrastructure Resilience

Across the nation, roads, bridges, tunnels, ports, and airports are vulnerable to the range of climate impacts, which lead to travel and shipping delays, as well as temporary or even permanent closures. Exposure to flooding, wildfires, and extreme temperatures also shortens the life expectancy of roads, highways, and runways, increases maintenance costs, compromises worker safety, and disrupts critical access to evacuation routes. Extended power outages during disasters can disrupt critical public transit networks. The 117th Congress provided major investments in transportation infrastructure through the BIL, deploying funds to strengthen and retrofit transportation infrastructure with climate risks in mind to enhance public safety and ensure those assets last their full expected lifetime.

Key Accomplishments

Light-Duty Vehicles

The BIL invested in cleaner options for passenger vehicles by providing $7.5 billion for EV charging.

[42] Office of the Spokesperson, "Launch of the Green Shipping Challenge at COP27," press release, *U.S. Department of State*, November 7, 2022.

[43] The White House, "FACT SHEET: President Biden's Economic Plan Drives America's Electric Vehicle Manufacturing Boom," September 14, 2022.

The IRA provided major incentives for deployment of clean vehicles, including:

- Extended EV tax credits of up to $7,500 for new electric vehicles and new tax credits for used EVs of up to $4,000, with credits transferrable to the dealership to make them more accessible for low-income families;
- Bonuses for high road labor standards in clean vehicle tax provisions, which will help incentivize prevailing wages, apprenticeships, and using domestic content;
- Extended tax credits for EV charging, including for bidirectional chargers; and
- New clean hydrogen production and investment tax credits.

The FY23 NDAA authorizes a Pilot Program for Transition of Certain Nontactical Vehicle Fleets of Department of Defense (DOD) to Electric Vehicles.

The Energy Act of 2020 authorized $2.5 billion for DOE's Sustainable Transportation programs, including vehicles, bioenergy, and hydrogen and fuel cell R&D.

Smart Transportation Policies to Increase Consumer Choice, Reduce Congestion, and Cut Carbon Pollution

The BIL provided significant investments in smart transportation policies, including:

- $108 billion for public transit, the largest investment in transit in U.S. history;
- $6.4 billion for a carbon reduction program to reduce transportation climate pollution;
- $4.6 billion for the Formula Grants for Rural Communities Program to support public transportation in rural areas with populations less than 50,000 and to provide funding for state and national training and technical assistance through the Rural Transportation Assistance Program and
- Together the BIL and the IRA provided $4 billion to reconnect environmental justice communities divided by highways.

Reduce Pollution from Heavy-Duty Trucks and Buses by Deploying Cleaner Vehicles and Fuels

The BIL provided substantial investments to address emissions from heavy-duty vehicles and buses, including:

- $5 billion for clean school buses;
- $5.6 billion for low or no emission transit buses;
- Expanded the DOE ATVM program to include heavy-duty vehicles; and
- Authorized the National Alternative Fuels Corridors that designates a national network of EV charging and alternative fueling infrastructure along national highway system corridors that will support this class of vehicles.

The IRA provided major investments and incentives for deployment of clean heavy-duty vehicles, including:

- $1 billion for zero-emission heavy-duty vehicles and infrastructure like electric school and transit buses and garbage trucks, with a set-aside for areas with poor air quality;
- New tax credits for commercial EVs such as delivery vans, buses, and trucks, including a direct pay option for nonprofits and state, local, and tribal governments;
- Bonuses for high road labor standards in clean vehicle tax provisions, which will help incentivize prevailing wages, apprenticeships, and using domestic content;

- Extended tax credits for EV charging, including for bidirectional chargers;
- $3 billion for U.S. Postal Service for electrification of its fleet of delivery vehicles;
- Extended biofuels tax credits, $500 million for biofuels infrastructure grants, and $15 million for advanced biofuel testing and investments, including analysis of impacts of fuel on the environment and public health; and
- Workforce development and training on zero-emission heavy-duty vehicle maintenance funded through the EPA.

Expand, Maintain, and Modernize the Nation's Rail Network
The BIL provided $66 billion for passenger and freight rail, including:

- $36 billon for the Federal-State Partnership for Intercity Passenger Rail Grants, which are grants for projects to improve intercity passenger rail service performance, including reduced trip times, increased train frequencies, higher operating speeds, improved reliability, expanded capacity, reduced congestion, electrification, and other improvements, and grants for projects to expand or establish new intercity passenger rail service;
- $15.75 billion for the Amtrak National Network for new service and $6 billion in dedicated funding for the Amtrak Northeast Corridor, which incurred a severe repair backlog after Hurricane Sandy; and
- $5 billion for the Consolidated Rail Infrastructure and Safety Improvements Grant Program, which offers grants for research, development, and testing to advance innovative rail projects, as well as grants for rehabilitating, remanufacturing, procuring, or overhauling locomotives, provided that such activities result in a significant reduction of emissions.

Build a Cleaner and More Resilient Aviation Sector

- The BIL provided $25 billion for airport infrastructure (this total includes support for sustainable aviation fuel infrastructure as well as formula funding). Funding would be used for an Airport Improvement grant program for runways, gates, and taxiways as well as a new Airport Terminal Improvement program for terminals, concessions, and multimodal connections. This also improves air traffic control infrastructure.
- The CHIPS and Science Act authorizes support for new efficient and net-zero emissions aircraft research, including reducing climate pollution from aviation technology, including groundbreaking bioenergy research that will enable new sustainable aviation fuel pathways.
- The IRA provided a new tax credit for sustainable aviation fuel and nearly $300 million for grants to support sustainable aviation fuel development and low emission aviation technologies.
- The FY23 NDAA authorizes a DOD Pilot Program on Use of Sustainable Aviation Fuel.

Build a Cleaner and More Resilient Maritime and Shipping Sector
The BIL provided substantial investments in clean alternatives for maritime transportation, including:

- $2.5 billion for clean ferries;
- $16.6 billion for ports and waterways, coastal infrastructure, inland waterway improvements, and land ports of entry;

- $70.4 million for Marine Energy Research, Development, and Demonstration; and
- $25 million for America's Marine Highway Program Grants.

The IRA invested $3 billion to reduce air pollution at ports using zero-emission equipment and technology.

Domestic Manufacturing of Zero-Emission Vehicles and Components
The BIL included a major focus on clean vehicle supply chains, including by:

- Expanding the DOE ATVM program to include heavy-duty vehicles;
- Investing in critical minerals supply chains, including establishing an Earth Mapping Resources Initiative at the U.S. Geological Survey to map domestic critical minerals resources, including at mine waste sites, $140 million for a demonstration facility to separate and refine rare earth elements from mine waste, and direction to federal agencies to improve permitting for critical mineral mines on federal lands; and
- Investing in battery processing, manufacturing, and recycling, including $3 billion for U.S. battery materials processing demonstration projects and new or retooled commercial-scale battery materials processing facilities, $3 billion for U.S. battery manufacturing or recycling demonstration projects and new or retooled commercial-scale battery manufacturing or recycling facilities, $1 billion for RD&D on EV battery second-life applications and recycling, and $10 million for a Lithium-Ion battery recycling prize competition.

The IRA provided significant investments in domestic manufacturing of clean vehicles and components, including:

- More than $300 billion in new loan authority across multiple programs at DOE, including the ATVM, Domestic Manufacturing Conversion, and Energy Infrastructure Reinvestment Financing programs. These loans and loan guarantees will accelerate development and deployment of innovative technologies and will boost American manufacturing of clean car and clean truck technologies;
- A new advanced manufacturing production tax credit to support domestic manufacturing of solar panel and wind turbine components, batteries, and critical minerals, with a direct pay option for all taxpayers for the advanced manufacturing production credit;
- $10 billion for a revived 48C clean manufacturing investment tax credit, with a set-aside of $4 billion for energy communities, such as brownfields sites, areas with significant fossil-fuel related employment, and areas where a coal mine or coal plant recently closed; and
- $500 million for DOE to use the Defense Production Act to increase manufacturing of heat pumps and critical minerals processing.

Climate Resilience
The BIL made significant investments in modernizing and strengthening the nation's transportation infrastructure, including:

- $8.7 billion for the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation grant program;
- $1 billion to the Department of Transportation (DOT) Reconnecting Communities Pilot Program, which can include planning to reduce emissions and increase resilience;

- $69 million to DOT Pilot Program for Transit Oriented Development; and
- $250 million to DOT Congestion Relief Program, including planning to reduce congestion and the related economic and environmental costs.

Opportunities for Future Congressional Action[44]

On-road Vehicles

- Establish Zero-Emission Vehicle sales standards for light-duty and medium- and heavy-duty vehicles that are consistent with President Biden's 2030 pledge and climate science.
- Continue to provide incentives for development and adoption of more efficient EVs.*
- Continued federal investment to expand EV charging infrastructure and hydrogen refueling infrastructure for medium- and heavy-duty vehicles, as well as more investment in community charging for light-duty vehicles.
- Ensure GHG standards for motor vehicles (light-, medium-, and heavy-duty) meet the need to reduce pollution in line with the science. Amend the Clean Air Act so all states can adopt and enforce California's motor vehicle emission standards.
- Require the federal government to acquire an increasing percentage of zero-emission vehicles for its civilian fleet, including National Park Service and Forest Service fleets.
- Leverage dedicated funds provided by the BIL and the IRA to require an increasing percentage of zero-emission vehicles in the USPS fleet, with the goal of achieving a 100% electric or zero-emission USPS vehicle fleet.
- Establish a voucher program at the DOT to accelerate the turnover of the U.S. vehicle fleet to zero-emission vehicles. The program should provide higher financial incentives for low-income consumers and vehicles manufactured in the United States with strong labor standards.
- Build on the Renewable Fuel Standard with a transition to a Low Carbon Fuel Standard.
- Support EPA's efforts to credit electricity generated from renewable biogas and used to power EVs.
- Establish additional purchase incentives, such as voucher programs, for zero-emission heavy-duty vehicles.
- Provide additional federal funding for the Diesel Emissions Reduction Act and DOE Transportation Electrification grants.

Smart Transportation Policies to Increase Consumer Choice, Reduce Congestion, and Cut Carbon Pollution

- Increase federal funding for transit to support access to affordable housing, access to work and educational opportunities, and to enhance mobility for residents of disadvantaged communities. This should include expansion of service areas, improved frequency on existing routes, and funding for zero-emission transit buses.
- Increase funding for transit to trails. Prioritize maintaining and improving existing transportation infrastructure and bringing it up to a state of good repair (i.e., "Fix it First").
- Require states and Metropolitan Planning Organizations to set and meet goals to reduce transportation-related GHG emissions and provide households with alternatives to

[44] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

driving, evaluate how well the transportation system is facilitating access to housing, jobs, and critical services, develop and implement "Complete Streets" programs, and deploy transportation demand management.

Rail

- Extend the tax credit for maintenance and upgrades of short-line railroads.
- Incentivize electrification at the nation's railyards.

Aviation and Maritime

- Continue Federal research on solutions for aviation, including electrification.
- Continue RDD&D for low-carbon alternative fuels, including next generation feedstocks, biofuels, and bioderived chemicals; low-carbon building and infrastructure and materials; and solutions for medium- and heavy-duty, and off-road transportation, including rail, aviation, and maritime.
- Adopt targets to accelerate aviation decarbonization.*
- Continue to provide tax incentives and grant support for low-emission aviation technology and sustainable aviation fuels that reduce carbon pollution.
- Continue to expand the Federal Aviation Administration's grant programs for cleaning up airport ground support equipment.
- Provide additional credit for SAF and ensure low-carbon shipping fuels are eligible under the Renewable Fuel Standard or a future Federal Low Carbon Fuel Standard.
- Continue to provide grants to expedite port electrification, reduce emissions from port operations, and upgrade ports for offshore wind development.

Transportation Supply Chains

- Continued federal investment to help companies build, retool, or convert manufacturing plants in the United States and expand critical domestic supply chains.
- Enact policies and provide investments to secure supplies of critical minerals and materials and develop domestic recycling capabilities for lithium batteries and other components. This should include updating the General Mining Law of 1872 to ensure critical minerals are secured in an environmentally, economically, and socially responsible way.*

Transportation Resilience

- Ensure DOT implementation of the Federal Flood Risk Management Standard (FFRMS) by codifying requirements for flood resilience in the siting and design of the nation's roads, highways, bridges, tunnels, ports, and airports.
- Consider resilience and hazard mitigation to the range of weather and climate-related hazards throughout project planning, selection, and design.
- Fund and expand the Airport Improvement Program to support resilience.

Build and Upgrade Homes and Businesses to Maximize Energy Efficiency and Eliminate Emissions

The 117th Congress made substantial progress on policies to clean up the electricity and transportation sectors; reductions in those sectors will make up a good portion of President

Biden's pledge to cut U.S. climate pollution levels in half from 2005 levels by 2030. The 117th Congress also made significant investments in energy efficiency, including consumer incentives for building energy efficiency and electrification, that will also contribute to achieving climate pollution reductions. However, Congress must advance additional policies to decarbonize buildings in order to achieve the 2030 goal. One of the biggest challenges will be retrofitting existing buildings: consumer incentives on their own are unlikely to be sufficient to decarbonize buildings because there are millions of individual building owners and homeowners and there is a training gap among contractors. In addition, policies must focus on immediate electrification of building appliances and equipment, due to their longevity and the few appliance and equipment replacement cycles between now and 2050.

Improving the Energy Efficiency and Climate Resilience of Buildings

Due to the pandemic and the war in Ukraine, there is a heightened awareness of the need to maximize energy efficiency to help low- and moderate-income Americans with energy bills and to enhance American energy security. The 117th Congress made major investments in energy efficiency in the BIL from reauthorizing the Energy Efficiency and Conservation Block Grant program to establishing new energy efficiency financing programs to providing technical assistance to states to support adoption and implementation of modern building energy conservation and zero energy codes. In the IRA, the 117th Congress also provided tax credits for commercial and residential energy efficiency upgrades, provided rebates for energy-efficient and electric residential appliances, and provided funding for states for training and education programs for contractors to install energy efficient and electrification improvements. The legislative accomplishments of the 117th Congress build on energy efficiency policy in the Energy Act of 2020, including improvements to federal building energy efficiency, enhanced coordination of energy efficiency initiatives for schools, and authorization of research.

Recent climate disasters from wildfire to hurricanes have also underscored the need to ensure that buildings are built and rebuilt using resilience-based codes and standards consistent with affordable housing priorities. To that end, President Biden launched an initiative to modernize building codes, improve climate resilience, and reduce energy costs which includes a commitment to a net-zero emissions federal building portfolio by 2045, with a 50% emissions reduction by 2032.[45] President Biden previously committed to net-zero emissions from overall federal operations by 2050, including a 65% emissions reduction by 2030.[46] It could be helpful for the 118th Congress to explore setting ambitious resilience, energy-efficiency, and emissions targets for federal buildings through legislation building on the Biden-Harris Administration's efforts. Building codes and standards for resilience are further discussed in the section of this report titled, "Build - and Rebuild - Using Resilience-Based Codes and Standards."

Unfortunately, challenges remain. Pandemic-related supply chain issues, inflation, trade issues, and the war in Ukraine have driven up energy costs across the board and these trends can have a

[45] The White House, "FACT SHEET: Biden-Harris Administration Launches Initiative to Modernize Building Codes, Improve Climate Resilience, and Reduce Energy Costs," June 1, 2022.
[46] The White House, "FACT SHEET: President Biden Signs Executive Order Catalyzing America's Clean Energy Economy Through Federal Sustainability," December 8, 2022.

chilling impact on investments in building upgrades. While the federal role is important, much of the policy on buildings is at the state level, and many states have outdated building codes and more work to do to tackle the climate crisis.

Market interest and commercial availability of smart building technologies that reduce energy use continues to grow.[47] But barriers still exist that slow the uptake of these technologies, like a lack of access to utility data. In addition, outdated wholesale power market design limits the use of demand response, which would otherwise facilitate a more flexible electric grid that can integrate higher levels of renewable energy. With reforms, markets can provide homeowners with an economic incentive to conserve energy in ways that benefit overall grid reliability and reduce costs. Further research investments in building technologies and policies to address cybersecurity threats to smart building technologies and buildings-to-grid technologies are also needed to maximize the use of renewable energy and eliminate carbon pollution from both the building sector and the electric grid.

Renewable Energy, Building Electrification, and EV Charging Infrastructure
Technology costs continue to fall for renewable energy and home storage, but supply chains have been slow to recover from the pandemic, limiting availability. In the IRA, the 117th Congress extended and expanded tax credits for residential rooftop solar and residential battery storage. Some states like Florida are trying to roll back net metering, while other states like California are trying to identify how to modernize those policies as rooftop solar energy deployment reaches new levels. Federal support to review state policies and identify the best net metering practices could help drive the next generation of policies to support rooftop solar deployment.

Building electrification is benefiting from the improvement in appliance technologies. There are now more air-source heat pumps available that work in cold climates and provide an alternative to fossil fuel-fired conventional technologies.[48] In the IRA, the 117th Congress provided the first-ever rebates for residential electric appliances and equipment. Much more federal funding, especially in the form of point-of-sale rebates, will be required to help homeowners and building owners switch from fossil fuel-fired appliances and equipment to cleaner, electric options.

To support EVs and EV charging infrastructure, buildings must be able to support charging infrastructure ("EV-ready") so the built environment does not have a chilling effect on continued increased uptake of EVs. In the BIL, the 117th Congress made significant investments to establish a national network of EV chargers and required states to consider measures to promote greater electrification of the transportation sector, such as establishing rates that promote affordable and equitable EV charging options, improve the EV charging customer experience, including by reducing charging times, and accelerate third-party investment in EV charging. To build on this progress, it would be helpful for Congress to enact model building codes and

[47] Research and Markets, "Smart Building Market Size, Share & Trends Analysis Report by Solution (Safety & Security Management, Energy Management, Building Infrastructure Management), by Service, by End-use, by Region, and Segment Forecasts, 2022-203," August 2022.
[48] Liam McCabe, "Can Heat Pumps Actually Work in Cold Climates?," *Consumer Reports*, August 2, 2022.

rebates that integrate EV charging, onsite renewable energy generation, and storage into residential and commercial buildings, including multi-family buildings.

Reducing Emissions from Building Materials
The embodied carbon emissions in building materials is another area of opportunity to reduce climate pollution from buildings. In December 2021, President Biden announced a goal of net-zero emissions from federal procurement no later than 2050, including a Buy Clean initiative to promote use of construction materials with lower embodied emissions.[49] Specifically, under the Buy Clean initiative, the federal government will prioritize purchases of lower-carbon steel, concrete, asphalt, flat glass, and structural engineered wood (including cross-laminated timber and mass timber) and will also start to apply the criteria to federally-funded projects.[50]

In the IRA, the 117th Congress provided investments to help develop environmental product declarations (EPDs) for construction materials and to develop low-embodied carbon labeling for construction materials in transportation projects and federal buildings projects to support green procurement initiatives. Congress needs to build on these accomplishments by requiring federal agencies to use EPDs when they procure building materials and legislating a Federal Buy Clean Program. There is a significant opportunity to use captured carbon in building materials, but more federal RDD&D on technologies and deployment incentives are needed. Performance-based construction requirements and embodied emissions goals for federal projects would also help reduce even more climate pollution.

Invest in Disproportionately Exposed, Frontline, and Vulnerable Communities
Recognizing the need to help struggling Americans with energy bills due to the pandemic, the 117th Congress invested billions of dollars in the Low Income Home Energy Assistance Program (LIHEAP), the Weatherization Assistance Program, and the State Energy Program. Given the sensitivity of low- and moderate-income Americans to rising energy bills and the urgent need to reduce energy use and emissions, much more funding will be required to help weatherize every home in America. Tribes should receive this funding directly, rather than through state allocations. Future investments should also support states and tribes to expand residential solar energy for low-income families.

Lack of access to affordable housing continues to be a major challenge across the country. Congress needs to increase federal investments in affordable and public housing near public transit. This housing should be resilient to climate impacts and incorporate energy efficiency, electrification, renewable energy, and backup storage.

The pandemic also revealed the need to upgrade existing buildings for improved ventilation and indoor air quality, which creates an opportunity for investment alongside energy efficiency

[49] The White House, "Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability," December 8, 2021.
[50] The White House, "FACT SHEET: Biden-Harris Administration Announces New Buy Clean Actions to Ensure American Manufacturing Leads in the 21st Century," September 15, 2022; U.S. General Services Administration, "GSA Seeks Industry Input on Clean Construction Materials," news release, October 4, 2022.

upgrades. The federal government should provide additional funding and incentives in order to maximize both types of improvements.

Key Accomplishments

Reduce Energy Use in New and Existing Buildings

The BIL provided substantial investments in building energy efficiency, including:

- $3.5 billion for the Weatherization Assistance Program;
- Reauthorization of, and $550 million for, the Energy Efficiency and Conservation Block Grant program; and
- $250 million for states through the Energy Efficiency Revolving Loan Fund Capitalization Grant Program.

The BIL also provided $65 billion in broadband investments, which can enable the use of smart building technologies.

The IRA provided major incentives for and investments in building energy efficiency, including:

- Extended and expanded incentives for building energy efficient homes and for commercial energy efficiency upgrades;
- $4.3 billion in rebates for home energy performance-based whole-house efficiency retrofits;
- $1 billion for DOE to provide technical assistance to states to support adoption and implementation of the latest building energy conservation and zero energy codes; and
- $200 million for states to develop training and education programs for contractors to install energy efficiency and electrification improvements.

The Energy Act of 2020 established an initiative to help the private sector improve the energy efficiency of data centers and established a smart building accelerator to help demonstrate smart building technologies to increase their uptake in the private sector.

Generate More Net-Zero Energy Onsite and Electrify End Uses

The IRA provided new and improved incentives for on-site renewable energy and building electrification, including:

- Extended and expanded tax credits for residential rooftop solar and residential battery storage as well as for electric heat pumps, electric heat pump water heaters, and electric panel upgrades; and
- $4.5 billion in rebates for low- and moderate-income households to install residential electrification upgrades that will help reduce carbon pollution from buildings, which make up a significant amount of total U.S. carbon pollution, up to $1,750 for heat pump water heaters, up to $8,000 for heat pumps for space heating and cooling, and additional rebates for electrical panel upgrades.

Reduce Emissions from Building Materials

The IRA provided $250 million for environmental product declarations for construction materials and $100 million for low-embodied carbon labeling for construction materials in transportation projects and federal buildings projects to support green procurement initiatives.

It also provided over $2 billion for use of low carbon materials at the General Services Administration and $2 billion for low carbon transportation materials at the Federal Housing Administration.

Invest in Disproportionately Exposed, Frontline, and Vulnerable Communities
The American Rescue Plan increased funding for LIHEAP.

The BIL provided substantial investments in improving buildings in disproportionately exposed, frontline, and vulnerable communities, including:

- $3.5 billion for the Weatherization Assistance Program;
- Reauthorization of, and $550 million for, the Energy Efficiency and Conservation Block Grant Program;
- $250 million for states through the Energy Efficiency Revolving Loan Fund Capitalization Grant Program;
- $250 million for the Rural and Municipal Utility Advanced Cybersecurity Grant and Technical Assistance Program; and
- $500 million for grants for energy improvements and renewable improvements at public school facilities.

The IRA provided major investments in in improving buildings in disproportionately exposed, frontline, and vulnerable communities, including:

- $1 billion for improving affordable housing energy efficiency, water efficiency, and climate resilience;
- Enabled greater pairing of the Section 42 Low Income Housing Tax Credit with the ITC to encourage solar energy investments in affordable housing;
- A new low-income adder in the Section 48 energy ITC which provides a 20% bonus for solar or wind projects in affordable housing, a 20% bonus for low- and moderate-income community solar, or a 10% bonus for solar and wind projects in low-income communities; and
- $145.5 million for the Tribal Electrification Program to help electrify homes.

The Energy Act of 2020 reauthorized the Weatherization Assistance Program, streamlined federal energy efficiency initiatives and financing to help lower energy costs for schools, and established a smart energy water efficiency pilot program to advance technologies that can be used in diverse geographic regions and communities.

Provide Federal Leadership on Buildings
The BIL provided $250 million for the Assisting Federal Facilities with Energy Conservation Technologies Grant Program.

The IRA provided $975 million for the use of emerging and sustainable technologies in federal buildings and $250 million to convert federal facilities to high-performance green buildings.

The Energy Act of 2020:

- Updated requirements for federal agency energy savings performance contracts;

- Required improved collaboration across federal agencies on energy-efficient information technologies;
- Established a Federal Smart Buildings Program; and
- Authorized the Federal Energy Management Program and created energy and water resilience goals for the program.

Opportunities for Future Congressional Action[51]

- Encourage rapid deployment of IRA cost-saving measures for consumers and businesses.*
- Facilitate customer access to utility data, establish a national building energy benchmarking initiative, and develop model building energy and emissions performance standards, codifying the Biden-Harris Administration's efforts.
- Provide continued incentives for state and local adoption of updated building codes, including zero-emission codes.
- Support robust energy efficiency standards for appliances and equipment.
- Incorporate electrification and climate pollution reduction into energy efficiency goals.
- Expand federal research in building technologies.
- Expanded point-of-sale rebates for electric appliances and equipment.
- Review state policies and identify best practices for net metering.
- Develop model building codes for EV charging infrastructure, on-site renewable energy generation, and storage in residential and commercial buildings, including multi-family buildings. Provide rebates to help deploy EV charging infrastructure.
- Require federal agencies to use Environmental Product Declarations when they procure building materials, coordinated with a Federal Buy Clean initiative.
- Expand financial incentives for reusing existing buildings.
- More R&D and deployment incentives to accelerate the use of captured carbon in building materials.
- Reduce embodied emissions from federal buildings and projects through performance-based construction requirements and embodied emissions goals.
- Continue to provide federal funding to weatherize every home in the United States.
- Continue to fund LIHEAP and increase funding for rooftop solar and home storage.
- Expand the Low Income Housing Tax Credit.
- Increase federal funding to retrofit and decarbonize all public housing.
- Increase funding for Department of Housing and Urban Development (HUD) policies to fight climate change and promote equity.
- Relaunch and expand the Sustainable Communities Initiative.
- Establish ambitious energy efficiency and emissions reduction targets for all federal buildings and expand federal use of energy savings performance contracting.

[51] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Invest in Water Infrastructure to Provide Clean Water and Prevent Catastrophic Flooding

Extreme floods and droughts have continued to increase over the past several decades putting communities, farms, drinking water supplies and commerce at higher risk and exacting a toll on all Americans. These costly and destabilizing water-related impacts are grounded in, and exacerbated by, a changing climate affecting temperature, precipitation, and hydrology. Congress and the range of federal agencies with water-related missions must ensure that the historic investments provided by the BIL and Water Resources Development Act (WRDA) more effectively use their capabilities to address the growing demand for integrated water resource management and advance a whole-of-government effort for resilient and efficient water infrastructure and supplies across the nation. Natural solutions to water supply and flooding challenges offer cost-effective and science-based answers to the difficult challenges ahead and should be advanced along with other modernization efforts.

Invest in Infrastructure to Prevent Catastrophic Flooding

Levees, seawalls, and dams play a significant role in flood risk reduction in communities across the United States that were settled in flood-prone areas around rivers and coasts. At least one-third of communities with a population of 50,000+ have some portion of their jurisdiction behind levees.[52] Levees and dams also provide protective services to all other types of infrastructure, from roads and bridges to water facilities and power plants. Climate change, aging infrastructure, and increased population behind levees and downstream of dams serve to increase both risk and reliance on flood risk management infrastructure to perform as designed against rising seas and increasingly extreme storms. However, the nation has a complicated experience with flood risk management infrastructure, as systems can overtop or fail with catastrophic and deadly consequences.

The 116th and 117th Congresses and the Biden-Harris Administration have aligned policy priorities and investments to reduce flood risk, integrate natural systems and services, maximize nonstructural options, and ensure that infrastructure is sited, designed, and maintained to withstand more extreme conditions. Agencies are making steady progress to implement responsibilities to address risks associated with dams and levees, including the partnered effort of the U.S. Army Corps of Engineers (USACE) and the Federal Emergency Management Agency (FEMA) on the National Levee Safety Program and FERC's update to its dam safety regulations.[53]

Key Accomplishments

The BIL provided significant investments in water resources and infrastructure to reduce flood risk and drought, including:

- $2.8 billion for dam safety, hydropower retrofits and upgrades, removal of unneeded dams, and Natural Resources Conservation Service watershed restoration, flood prevention, and emergency watershed protection programs;
- $2.55 billion to USACE coastal storm risk management, hurricane, and storm damage reduction projects;

[52] National Levee Safety Program, "About the Program," *USACE* and *FEMA.*
[53] National Levee Safety Program, *USACE* and *FEMA*; FERC, "FERC Finalizes Dam Safety Regulations," news release, December 16, 2021.

- $2.5 billion to USACE for inland flood risk management (FRM) projects;
- $1.9 billion to USACE for Aquatic Ecosystem Restoration Projects;
- $465 million to USACE for Continuing Authorities Program (under Flood Control Act and Rivers and Harbors Act);
- $251 million to USACE for Flood Control and Coastal Emergencies Program;
- $30 million to USACE Planning Assistance to States, which can support flood resilience planning in support of future flood control projects;
- $45 million to USACE for Floodplain Management Services program;
- $3.5 billion for FEMA Flood Mitigation Assistance;
- $1 billion in FEMA Building Resilient Infrastructure and Communities (BRIC) funding; and
- $1.475 billion for the National Oceanic and Atmospheric Administration (NOAA) Coastal Resilience, including $492 million for the Coastal Resilience Fund, $491 million for Community-Based Restoration Projects, and $492 million for mapping, modeling, and observations, including Atlas 14.

The BIL builds upon the foundation of the 2020 WRDA that included numerous provisions to address water resource-related challenges:

Ports, Harbors, and Inland Waterways

- Unlocked the Harbor Maintenance Trust Fund by providing the authority to appropriate $2 billion in additional funds annually for harbor maintenance needs from the existing balance in the Trust Fund. When combined with a previously enacted provision from the Coronavirus Aid, Relief, and Economic Security (CARES) Act, WRDA 2020 provided for expenditures of approximately $3.5 billion to $4.0 billion in annual expenditures for port maintenance.
- Directed the USACE to equitably allocate harbor maintenance expenditures to pay for U.S. harbor operation and maintenance needs, while addressing the ongoing needs of the nation's largest donor and energy-transfer ports, Great Lakes harbors, emerging harbors, and commercial strategic seaports.

Equity and Community Resilience

- Directed the Secretary of the Army to issue final agency procedures for its Principles, Requirements, and Guidelines, to ensure that future water resources development projects will maximize sustainable development, protect and restore the functions of natural systems, and affordably address the needs of economically disadvantaged communities.
- Allowed for the calculation of sea level rise benefits for USACE projects, and requires the Secretary to consider, when requested, whether the need for the project is predicated upon or exacerbated by conditions related to sea level rise.
- Authorized the USACE to study, design, and construct water resources projects for communities that have been subjected to repetitive flooding events and have received emergency flood assistance, including construction of temporary barriers. This authority is directed at helping repetitive loss communities, especially those in economically disadvantaged communities, obtain critical flood protection.
- Examined the USACE's important role in addressing the future water supply needs of communities, especially those communities in the nation's arid regions.

- Required the USACE to complete its review on minority community and tribal consultation, as well as update USACE's policies on environmental justice considerations and community engagement and consultation.
- Expanded the USACE's consultation requirements with tribal and indigenous groups when working on or adjacent to tribal lands and areas and increased the authorization for the Tribal Partnership Program per project limit to $18.5 million.
- Created additional flexibility for the USACE to address the water resources needs of economically disadvantaged communities, minority communities, and rural communities.
- Authorized the USACE to provide technical assistance for resiliency planning, with priority given to economically disadvantaged communities and communities with repetitive flooding.
- Authorized the USACE to affordably study the flooding and storm damage reduction needs of economically disadvantaged communities, including minority communities, rural communities, and Indian tribes.

Natural Infrastructure, Ecosystem Protection, and Restoration

- Directed the USACE to document the consideration of natural and nature-based alternatives in the study of flood risk management and hurricane and storm damage reduction projects, including estimates of long-term costs and benefits of such alternatives; ensures that natural alternatives are provided the same cost-share as structural alternatives; and clarifies that natural and nature-based projects are eligible under the USACE's continuing authorities programs.
- Directed the USACE to carry out a demonstration program to assist in detecting, treating, and preventing harmful algal blooms.
- Authorized the USACE to carry out efforts to restore anadromous fish habitat.
- Allowed the USACE to carry out dam rehabilitation or modification activities to restore, protect, and preserve the surrounding ecosystem.
- Increased the authorization level for the USACE's Abandoned and Inactive Noncoal Mine Restoration Program.

The 2022 WRDA included measures to reduce climate risk and strengthen community resilience in order to:

Address Climate Risks and Integrate Nature-Based Solutions in USACE Projects

- Expedites the completion of the Forecast Informed Reservoir Operations in updating water control manuals and USACE regulations to allow for flexible water reservoir management based on weather forecasting.
- Requires a study to assess the feasibility of integrating solar panels or floating solar on USACE managed reservoirs, infrastructure, and other facilities.
- Promotes the beneficial reuse of sediment by establishing a strategic plan for using clean dredged materials for ecosystem restoration or storm damage reduction projects.
- Requires consideration of projected changes in wave height (including from sea level change) when repairing, or in maintenance activities of, federal jetties or breakwaters associated with authorized navigation projects; and this work should be classified as routine operations and maintenance if the functionality of the structure has diminished due to lack of routine maintenance.

- Authorizes repair or restoration of a shore protection project beyond the original design level to account for increases in projected sea level change or storm surge.
- Authorizes the Secretary to consider tidal and inland flooding within feasibility studies for coastal storm risk reduction projects.
- Directs USACE to do an inventory and investigate opportunities to restore natural floodplains and encourages consideration of opportunities to restore swamps and wetland forests in ecosystem restoration, flood risk management, and hurricane and storm damage risk reduction projects.
- Allows for the consideration of removal of man-made obstructions (with consent of owner) within projects to enable achievement or improving of aquatic ecosystem restoration goals.
- Directs the Secretary of the Army to study and map coastal geographic land changes and provide best practices for coastal change mapping and how to best disseminate this information among relevant agencies, state, and local governments.
- Directs periodic assessment of USACE-constructed levees to identify opportunities for modification, including inclusion of nature-based features to improve flood resiliency, and other ecological benefits. The assessments are required to prioritize areas that have experienced two or more flood events in the past 10 years.
- Expands the basic research and development capabilities of the USACE.
- Authorizes a study looking at the feasibility of managed aquifer recharge projects to address drought, water resiliency, and aquifer depletion, particularly in areas experiencing drought conditions.
- Authorizes a study of USACE reservoirs in western states to evaluate opportunities to improve water management, supply, and preparedness for changing hydrological and climatic conditions, including addition of natural or nature-based features. Relevant state, local, and tribal interests must be consulted in the course of the study.
- Requires a report to Congress on economic valuation of lands that are considered for construction of flood risk reduction or hurricane/storm risk reductions projects or being maintained for open space, recreation, or preservation of fish and wildlife habitat.

Advance Equity and Deepen Community Engagement in USACE Projects

- Establishes national policy that the Corps strive to understand, accommodate, and seek to address the water resources development needs of all communities through additional outreach, education on USACE programs, and technical and financial assistance.
- Establishes the Tribal and Economically Disadvantaged Communities Advisory Committee to ensure more effective delivery of water resources development projects, programs, and other assistance to Indian Tribes and economically disadvantaged communities.
- Increases the number of projects and studies in economically disadvantaged communities that USACE can carry out at no cost to the communities.
- Increases funding to $30 million for technical assistance under planning assistance to states and authorizes the Secretary to waive the cost of technical assistance for economically disadvantaged communities.
- Increases outreach to urban, rural, and tribal communities and provides additional public resources for increased community engagement, including assistance and guidance for pursuing technical services and developing proposals for USACE projects, and assistance

with researching existing project authorizations to address local water resource challenges.
- Reauthorizes the Tribal Partnership Program through 2033 and allows for technical assistance to be considered an eligible use under the program.
- Requires each USACE district that contains a tribal community to create a position within the district to serve as a tribal liaison.
- Require USACE to waive local cost-shares for watershed assessments for tribes, territories, and certain Indigenous communities.
- Directs USACE to coordinate with the EPA to remediate legacy contamination of potentially hazardous materials at specific locations throughout the nation.

Opportunities for Future Congressional Action[54]

Congress needs to ensure the USACE and other agencies with water resources missions work toward timely and meaningful implementation of climate-ready water infrastructure policies included in recently enacted laws like the BIL, IRA, and previous WRDAs. This includes ensuring projects are built to address sea-level rise, extreme weather, and other challenges posed by climate change; addressing the future water supply needs of communities, especially those communities in the nation's arid regions; and increasing coordination with tribal, indigenous, and environmental justice communities. Congress also needs to continue to address climate risks and water resources to:

- Codify the Flood Risk Management Standard and direct timely implementation of updates to floodplain management procedures for the USACE, FEMA, Natural Resource Conservation Service (NRCS), Bureau of Reclamation, and other agencies with water resource management missions;
- Fully fund the USACE Levee Safety Program to establish and promote consistent levee safety standards, create levee safety guidelines that include resilience-based codes and standards for development in areas behind levees, and complete assessments of the nation's levees, taking climate risks into account. Congress also should authorize and appropriate funding to address climate risks identified through those assessments;
- Provide funding to FEMA to support the establishment of state and tribal levee safety programs to ensure that the nation's network of levees help to protect communities from the effects of extreme flooding;
- Require that levee owners or operators show financial capability to operate, maintain, repair, and replace the levee for its expected life; and
- Ensure that the USACE investigates the full range of cost-effective potential solutions as part of congressionally-authorized federal flood risk studies, including nonstructural options such as buying out and relocating willing property owners and communities that are exposed to repeated and increasing flood losses; elevating and floodproofing structures, where appropriate; and restoring intact, functioning, and healthy coastal and riverine ecosystems that can reduce flood impacts and provide other benefits, including mitigating erosion and enhancing water quality, recreation, and intrinsic community well-being.

[54] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Invest in Water Systems to Best Serve Community Needs in the Face of Climate Impacts
Access to clean water is a necessity that is increasingly threatened as the climate crisis shifts availability and access to freshwater, endangering the health, safety, and livelihoods of communities across the country. Aging infrastructure is energy-intensive and further imperils the ability to store and deliver clean water and manage wastewater, resulting in a system that is vulnerable to climate-related pressures like severe storms, droughts, and floods that occur with increasing frequency and duration. These impacts are further magnified for underserved communities, including tribes, low-income communities, rural areas, and communities of color. In July and August 2021, flooding from heavy rains severely damaged Jackson, Mississippi's public drinking water system, which has struggled for years to address operational and maintenance problems. As a result, the residents of Jackson were left without access to clean, safe water for drinking, cooking, or sanitation. The 2021 Texas Freeze also highlighted the interdependence of the electricity, natural gas, and water systems when extremely cold weather froze natural gas infrastructure, causing a shortage of electricity to run water systems and freezing pipes in homes, leading to extensive damage. More investments are needed to ensure that water systems are funded and maintained to meet the challenges of climate-fueled extreme weather and have clean distributed energy resources and backup storage to prevent costly damage and service disruption.

The 117th Congress made the single largest investment in water ever through the BIL, providing funding for communities to replace or upgrade drinking water and wastewater infrastructure. As states leverage this funding to build the water infrastructure of the future, it is imperative that projects include climate considerations in their design to ensure resilience in the face of climate-related pressures. New and innovative solutions, including implementing green infrastructure that provides multiple climate, environmental, and health benefits to communities, should be prioritized.

Drought conditions present an additional infrastructure challenge, requiring cutting-edge science, data, and technology to meet the needs of water-stressed communities. The drought conditions at the end of October 2022 – with over half of the continental United States experiencing drought conditions, and almost 15% experiencing extreme or exceptional drought – underscores the acute need for both short- and long-term adaptation measures to ensure drinking water and irrigation requirements are met.[55] The Western United States has been particularly subject to drought impacts, with the Colorado River Basin, which provides water for seven states and parts of Mexico, increasingly requiring emergency actions due to low water levels. Throughout the Mississippi River basin, months of drought have reduced water levels to extremely low thresholds, posing threats to navigation, agriculture, and drinking water.[56] The BIL and the IRA invested significant funding to address the impacts of drought, both now and into the future. Technological solutions, spanning from water recycling to desalination, can increase water supply, while nature-based solutions such as ecosystem restoration and regenerative agriculture

[55] U.S. Drought Monitor, "Data Tables," *National Drought Mitigation Center, USDA,* and *NOAA*, Accessed December 9, 2022.
[56] NASA Earth Observatory, "Drought and Barge Backups on the Mississippi," Accessed December 9, 2022; Keith Good, "Drought Closes Portion of Mississippi River- Soybean, Corn Exports Lagging, While Black Sea Export Discussions Continue," *Farm Policy News*, October 18, 2022; Farm Service Agency, "USDA Designates 23 Mississippi Counties as Primary Natural Disaster Areas," *USDA*; USACE New Orleans District, "A Saltwater Wedge Affects the Mississippi," *USACE*, 2022.

practices can further enhance the environment's ability to retain water. The sections of this report titled "Invest in American Agriculture for Climate Solutions" and "Protect and Restore America's Lands, Waters, Ocean, and Wildlife" offer additional recommendations for conserving water and managing drought.

Key Accomplishments

- The BIL provided the largest federal investment ever to ensure access to safe and secure water: $50 billion for EPA's water infrastructure program, including $20 billion for safe drinking water and $12 billion to ensure clean water; $3.5 billion for water infrastructure for tribal communities; $375 million for a new Clean Water and Drinking Water resilience and sustainability program; $23 billion for water infrastructure through the general Clean and Drinking Water State Revolving Funds; and $15 billion for lead service line replacement.
- The BIL included $1 billion for rural water projects to meet critical needs of rural communities and tribes. The IRA provided $550 million to provide water supplies to disadvantaged communities without reliable access and $12.5 million for emergency near-term drought relief for tribal communities impacted by Bureau of Reclamation water projects.
- The IRA provided $4 billion for drought mitigation projects at the Bureau of Reclamation, prioritizing the Colorado River Basin, to mitigate the impacts of drought on communities. This includes funding compensation for voluntary reductions in water use, conservation projects that reduce water demand, and ecosystem restoration projects that address drought issues. The BIL also included $300 million to implement the Colorado River Basin Drought Contingency Plan's voluntary reductions and conservation measures.
- The BIL also provided $8.3 billion for the Bureau of Reclamation's water infrastructure program, including $1 billion for WaterSMART Program to support reuse projects.
- The BIL included $250 million to support the development and construction of desalination facilities to supplement water supplies during shortages.
- The BIL invested $75 million for USACE Water Infrastructure Finance and Innovation Act (WIFIA), which provides water infrastructure finance.
- The Energy Act of 2020 authorized the DOE to consider the use of water in energy systems and use of energy in water extraction and treatment in its research, development, and demonstration programs.

Opportunities for Future Congressional Action[57]

- Appropriate needed funds and encourage timely implementation of the BIL water infrastructure investments.*
- Require that climate resilience be incorporated in the planning of all drinking water and wastewater projects that receive federal financial assistance from EPA, FEMA, HUD, and U.S. Department of Agriculture (USDA) programs.
- Direct the EPA to require that all water infrastructure projects greater than $5 million use lifecycle risk and cost analysis, including for climate risks and costs.

[57] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Codify the requirement that states dedicate a portion of their annual Clean Water State Revolving Fund grant allocation for implementation of green infrastructure approaches.
- Direct the EPA to establish centers of excellence for innovative stormwater and floodplain management for research, development, and deployment of technical assistance on green infrastructure.
- Reauthorize and increase funding for the Bureau of Reclamation's Desalination and Water Purification Research and other water conservation research, development, and deployment programs to help reduce environmental impacts, lower energy consumption, and develop more advanced desalination technologies.*
- Increase funding to EPA to support investment in alternative water source projects, including projects for groundwater recharge and potable reuse.*
- Increase funding to EPA for sewer overflow and stormwater reuse projects with a greater federal cost share of projects that serve financially distressed communities.*

Prepare the Nation's Telecommunications Network for Climate Impacts

Wireless and broadband networks are essential utilities for commerce, health, education, and emergency services. However, millions of Americans lack access to reliable broadband internet, particularly in rural, tribal, and disadvantaged communities and in low-income households. Additionally, telecommunications networks are vulnerable to outages during disasters. As classrooms, workplaces, and social activities migrated online during the COVID-19 pandemic, the digital divide – the gap between those who have access to broadband internet and those who do not – became increasingly apparent. The 116th and 117th Congresses and the Biden-Harris Administration prioritized investments in the nation's telecommunications networks as part of the national response to the COVID-19 pandemic and infrastructure investments, especially the BIL that has the potential to make great strides in bridging the digital divide.

Key Accomplishments

- The Coronavirus Aid, Relief, and Economic Security (CARES) Act, which provided $100 million for broadband programs at the USDA.[58]
- The Consolidated Appropriations Act, 2021, which provided $6.2 billion to broadband programs at the Federal Communications Commission (FCC), National Telecommunications and Information Administration (NTIA), and USDA, including $1 billion for grants to expand access to and adoption of broadband service on tribal lands and a $3.2 billion Emergency Broadband Benefit program to reimburse participating providers up to $50 per month ($75 in tribal areas) for providing discounted broadband service to eligible households.[59]
- The American Rescue Plan Act of 2021, which provided $7.171 billion to broadband programs at the FCC.[60]
- The BIL, which provided $64.4 billion for broadband programs at the FCC, NTIA, and USDA, is the largest federal broadband investment in history to make access more

[58] CARES Act; P.L. 116-136.
[59] CAA, 2021; P.L. 116-260.
[60] ARPA; P.L. 117-2.

affordable for low-income families, expand eligible private activity bond projects to include broadband infrastructure, and support middle-mile deployment efforts.[61]

Opportunities for Future Congressional Action[62]
Congress should ensure timely implementation of these new broadband programs and direct additional resources to address climate-related risks to the nation's telecommunications infrastructure.

- Codify federal resilience standards against flood, wildfire, wind, and other climate-fueled hazards and direct the FCC, NTIA, USDA, and other agencies with telecommunications and broadband infrastructure deployment missions to ensure projects are sited and designed for operational reliability to the range of climate and extreme weather conditions.*
- Increase funding to the USDA ReConnect Program and Rural Broadband Program to accelerate efforts to close the digital divide in rural and hazard-prone communities and boost precision climate-smart agriculture.*
- Increase funding for tribes to expand their access to electricity and the internet, especially tribes located in remote areas.*
- Direct the FCC to update its National Broadband Plan to address climate risks to telecommunications infrastructure.*
- Increase funding to the NTIA to provide grants to public-private partnerships for projects that increase access to affordable broadband internet services.*
- Invest in deployment of Next Generation 9-1-1 to strengthen the continuity and capacity of 9-1-1 services during disasters.
- Give states and territories the authority to require that wireless communications networks be resilient to disasters as part of the terms and conditions for mobile services.
- Direct the FCC to require providers of wireless communications services, 9-1-1 operators, and public safety entities to work together to ensure that advanced communications service remains operational during times of emergency and pre-planned power downs and that wireless networks do not interfere with critical weather forecasts.

Fix Leaks and Cut Pollution from America's Oil and Gas Infrastructure

While the climate impacts of combusting fossil fuels for electricity and transportation are well known, U.S. oil and gas infrastructure itself – the wells, drilling, and pipelines – are also major sources of harmful pollutants, especially the super-pollutant methane. Methane is an extremely potent greenhouse gas: while it is short-lived in the atmosphere, methane causes over 80 times more warming than carbon dioxide over a 20-year timeframe. The 2021 Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report highlighted the outsized role reducing methane pollution can have on mitigating near-term climate change. In the United States, natural gas and petroleum systems are the second largest contributor of methane emissions, accounting for 32% of U.S. methane emissions,[63] behind agriculture (42%) and ahead of landfills (17%).[64] The section of this report titled "Invest in American Agriculture for Climate Solutions" offers

[61] Infrastructure Investment and Jobs Act; P.L. 117-58.
[62] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[63] EPA, "Overview of Greenhouse Gases," May 16, 2022.
[64] EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020"

additional recommendations for addressing methane emissions from the agriculture and landfill sectors. Given the impact of super-pollutants on the climate, it is important to quickly eliminate methane pollution from the relatively less challenging sectors, like oil and gas infrastructure.

As a result, there is growing attention focused on opportunities to fix leaks and cut pollution from U.S. oil and gas infrastructure in order to reduce waste, improve public health, and strategically target short-lived heat-trapping pollution. These efforts also make economic sense, as leaks and other losses reduce the amount of natural gas that makes it to market, a particularly salient issue in light of Europe's current energy needs and restricted gas supplies due to the war in Ukraine. Moreover, the growing U.S. methane mitigation industry provides a new avenue to support small businesses and thousands of new jobs, and there is export potential as well since global oil and gas infrastructure faces similar challenges.

Cut Methane Pollution from Oil and Gas Production and Eliminate Methane Leaks from Existing Natural Gas Pipelines

Methane is commonly wasted during natural gas production, through leaks from equipment and pipelines or venting and flaring as part of production. As the global energy market tightens, it is imperative to cut down wasteful emissions as much as possible. According to the International Energy Agency (IEA), natural gas markets could have sold an additional 180 billion cubic meters of natural gas if all leaks from fossil fuel operations in 2021 had been captured – a volume equal to the entire gas market of Europe.[65] New technologies, including improved satellite monitoring and piloted aircraft, are making it easier for industry and regulators to monitor methane emissions and identify "super-emitters" that emit methane at high rates. Early detection allows emitters to rapidly repair leaks to capture otherwise lost methane, which is then available for use or to sell. The push to mitigate methane emissions has resulted in new businesses and new, good-paying jobs – and the industry continues to grow.

However, more sensitive monitoring technology has also revealed that methane emissions are significantly underestimated, especially by super-emitters. This makes the major strides both the federal government and states have made towards reducing methane pollution that much more important. The 116th Congress enacted the bipartisan Protecting Our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act, requiring pipeline operators to conduct leak detection and repair programs. In a bipartisan disapproval resolution, the 117th Congress reinstated the National Standards for methane emissions released by the EPA in 2016. Through the IRA, the 117th Congress also enacted several proposals to cut methane emissions, including the Methane Emissions Reduction Program to hold companies accountable for wasted methane pollution, and assessing royalties on methane wasted by venting and flaring during natural gas production. States, such as New Mexico and Colorado, have taken a leadership role and implemented their own regulations which can now be a model for future EPA standards.

In recognition of the impact of methane on the global climate, the United States, along with the European Union, launched the Global Methane Pledge in 2021 at the United Nations Framework Convention on Climate Change (UNFCCC) 26th Conference of the Parties (COP26) to spur countries to reduce methane emissions by at least 30% by 2030. Since the launch, 150 countries

[65] IEA, "Methane emissions from the energy sector are 70% higher than official figures," press release, February 2022.

have signed on to the pledge and in June 2022 a new initiative was launched to accelerate cuts in methane from the fossil fuel energy sector.[66]

In November 2021, the Biden-Harris Administration released the *U.S. Methane Emissions Reduction Action Plan* enumerating actions to reduce methane emissions, including updating regulations on methane from new oil and gas sources, limiting venting and flaring of methane, and implementing the bipartisan PIPES Act. Building on the Global Methane Pledge, the United States should set ambitious methane reduction targets for the oil and gas sector, including interim targets.

It is also imperative that the EPA ensures that the proposed methane pollution limits are as strong as possible, and the Bureau of Land Management (BLM) ensures that the methane and waste prevention rules as called for in the Biden-Harris Administration's Methane Reduction Action Plan are as strong as possible. Legislatively, requirements for pipeline operators should be strengthened to require adoption of commercially available technology for methane detection, more robust repair obligations, and increased civil penalties for violations. Continued federal funding will also be needed to repair and replace leaky natural gas distribution pipelines, which also pose major safety hazards to communities.

Curb Air and Water Pollution and Safely Dispose of Hazardous Waste From the Oil and Gas Industry

In additional to methane, oil and gas infrastructure often emits harmful air pollutants, such as benzene, xylene, and hydrogen sulfide, which are harmful to human health.[67] Recent research has also shown that oil and gas companies have been widely using the class of "forever" chemicals per- and polyfluoroalkyl substances (PFAS), which have been linked to cancer, reduced fertility, and developmental effects in children.[68] Abandoned and orphaned wells can also be sources of pollution, including methane, oil, and toxic chemicals that contaminate the air and water. The 117th Congress took multiple steps to monitor and reduce pollution from oil and gas that is harmful to human health. As part of the BIL, the 117th Congress invested $4.7 billion to plug orphaned oil and gas wells on federal, state, and tribal lands as part of the largest package to reduce legacy pollution in history. Through the IRA, the 117th Congress included billions of dollars to support air quality monitoring and other data collection to track disproportionate environmental burdens on frontline communities.

Unfortunately, these toxic releases continue due to the oil and gas industry enjoying exemptions from bedrock environmental laws, including the Clean Air Act (CAA), Clean Water Act (CWA), and Resource Conservation and Recovery Act (RCRA). Discharges of stormwater runoff from activities associated with oil and gas exploration, production, treatment, or transmission are not required to obtain a permit under the CWA. Similarly, oil and gas waste, including contaminated water, drilling fluids, and pit sludges, are exempt from RCRA regulations. Under the CAA, the EPA cannot regulate aggregated pollution from oil and gas wells and treat them as a major

[66] U.S. Department of State, "Global Methane Pledge: From Moment to Momentum" November 17, 2022.
[67] Macey et al., "Air concentrations of volatile compounds near oil and gas production: a community-based exploratory study," *Environmental Health*, October 30, 2014.
[68] Julie Grant, "Group finds 'forever' chemicals used thousands of times in Ohio oil and gas wells," *The Allegheny Front*, October 3, 2022.

source – which would require advanced pollution controls – even when facilities operated by the same company are close together. Congress should eliminate these exemptions and ensure that oil and gas companies do not get a free pass to harm human health or the environment.

Ensure that Natural Gas Pipelines and LNG Infrastructure Do Not Harm the Climate, the Environment, and Communities

Natural gas is used in a wide range of applications, including generating electricity, producing fertilizers, plastics, and other chemicals, and heating homes and businesses.[69] In order to transport gas across the country, nearly three million miles of pipelines connect production facilities with consumers. For export purposes, Liquefied Natural Gas (LNG) terminals receive gas by pipeline and liquefy the gas for shipping via specially designed tankers. Since 2017, the United States has been a net exporter of natural gas[70] and exports are expected to continue to increase due to rising global demand and market disruptions as a result of the war in Ukraine. The rising demand and rising prices for natural gas, has led to increased interest in new gas pipelines and LNG export facilities. New infrastructure will not be online for years, so it will offer little immediate relief to Europe, and poses the risk of stranded assets.[71] Increased exports have also led to a rise in domestic prices for natural gas, squeezing American consumers at a time when they are facing rising costs due to pandemic-related supply chain disruptions. This further underscores the need to accelerate the transition to a clean energy economy that will reduce exposure to volatile fossil fuel prices, lower energy bills, and increase energy security.

FERC is responsible for evaluating applications for new interstate natural gas pipelines and may only approve them if they are in the public interest and required by necessity – a broad standard under the Natural Gas Act. In evaluating proposals, FERC undertakes environmental reviews and stakeholder consultations as part of the National Environmental Policy Act (NEPA).

FERC is currently attempting to rectify many of the problems of past NEPA analyses. For example, in many cases, FERC used a narrow scope of review which failed to adequately evaluate and address environmental and climate concerns and concerns from environmental justice communities. Federal courts have ruled that downstream greenhouse gas emissions must be included in FERC's environmental analysis.[72]

Other FERC practices give broad latitude to pipeline developers, minimizing public participation in the certification process and limiting opportunities to challenge pipeline approvals in court. For example, FERC had a practice of pausing the date for issuing a final, appealable decision on a request for rehearing after a pipeline approval (known as a "tolling order") which kept the landowner in a holding pattern but allowed the pipeline developer to begin construction. In July 2020, a federal court invalidated the use of "tolling orders."[73] Other harmful FERC practices continue, like issuing conditional certificates to pipeline developers allowing them to begin construction even before they have received all necessary permits.

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[69] EIA, "Natural Gas Explained," December 2, 2021.
[70] EIA, "Liquefied natural gas exports continue to lead growth in U.S. natural gas exports," April 20, 2022.
[71] Evan Halper, "Gulf Coast gas export frenzy raises tough questions for U.S., Europe," *The Washington Post*, April 21, 2022.
[72] Barbara Grzincic, "D.C. Circuit orders FERC to revise assessment of pipeline upgrade," *Reuters,* March 12, 2022.
[73] Adam Vann, "For Whom the FERC Tolls: Federal Court Rejects Agency 'Tolling Orders,'" *Congressional Research Service*, September 8, 2020.

In February 2022, FERC issued two new interim policies seeking to clarify how FERC would evaluate applications to build new interstate natural gas pipelines; one policy clarified how greenhouse gas emissions and climate impacts would be considered and the second policy stated that FERC would consider environmental justice and landowner impacts in its analysis as well.[74] FERC later clarified that it would not apply the interim policies to pending or new applications and instead designated them as draft policies and opened them for public comment.[75] FERC has also taken administrative steps to increase opportunities for addressing social and environmental impacts, including establishing the Office of Public Participation, issuing an Equity Action Plan, and hiring a Senior Counsel for Environmental Justice and Equity.[76] FERC's attention to these issues are commendable and legislative action is needed to ensure permanent improvements to the natural gas pipeline approval process and to align them with climate and environmental justice goals.

To permit LNG exports, the Natural Gas Act requires the DOE to determine if it is consistent with the public interest. The statute creates a presumption that LNG exports are consistent with the public interest where there is a free trade agreement in place requiring countries to treat foreign natural gas the same as domestic natural gas ("national treatment"). The statute also gives authority for FERC to approve or deny any application to site, construct, expand, or operate a LNG terminal. The Trump Administration issued a rule that would allow DOE to use a categorical exclusion as the form of NEPA review for all applications for LNG exports. The Biden-Harris Administration has elected not to use that rule for any significant authorizations and has continued to apply broader environmental review to LNG export applications, including consideration of greenhouse gas emissions. In April 2022, DOE announced that it will reconsider the rule. The war in Ukraine has focused attention on U.S. LNG exports and the administration has prioritized helping U.S. allies and trading partners in the near term while continuing to work to mitigate the impact of climate change.

Make the Nation's Pipelines More Resilient to Climate Impacts

Natural gas and petroleum pipelines are vulnerable to the impacts of climate change and risk causing health, environmental, socioeconomic, and other harms to frontline communities. Climate-fueled disasters, such as hurricanes and other severe storms, can rupture pipelines resulting in leaks and spills, especially in areas at high risk such as Texas and Louisiana, two of the top three states for pipelines. Climate-fueled warming in the Arctic is causing permafrost to thaw, changing the topography of the ground and undermining the structural integrity of pipelines like the 800-mile long Trans-Alaska Pipeline. Extreme cold temperatures and ice forming around pipelines can also cause damage and result in leaks or other failures. In addition to climate impacts, the country's pipeline infrastructure is increasingly vulnerable to other disruptions as well, including cybersecurity attacks like the May 2021 attack on the Colonial Pipeline.

[74] FERC, "FERC Updates Policies to Guide Natural Gas Project Certifications," news release, February 17, 2022.
[75] Miranda Willson, "FERC retreats on gas policies as chair pursues clarity," *E&E News*, March 25, 2022.
[76] FERC, "FERC establishes Office of Public Participation," news release, June 24, 2021; FERC, "FERC issues Equity Action Plan," April 15, 2022; FERC, "Glick names Montina Cole to Top Environmental Justice Post at FERC," news release, May 20, 2021.

Currently, energy pipelines are not subject to mandatory federal standards that guarantee customers a reliable source of energy. As a result, vulnerabilities in the natural gas system can have cascading implications for the bulk electric system and for the water system. For example, the 2021 Texas Freeze led to mass blackouts and lack of access to potable water when natural gas supplies plummeted and pipeline operators failed to deliver adequate supplies to power plants, which in turn led to the failure of water systems.

The expanding oil and natural gas markets, bolstered by rising prices and strong demand for U.S. exports, is fueling interest in new pipelines and related energy infrastructure. With a lifespan of 50 years, plus continued risk of leaks and spills after decommissioning, it is essential that climate considerations be incorporated into design and operation of facilities. Congress should ensure that climate impacts are considered in siting, design, repair, and maintenance of oil and gas infrastructure, including pipelines and LNG export facilities. A stakeholder-driven process to developing standards for energy pipeline reliability and cybersecurity is needed, as are policy solutions to fix vulnerabilities associated with the interdependence of the bulk electric system, the natural gas system, and the water system.

Key Accomplishments

Cut Methane Pollution from Oil and Gas Production and Eliminate Methane Leaks from Existing Natural Gas Pipelines

- As part of the 2020 Omnibus package, Congress passed the PIPES Act, which requires pipeline operators to minimize methane leaks.
- In June 2021, Congress passed a bipartisan resolution of disapproval that reinstated the 2016 EPA Methane Standards.
- The BIL provided $1 billion for natural gas pipeline modernization at the DOT.
- The IRA established a new Methane Emissions Reduction Program to hold companies accountable for wasted methane pollution and provide incentives to find and fix leaks and stop venting and flaring. The IRA also established royalties for wasted methane released during natural gas production and limits flaring.

Curb Air and Water Pollution and Safely Dispose of Hazardous Waste From the Oil and Gas Industry

- The American Rescue Plan invested $50 million to increase air quality monitoring and $50 million to identify and address public health harms and risks in vulnerable populations.
- The BIL invested $4.7 billion to plug orphaned wells on federal, state, and tribal lands and $11.3 billion for reclamation of abandoned mines. Congress also invested $30 million in research and development at DOE to assist in identifying, characterizing, and mitigating the environmental risks of undocumented orphaned wells.
- The BIL also included $100 million for wastewater efficiency investments at EPA, including methane capture or transfers.
- The IRA invested over $230 million for air quality monitoring and $32.5 million to support data collection tracking environmental burdens and impacts on frontline communities.

*Make the Nation's Pipelin*es *More Resilient to Climate Impacts*

- The BIL provided $1 billion for natural gas pipeline modernization at DOT, which will provide grants to repair or replace pipelines.

Opportunities For Future Congressional Action[77]

Cut Methane Pollution from Oil and Gas Production and Eliminate Methane Leaks from Existing Natural Gas Pipelines

- Establish ambitious methane reduction targets for the oil and gas sector, including interim targets.
- Support EPA's efforts to finalize the strongest possible rule on methane pollution limits and BLM's efforts to finalize the strongest possible methane and waste prevention rule.
- Support the efforts of EPA and BLM to set limits on routine flaring of associated natural gas at oil wells.
- Require pipeline operators to adopt commercially available technology for methane detection, strengthen repair requirements, and increase civil penalties for violations.
- Continued funding to repair and replace leaky natural gas distribution pipelines.
- Support the efforts of EPA to expand air quality monitoring to communities with significant oil and gas development.

Curb Air and Water Pollution and Safely Dispose of Hazardous Waste From the Oil and Gas Industry

- Eliminate exemptions for the oil and gas industry in cornerstone environmental laws like the CAA, the CWA, and the RCRA.

Ensure that Natural Gas Pipelines and LNG Infrastructure Do Not Harm The Climate, the Environment, and Communities

- For natural gas pipelines, existing law gives FERC the authority to consider the climate crisis, community and landowner impacts, and market necessity in its analysis of public necessity and convenience, but FERC has been reluctant to use the full scope of its authority. To ensure that FERC follows congressional intent, Congress should amend the Natural Gas Act to require FERC to consider all of those factors in its public convenience and necessity analysis.
- For LNG infrastructure, existing law requires consideration of lifecycle GHG emissions and community and landowner impacts. To ensure that federal agencies follow congressional intent, Congress should amend the Natural Gas Act to require FERC and DOE to collectively consider all factors, including GHG emissions and community and landowner impacts, relevant to the public interest.
- Amend the Natural Gas Act to require FERC to ensure landowners receive actual notice of applications, and that notices should provide clear instructions on how to intervene.
- Amend the Natural Gas Act to prohibit developers from exercising rights of eminent domain or beginning construction activities until they receive all necessary federal and state permits.

[77] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Make the Nation's Pipelines More Resilient to Climate Impacts

- Ensure climate impacts are considered in siting, design, repair and maintenance of hazardous liquid and natural gas infrastructure, including pipelines and LNG export facilities.
- Codify the FFRMS requirements for pipeline infrastructure and direct DOE, FERC, EPA, DOT, and other agencies with pipeline authorities to implement the FFRMS through the full range of their authorities, including for permitting, consistent with Executive Orders 11988, 13690, and 14030.*
- Address the vulnerability of natural gas infrastructure by developing federal standards for energy pipeline reliability and cybersecurity.*
- Identify policy solutions to address vulnerabilities associated with the interdependence of the bulk electric system and the natural gas system.*

Pillar 2: Drive Innovation of Climate Solutions and Finance their Commercialization and Deployment at Scale

In general, technological innovation policy has received substantial bipartisan support, including through the bipartisan Energy Act of 2020 in the 116th Congress and the Bipartisan Infrastructure Law (BIL) and the CHIPS and Science Act in the 117th Congress. Looking ahead, key priorities will be providing adequate appropriations to government agencies so they can implement these laws and providing appropriations for the new authorizations in the CHIPS and Science Act. Despite this progress, much more clean energy research, development, demonstration, and deployment (RDD&D) funding is needed to meet international innovation commitments and the ultimate goal of a net-zero economy before 2050. The opportunity is worth the investment because the market for climate solutions could be worth more than $23 trillion by 2030.[78] Additionally, understanding of climate-related financial risks and opportunities to leverage financial innovation, markets, and private investment to confront the climate crisis have come into sharper focus. Investors are demanding greater transparency into corporate decisions and portfolios to understand the ways that climate poses risks to, and creates opportunities for, corporate assets and bottom lines. As the physical and transitional risks become more manifest through market destabilizations in energy, real estate, insurance, and other key economic sectors, it is essential that Congress and the Biden-Harris Administration continue to create conditions to catalyze climate investment and manage risks to investors and markets.

Support Technological Innovation to Drive Deep Decarbonization and U.S. Competitiveness

The Department of Energy (DOE) remains at the forefront of U.S. clean energy innovation, carrying out essential research and development (R&D) programs and funding through its network of 17 National Laboratories. The CHIPS and Science Act authorized a wide variety of DOE research programs ranging from advanced nuclear technologies to biological and climate research related to new energy technologies to low-emission steel. It also established a Foundation for Energy Security and Innovation at DOE to foster partnerships between government, industry, startups, and outside funding organizations to increase funding opportunities from the private sector, accelerate commercialization of technologies, and provide workforce training in energy security and innovation fields. The Energy Act of 2020 also provided historic levels of funding toward demonstration projects of transformational clean energy projects that will enable the United States to be a competitor in driving deep decarbonization across the economy.

The Biden-Harris Administration provided leadership by launching several initiatives aimed at supporting industrial and technological innovation, including Mission Innovation 2.0, which will focus on hydrogen, shipping, and carbon removal; the Breakthrough Agenda, which will focus on international public-private collaboration on power, hydrogen, road transport, steel, and agriculture; and the First Movers Coalition, which is a new platform for companies to harness their purchasing power and supply chains to create early markets for climate solutions. In September 2022, the first-ever Global Clean Energy Action Forum (GCEAF) was held, a joint convening of the 13th Clean Energy Ministerial and the 7th Mission Innovation ministerial, in

[78] Global Clean Energy Action Forum, "About Global Clean Energy Action Forum."

Pittsburgh, PA. Finally, DOE created two new offices: Office of Economic Impact and Diversity and Office of Clean Energy Demonstrations.

Technological advances in several sectors in artificial intelligence and quantum computing could dramatically increase efficiency and drive down emissions. While there has been a recent increase in private and venture capital investments in early-stage clean technology, challenges lie ahead. Government investments in research, development, and demonstration (RD&D) of energy science and clean tech are essential given the high-risk nature of such ventures that would otherwise not be executed by the hardest-to-decarbonize private sectors despite their potential benefits. In 2015, 24 nations made a pledge to double clean energy R&D by 2020 through the Mission Innovation initiative, but collectively fell over $50 billion short. The federal government faces similar challenges. Under current policy, there is a fiscal cliff in U.S. clean energy and climate R&D after the BIL appropriations end, leaving inadequate R&D investment in specific sectors, like the industrial sector and building technologies, in place.

Congress needs to further support technological innovation. Given the long runway needed for commercialization of clean energy technologies, significant increases in RD&D and reprioritization of decarbonization within the DOE will be necessary to maintain U.S. competitiveness.

Key Accomplishments

- The Inflation Reduction Act (IRA) appropriated $2 billion for National Lab infrastructure to accelerate breakthrough energy research at the DOE Offices of Science, Fossil Energy and Carbon Management, Nuclear Energy, and Energy Efficiency and Renewable Energy, as well as $700 million to support the availability of fuel for advanced nuclear reactors.
- The CHIPS and Science Act authorizes over $52 billion for semiconductor manufacturing, research, and development activities. Semiconductors are essential components of many climate-friendly technologies including building electrification, electric vehicles, renewable energy, and electric transmission technologies, among many other technologies.
- The CHIPS and Science Act authorized nearly $1 billion for DOE-supported R&D into microelectronics to enable clean energy-related science and technology development.
- The CHIPS and Science Act directs new Earth observation data collection systems under the National Aeronautics and Space Administration (NASA), directs the establishment of a new research and technology initiative to reduce greenhouse gas emissions (GHGs) from aviation, with the goal of achieving net zero GHGs from aircraft by 2050, and directs NASA to carry out experimental aircraft demonstrations, including those related to ultra-efficient and low emissions aircraft configurations.
- The CHIPS and Science Act authorizes a broad range of critical energy science research programs, covering materials sciences, chemical sciences, fusion energy, high-performance computing, quantum science, physical bioscience, geosciences, and additional disciplines to advance energy technologies. Programs will also support research in artificial photosynthesis, energy storage, nuclear matter, and carbon materials and sequestration.

- The CHIPS and Science Act authorizes new and existing biological, environmental, and climate research and development programs relevant to climate science and the development of energy technologies.
- The CHIPS and Science Act authorizes a low-emissions steel manufacturing technology R&D program focusing on key technology areas including heat generation, carbon capture, resource efficiency, and high-performance computing, among others (SUPER Act).
- The CHIPS and Science Act authorizes a DOE program to support the deployment of advanced nuclear reactors in communities affected by retiring coal facilities (Fission for the Future).
- The CHIPS and Science Act includes the Bioeconomy Act which will strengthen interagency coordination and boost the next generation of biotechnologies and advanced biomanufacturing.
- The FY23 NDAA provides funding for applied research in direct air capture and carbon removal technology program.
- The Energy Act of 2020 authorizes new investments and programs to significantly advance and assess promising fusion energy pathways, including a milestone-based development program, breakthrough alternative and enabling concepts, inertial fusion energy research, and full support for the U.S. contribution to the ITER international fusion project.
- The Energy Act of 2020 reauthorizes DOE's nuclear energy RD&D activities, including advanced fuel, reactor, and used fuel technologies for both existing plants and advanced nuclear concepts. It also authorizes an advanced reactor demonstration program, funding for the versatile test reactor, educational and technical assistance programs, as well as an international coordination effort.
- The Energy Act of 2020 reauthorizes the Advanced Research Projects Agency-Energy (ARPA-E) and expands its authority to work on projects relating to nuclear waste clean-up and management issues and projects to improve energy infrastructure, as well as to pursue scale-up and demonstration of transformational clean energy technologies.

Opportunities for Future Congressional Action[79]

- Reauthorize and update the mission and goals of DOE to prioritize decarbonization of the energy sector and climate change mitigation.
- Reorganize DOE to effectively advance technologies for decarbonization and address the climate crisis.
- Significantly increase RDD&D funding for key technologies in specific sectors (i.e., power sector, transportation sector, industrial sector, etc.) as well as for cross-cutting technologies (hydrogen, digitization, artificial intelligence).
- Continue to engage environmental justice communities in clean energy and climate RDD&D and ensure diverse participation in DOE RDD&D programs and access to capital in emerging industries for historically-excluded groups.
- Increase funding for the ARPA-E to reach at least $2 billion annually by 2030.

[79] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Enable and Accelerate Financing for Climate Change Mitigation and Climate-Resilient Infrastructure

Meeting the climate financing needed to achieve emissions reduction, adaptation, and resilience goals requires massive investment of public funding and private capital. The 117th Congress and the Biden-Harris Administration unified policy to catalyze investments that are already transforming markets, building good-paying jobs, and attracting private capital flows toward innovative technologies, resilient infrastructure, and financial solutions for U.S. communities and businesses.

Key Accomplishments

- The BIL provided a range of finance reforms designed to spur private investment and public-private partnerships, including reforms to the DOE Loan Program Office and an expansion of the DOE Advanced Technology and Vehicle Manufacturing loan program to include heavy-duty vehicles as well as new funding for these initiatives and for tribal energy loan guarantees.
- The IRA provides numerous new tax incentives for electricity from clean and renewable resources, alternative fuels and alternative fuel infrastructure, residential and commercial energy efficiency, advanced energy manufacturing, and clean vehicles. The IRA also partially responds to calls for a national green bank with a new $27 billion Greenhouse Gas Reduction Fund that will finance the rapid deployment of zero-emission technologies, with more than half of these investments going to low-income and disadvantaged communities. The Biden-Harris Administration has launched this first-of-its-kind climate finance solution with a comprehensive engagement strategy to ensure that the Fund's design and implementation reflect input from diverse stakeholders to ensure the full economic and environmental benefits of this historic investment are realized by all people, particularly those who have been most burdened by environmental, social, and economic injustice.[80]

Since federal spending catalyzes private investment, these investments could drive total climate spending across the U.S. economy to more than $1.6 trillion over the coming decade.[81] Even so, there is more that Congress will need to do to prioritize environmental justice, frontline, and rural communities most affected by the transition to a clean economy. Additional opportunities to advance international climate finance are addressed in the section of the report titled, "Bolster Climate and Energy Security and Advance U.S. Leadership on the International Stage."

Opportunities for Future Congressional Action[82]

- Building on the successful establishment of the new Greenhouse Gas Reduction Fund, Congress should establish a National Climate Bank to help finance climate-resilient infrastructure as well as technologies for emissions reduction with intentional priority and measurable outcomes for environmental justice and energy transition communities. The

[80] EPA, "Biden-Harris Administration Seeks Public Input on Inflation Reduction Act's Greenhouse Gas Reduction Fund," news release, October 21, 2022.
[81] Robinson Meyer, "The Climate Economy Is About to Explode," *The Atlantic*, October 5, 2022. Credit Suisse, "U.S. Inflation Reduction Act: A Tipping Point in Climate Action," September 28, 2022, on file with staff.
[82] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

program should maximize creation of public-private partnerships to leverage private funds and avoid competing with private capital.

- Launch Climate Bonds and other innovative financial instruments to capitalize financing.
- Address municipal cash-flow problems to enable investments in climate resilience and clean energy by:
    - Expanding eligibility for borrowers from Municipal Liquidity Facilities to include tribes, territories, and less populous cities;
    - Prioritizing Municipal Liquidity Facilities purchases for infrastructure resilience; and
    - Establishing technical assistance programs to identify climate-related barriers to credit and capital, including loss of tax base and rising insurance costs, and help local governments, tribes, and special districts address credit rating challenges and access capital for sustainable economic development.*

Expose Climate-Related Risks to Private Capital to Shift Assets Toward Climate-Smart Investments

The risks to the U.S. financial system from climate change have attracted growing attention from investors, business leaders, and governments, raising questions about the roles of financial regulators in ensuring risks to the financial system are identified and disclosed. A 2020 report by the Commodity Futures Trading Commission (CFTC) found that climate change could pose systemic risks to the U.S. financial system.[83] The CFTC report concluded that existing legislation already provides U.S. financial regulators with wide-ranging and flexible authorities to address financial climate-related risk and that further rulemaking, and in some cases legislation, may be necessary to ensure a coordinated national response to climate change risks.[84] A 2021 report from the Financial Stability Oversight Council (FSOC) identified that climate change is an emerging threat to U.S. financial stability.[85] However, in the same year, fewer than half of registrants reported aligning with frameworks for disclosing risks and impacts of climate change.[86] Such trends show that the system is making unacceptably slow progress towards the intended effect of the Securities and Exchange Commission's (SEC) 2010 interpretive guidance, which instructed firms to disclose material risks from climate change.[87]

In March 2022, the SEC released their long-awaited proposed rulemaking that would require public companies to disclose climate-related information in their SEC filings.[88] The proposed

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[83] U.S. Commodity Futures Trading Commission (CFTC) Commissioner Rostin Behnam, Sponsor, and Bob Litterman, Chairman, "Managing Climate Risks in the Financial Sector," *The Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. CFTC*, September 9, 2020.
[84] Ibid. at 9.
[85] Financial Stability Oversight Council, "Fact Sheet: The Financial Stability Oversight Council's Response to Climate-Related Financial Risk," *U.S. Department of the Treasury*, October 21, 2021.
[86] Sankalp Gaur, et al., "TCFD-Aligned Reporting by Major U.S. and European Corporations," *Moody's Analytics*, February 2022.
[87] Securities and Exchange Commission, "Guidance Regarding Disclosure Related to Climate Change," Release No. 33-9106, 75 FR 6290, February 8, 2010.
[88] Securities and Exchange Commission, "SEC Proposes Rules to Enhance and Standardize Climate-Related Disclosures for Investors," press release, March 21, 2002; The Congressional Research Service developed a detailed history of SEC efforts on climate disclosures. See Rena S. Miller et al., "Climate Change Risk Disclosures and the Securities and Exchange Commission," *CRS*, updated February 17, 2022.

rules are modeled in part on the recommendations of the Task Force on Climate-related Financial Disclosures, which detail the significant financial risk that climate change poses to the global economy and follows the Climate Risk Disclosure Act, which would direct the SEC to require many of the disclosures embedded in the proposed rules.[89] In June 2022, more than 130 House Democratic Members urged the SEC to finalize its rule on climate risk disclosure to better inform investors about how climate change may impact a company's business, operations, or financial condition.[90]

In September 2022, the Federal Reserve Board announced that six of the nation's largest banks will participate in a pilot climate scenario analysis exercise designed to enhance the ability of supervisors and firms to measure and manage climate-related financial risks.[91] Scenario analysis, in which the resilience of financial institutions is assessed under different hypothetical climate scenarios, is an emerging tool to assess climate-related financial risks. The pilot exercise will launch in early 2023 based on climate scenario narratives, including a range of economic and financial variables. Over the course of the year, participating firms will analyze and report on the impact of the scenarios on specific portfolios and business strategies, enabling the Federal Reserve Board to review firm analyses and engage with those firms to build capacity to manage climate-related financial risks. The Board anticipates publishing insights reflecting what has been learned about climate risk management practices to help identify potential risks and promote risk management practices.

Opportunities for Future Congressional Action[92]

Despite the significant progress in better understanding climate-related financial risks, making those risks more transparent, and building greater resilience in U.S. and global financial systems, Congress will need to codify these actions to ensure their durability and take additional steps to protect investors, ensure quality disclosures and financial products, and mitigate climate shocks and stresses that can destabilize markets.

- Require publicly traded companies to disclose climate-related risks in SEC disclosures.
- Direct SEC, with the Treasury Department and FSOC, to require credit rating agencies disclose their climate risk evaluation methodologies for evaluating climate risk in assessing public finance issuers' capacities to protect critical assets, provide for public services, and maintain financial stability.
- Establish a federal advisory committee on sustainable finance to make recommendations to the SEC regarding the environmental, social, and governance metrics that the SEC should require issuers to disclose in their financial statements.
- Direct the Federal Reserve and other federal financial regulators, as appropriate, to identify and mitigate climate-related risks of large financial institutions through a

[89] Task Force on Climate-Related Financial Disclosures, "Recommendations of the Task Force on Climate-related Financial Disclosures," *Financial Stability Board*, June 2017; H.R. 2570, "Climate Risk Disclosure Act of 2021," 117th Congress.

[90] Select Committee on the Climate Crisis, "Chair Castor, Rep. Casten & 131 Other House Democrats Urge SEC to Finalize Rule on Climate Risk Disclosure," press release, June 17, 2022.

[91] Board of Governors of the Federal Reserve System, "Federal Reserve Board announces that six of the nation's largest banks will participate in a pilot climate scenario analysis exercise designed to enhance the ability of supervisors and firms to measure and manage climate-related financial risks," press release, September 29, 2022.

[92] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

comprehensive macroprudential framework. These measures should include enhanced capital, scenario planning, margin, portfolio limits, and divesture to address climate-related risks.

- Direct FSOC to study climate risks to the financial system, include a section in each FSOC Annual Report devoted to climate risk and financial stability, and make administrative and legislative recommendations for further regulation to mitigate such risks throughout the financial system, including a broad range of financial activities and institutions. For example, FSOC should investigate the climate risks of smaller financial institutions, such as local banks, which could have acute risks from regional concentration of assets.

Pillar 3: Transform U.S. Industry and Expand Domestic Manufacturing of Clean Energy and Zero-Emission Technologies

The 117th Congress enacted long-awaited industrial policies to support the manufacturing of clean energy and climate solutions in response to many factors, including China's prominence in key strategic sectors, pandemic-related supply chain problems, and the Russian invasion of Ukraine and its resultant impacts on essential metals and minerals markets. The 117th Congress also tackled the challenge of decarbonizing energy-intensive trade-exposed U.S. industries like steel and cement production by investing in research and development, infrastructure, and deployment incentives, which should also help revitalize economically depressed regions of the country. In October 2021, the United States and European Union took steps to address steel and aluminum climate pollution and drive global improvements in the sectors showing the Biden-Harris Administration's commitment to protecting American jobs while tackling the climate crisis by ensuring domestic policies supported lowering the carbon intensity of these industries.[93,94]

Looking ahead, the industrial sector will need substantial continued support because the technologies to decarbonize this sector are still under development and need to be commercially deployed before mid-century.

Rebuild U.S. Industry for Global Climate Leadership

The Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA), together with the Energy Act of 2020 and CHIPS and Science Act, provided major investments and established a comprehensive set of policies toward a cleaner industrial sector that will enhance U.S. competitiveness, create good paying jobs, and ensure safe and equitable industrial development.

The Biden-Harris Administration has demonstrated U.S. leadership in reducing climate pollution from the industrial sector. In October 2021, the United States and EU announced a trade deal on steel and aluminum, which included a provision on ensuring they would work to lower the carbon intensity of these industrial sectors. The Department of Energy (DOE) has led the charge in such efforts, releasing an Industrial Sector Decarbonization Roadmap that identified key pathways for industry actors to reduce their emissions, and launching three industrial sector initiatives to address some of the most challenging technical problems in energy known as Energy Earthshots: Hydrogen Shot, Carbon Negative Shot, and Industrial Heat Shot.[95] Through the ongoing negotiations to develop an international legally binding instrument on plastic pollution, the Biden-Harris Administration has an opportunity to support innovation in manufacturing of plastics, in addition to improving recycling and other waste management issues.

Global investment is beginning to flow into clean industry technologies and now is the time for U.S. investments to stay competitive in the developing global market. Green hydrogen and

[93] Office of the United States Trade Representative, "Joint US-EU Statement on Trade in Steel and Aluminum," October 31, 2021.
[94] Department of Commerce, "Fact Sheet: U.S. – EU Arrangements on Global Steel and Aluminum Excess Capacity and Carbon Intensity," October 31, 2021.
[95] Office of Energy Efficiency and Renewable Energy, "DOE Industrial Decarbonization Roadmap," DOE.

hydrogen infrastructure have been the greatest beneficiaries so far, with major European investments in hydrogen infrastructure as part of their Green Deal.[96] New green hydrogen standards announced in May 2022 by the Green Hydrogen Organization will spur investment and impose environmental, social, and governance (ESG) obligations on producers.[97] Other industrial areas are also receiving attention with private investments on the order of hundreds of millions of euros in green steel by Stockholm-based H2 Green Steel.[98]

However, challenges remain. Decarbonizing the industrial sector is currently an extremely expensive undertaking.[99] The war in Ukraine raised energy and fuel costs across the board, stressing the industrial sector as higher costs and rising interest rates could make it harder to invest in decarbonization. Natural gas is a key input for chemicals manufacturing with few alternatives available now, and U.S. refineries have been working at peak capacity to keep up with rebounding demand for gasoline and diesel because some refineries closed permanently during the pandemic. Similarly, oil and gas are primary components of plastics, the manufacturing of which is expected to drive half of all oil demand by 2050.[100] These issues are further exacerbated by increasing global demand for iron, steel, and cement and trade-related challenges for energy-intensive trade-exposed industries. Congress should invest in innovation to provide alternatives and improvements in the industrial sector to develop cleaner, cheaper products than we have today that do not worsen the climate crisis.

Focus Innovation and Commercialization in Technologies to Reduce Industrial Emissions
Building on the Energy Act of 2020, the BIL, IRA, and CHIPS and Science Act together represent the efforts of the 117th Congress in reducing industrial emissions by authorizing long-term research and leveraging U.S. innovation across the commercial sector. The CHIPS and Science Act authorized more than $49 billion to the DOE's Office of Science over five years to fight climate change through research in next-generation energy science and technologies, including many areas (e.g., development of relevant materials, chemical science, hydrogen technologies) important to industrial decarbonization. These funding levels also facilitate enabling and complementary research, including on light sources, large-scale experiments, and high-performance computing facilities. The CHIPS and Science Act also included a provision for the creation of a national science and technology strategy that will address, among other things, the transition to a circular economy. However, a broader approach on circular economy will be needed beyond research to include addressing financing challenges; establishing targets or requirements for recycled content of certain goods; creating standards and incentives to encourage better product design, longer product lifetimes, extended producer responsibility, refillable packaging and products, and new service-based and sharing business models;

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[96] Anmar Frangoul, "EU approves up to $5.2 billion in public funding for hydrogen projects," *CNBC,* September 21, 2022; America Hernandez, "Go big or go green? The EU's massively expanding hydrogen bet," *Politico*, October 19, 2022.
[97] Jeffrey McDonald, "GH2 launches green hydrogen standard to halt global emissions, spur investment," *SPGlobal*, May 17, 2022.
[98] Patricia Allen, "Greentech Report: Milestones, Funding and Important Updates in September 2022," *EU-Startups*, October 3, 2022.
[99] Dimana Doneva, "Wood Mackenzie: Iron Ore And Steel Need $1.4 Trillion To Decarbonize By 2050," *Carbon Herald*, September 30, 2022.
[100] Beth Gardiner, "The Plastics Pipeline: A Surge of New Production Is on the Way," *Yale Environment 360*, December 19, 2019.

preferential procurement; and fees and/or bans on certain materials, products, waste streams, and waste processing methods.

Key Accomplishments

- The Energy Act of 2020 authorized $500 million to create a cross-cutting clean industrial technologies research and development (R&D) program on technologies to reduce emissions from the manufacturing sector, including cement, steel, and chemicals manufacturing processes, high-temperature heat generation, alternative materials, and carbon capture for industrial processes, which was funded in Fiscal Year 2021 and 2022 appropriations bills. The BIL also appropriated an additional $500 million for industrial decarbonization research.
- The IRA provided $5.8 billion for advanced industrial technology to cut pollution at energy-intensive industrial and manufacturing facilities, like steel and cement production, which will help protect U.S. jobs and competitiveness.
- The BIL invested:
    - $2.537 billion for carbon capture demonstration projects;
    - $2.5 billion for carbon storage validation and testing; and
    - $937 million for carbon capture large-scale pilot projects.
- The CHIPS and Science Act included numerous industrial sector focused provisions, including:
    - Authorizing several industrial sector research programs:
        - $1 billion to carry out advanced manufacturing research, development, and demonstration (RD&D) activities;
        - $600 million to carry out advanced materials RD&D activities;
        - $600 million to carry out clean industrial technologies RD&D activities; and
        - A low-emissions steel manufacturing research program.
    - Creating a national science and technology strategy that will address, among other things, the transition to a circular economy;
    - Authorizing $49.8 billion to the DOE Office of Science over 5 years to fight climate change through research in next generation energy science and technologies, including many areas (e.g., development of relevant materials, chemical science, hydrogen technologies) important to industrial carbonization. This investment level would also ensure the completion of enabling research infrastructure including light sources, large-scale experiments, and high-performance computing facilities;
    - Authorizing activities related to clean energy technology commercialization, as well as reforms for DOE management and administration of demonstration projects and prize competitions;
    - Establishing the Foundation for Energy Security and Innovation for fostering public-private partnerships aimed at accelerating the commercialization of clean energy technologies; and
    - Authorizing DOE to establish a program of research, development, demonstration, and commercial application of advanced tools, technologies, and methods for low-emissions steel manufacturing.

Opportunities for Future Congressional Action[101]

- Continue to invest in public-private partnerships for industrial energy efficiency and smart manufacturing.
- Continued investments in electrification and low- and zero-emission industrial heat; carbon capture, utilization, and storage (CCUS); low- and zero-emission hydrogen; and innovative industrial feedstocks and alternative materials. Federal support for CCUS should ensure clear climate benefits.
- Build on the national science and technology strategy to develop a comprehensive circular economy roadmap that can be used to guide efforts to transition to a circular economy, in consultation with outside experts and industry stakeholders. It should address how key industrial subsectors would fit into a circular economy, key milestones and targets for these subsectors, and recommendations on specific federal policies needed to drive this transition, including options for financing a circular economy model.
- Continued focus on demonstration and commercialization.
- Ensure annual appropriations are commensurate with the funding levels authorized in the CHIPS and Science Act.

To enhance U.S. global competitiveness, Congress should provide annual appropriations commensurate with the funding levels authorized in the CHIPS and Science Act, and Congress must continue to support U.S. innovation and scientific research and technological leadership in the future.

Financially Support Deployment of Low-Emission and Industrial Efficiency Technologies
The IRA and BIL provided extensive investments and expanded tax credits to support the adoption of low emission and industrial efficiency technologies. The 117th Congress extended and expanded tax incentives for technologies such as carbon capture, hydrogen, combined heat and power, and waste heat to power, making it easier for hard-to-decarbonize industries to deploy them and reduce emissions. The IRA included a provision of $5.8 billion toward advanced industrial technology to cut pollution at energy-intensive industrial and manufacturing facilities, like steel and cement production, while protecting U.S. jobs and competitiveness.

Recent European, East Asian, and North American policy efforts in deploying hydrogen may find synergy and help further the reduction of industrial emissions. Such efforts come on the heels of the war in Ukraine that forced many countries to secure and diversify their energy supply. However, pandemic-related supply chain issues, increased costs, and rising interest rates have hindered new deployment initiatives.

Key Accomplishments

- The IRA provided $5.8 billion for advanced industrial technology at energy-intensive industrial and manufacturing facilities, like steel and cement production, to cut pollution while protecting U.S. jobs and competitiveness.
- The IRA extended and expanded tax incentives for combined heat and power and waste heat to power.

[101] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- The IRA extended and expanded the tax credit for carbon capture, lowering the cost which makes it easier for hard-to-decarbonize industries like steel and cement; an increased credit for direct air capture of carbon pollution to support carbon removal; and a direct pay option for all taxpayers for the carbon capture credit.
- The IRA added a new tax credit for clean hydrogen to decarbonize industrial processes and a direct pay option for all taxpayers.
- The BIL and IRA together invest over $2 billion in sustained cost-effective codes implementation for energy efficiency and resilience.
- The BIL included historic investments in energy efficiency measures that apply to industry, including:
    - $600 million for critical material innovation, efficiency, and alternatives;
    - $50 million for energy efficiency materials pilot program;
    - $250 million for the Energy Efficiency Revolving Loan Fund Capitalization Grant Program;
    - $550 million for the Energy Efficiency and Conservation Block Grant Program;
    - $10 million for energy efficient transformer rebates;
    - $500 million for grants for energy efficiency improvements and renewable improvements at public school facilities;
    - $75 million for hydroelectric efficiency improvement incentives;
    - $500 million for industrial emissions demonstration projects; and
    - $40 million for solar energy research and development.
- The FY23 NDAA requires a study to address how sustainable materials, such as mass timber and low carbon concrete, are assessed and included in planning and design.

Opportunities for Future Congressional Action[102]

- Provide direct grants and rebates to deploy industrial efficiency technologies.
- Continue to enable financing for reducing industrial emissions. Federal support for CCUS technologies should ensure clear climate benefits.

Build Physical and Knowledge Infrastructure to Enable Industrial Decarbonization

One of the greatest challenges facing the energy transition will be the development of infrastructure for materials recovery and recycling of critical minerals. In the 117th Congress, the BIL appropriated over $6 billion in battery material processing, manufacturing, and recycling grants to meet this challenge and develop a circular economy. In addition, the BIL included investments in further researching and developing the technologies needed to establish a circular economy in wind, solar, and clean hydrogen energy sources. These provisions build on the bipartisan accomplishments in the Energy Act of 2020 and CHIPS and Science Act, which provided much of the research and development efforts for clean energy innovation.

In March 2022, President Biden invoked the Defense Production Act to boost mineral development and production.[103] President Biden also directed the Department of Defense to

[102] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[103] The White House, "Fact Sheet: President Biden's Plan to Respond to Putin's Price Hike at the Pump," March 31, 2022.

designate as essential to national security the following critical minerals: lithium, cobalt, graphite, nickel, and manganese.[104]

Key Accomplishments

- The IRA included an advanced manufacturing production tax credit for critical minerals.
- The IRA provided $250 million for environmental product declarations for construction materials and $100 million for low-embodied carbon labeling for construction materials in transportation projects and federal buildings projects to support green procurement initiatives.
- The BIL invested nearly $7 billion in advancing our domestic battery supply chain, including:
    - $3 billion for battery material processing grants;
    - $3 billion for battery manufacturing and recycling grants;
    - $125 million for battery and critical mineral recycling, battery recycling RD&D, retailers as collection points, and state and local programs;
    - $125 million for critical minerals mining and recycling research;
    - $75 million for the Critical Material Supply Chain Research Facility; and
    - $600 million for critical material innovation, efficiency, and alternatives research.
- The BIL invested $500 million for clean hydrogen manufacturing and recycling RD&D program.
- The BIL included $60 million for Wind Energy Technology Program.
- The BIL provided $40 million for Wind Energy Technology Manufacturing Recycling RD&D Program.
- The BIL included $20 million for Solar Energy Technology Recycling RD&D Program.
- The BIL invested $40 million for solar energy R&D.
- The BIL provided $500 million for industrial emissions demonstration projects.
- The Energy Act of 2020 authorized activities to improve critical materials recycling, reduce the reliance on critical materials through greater efficiency and material substitutes, find sustainable new critical materials sources, and better understand the critical materials supply chain and adverse impacts caused by shortages.

Opportunities for Future Congressional Action[105]

- Facilitate the development of infrastructure for materials recovery and recycling.
- Support carbon storage capabilities necessary for industrial decarbonization and direct air capture and the robust regulatory oversight required to ensure a clear climate benefit and protection of impacted communities.

Create Markets and Establish Standards for Low-Emission Industrial Goods and Technologies

The 117th Congress invested significantly in creating markets for low-emissions industrial goods and technologies by leveraging the Federal government's purchasing power. The IRA included

[104] Department of Defense, "Defense Production Act Title III Presidential Determination for Critical Materials in Large-Capacity Batteries," press release, April 5, 2022.

[105] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

over $4 billion for low-carbon materials in federal buildings construction or renovations and incentivized their use in federal highway projects.

The federal government can use its procurement power to create markets for low-emission industrial goods and help lower their costs, easing their adoption by businesses and consumers. A federal Buy Clean initiative would further leverage the federal government's power to promote the use of low-carbon, made in America materials and advance America's industrial capacity to produce and supply such goods. In December 2021, the Biden-Harris Administration established a federal Buy Clean initiative under E.O. 14057, which prioritizes the use of American-made, lower-carbon construction materials, such as steel and concrete, in federal procurement and federally funded projects. Congress should also ensure that technologies enabling industrial decarbonization are included in federal energy procurement policies and standards.

Establishing standards will go a long way in increasing widespread deployment of low-emission goods and technologies to reduce industrial emissions and other pollution. Such standards including establishing tradeable, performance-based emissions standards for key industrial products, and robust energy efficiency standards for industrial equipment and processes, as well as standards to increase materials recirculation and efficiency to move toward a circular economy. To encourage global adoption of similar standards and maintain U.S. competitiveness, Congress should evaluate the need for a border adjustment mechanism.

Key Accomplishments

- The BIL provided over $300 million for states that procure materials made from captured carbon.
- The IRA invested $2.15 billion for low-carbon materials in federal buildings construction or renovations.
- The IRA invested $2 billion to incentivize use of low-carbon materials in federal highway projects.
- The IRA required federal buildings projects to support green procurement initiatives.

Opportunities for Future Congressional Action[106]

- Codify a federal Buy Clean program to promote adoption of low carbon, made in America products.
- Establish tradeable performance-based emissions standards for key industrial products.
- Implement border adjustment mechanisms for emissions-intensive goods.
- Establish robust energy efficiency standards for industrial equipment and processes.
- Establish a low-emission heat portfolio and performance standard.
- Establish standards to increase materials recirculation and efficiency to move toward a circular economy.
- Ensure that technologies enabling industrial decarbonization are included in federal energy procurement policies and standards. Federal support for CCUS technologies should ensure clear climate benefits.
- Create international certifications and labels for emissions-intensive goods.

[106] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Invest in Manufacturing of Clean Energy, Clean Vehicle, and Zero-Emission Technologies

The global race to win the industries of the future continues and the 117th Congress made substantial investments to ensure American leadership. A sustained industrial policy will be required for the needed transformation to address the challenges presented by the climate crisis.

Construct New or Retool Existing Manufacturing Facilities in the United States

More companies are announcing investments in U.S. facilities to manufacture clean energy, clean vehicles, and other climate solutions as a result of the BIL and IRA. Policies like the 48C clean manufacturing investment tax will boost our clean energy sector while increasing U.S. manufacturing jobs. At the same time, rising interest rates may slow corporate investments, but continued federal incentives could help overcome that drag. As added incentive, $4 billion was set aside for coal communities impacted by the energy transition, such as those located in areas where a coal mine or coal-fired power plant recently closed, as part of the revived 48C credit. The war in Ukraine and pandemic-related supply chain challenges further emphasized the need to establish a domestic supply chain for clean energy technologies. The IRA launched several efforts to accomplish this, including a new advanced manufacturing production tax credit to support domestic manufacturing of solar panel and wind turbine components, batteries, and critical minerals. The DOE received more than $300 billion in new loan authority across several programs to accelerate the development and deployment of innovative technologies and boost American manufacturing of clean car and truck technologies.

Key Accomplishments

- The IRA invested $10 billion for a revived 48C clean manufacturing investment tax credit, with a set-aside of $4 billion for coal communities.
- The IRA included a new advanced manufacturing production tax credit to support domestic manufacturing of solar panel and wind turbine components, batteries, and critical minerals, with a direct pay option for all taxpayers for the advanced manufacturing production credit.
- The IRA granted more than $300 billion in new loan authority across multiple programs at DOE, including the Advanced Technology Vehicle Manufacturing, Domestic Manufacturing Conversion, and Energy Infrastructure Reinvestment Financing programs.

Opportunities for Future Congressional Action[107]

- Continue to invest in the 48C Manufacturing Tax Credit, which is currently capped at $10 billion.

Develop and Implement Comprehensive Federal Strategies to Achieve Domestic Manufacturing and Supply Chain Goals

The 117th Congress and the Biden-Harris Administration worked to address supply chain issues related to the COVID-19 pandemic, the war in Ukraine, and climate-related effects that would further exacerbate any existing supply vulnerabilities. As a result, President Biden conducted a supply chain vulnerability assessment to secure critical supply chains against a wide range of

[107] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

risks and threats to put the American economy on a path toward long-term resilience.[108] The 117th Congress also identified climate change as a key national challenge, calling for an increase in domestic manufacturing and bolstered U.S. manufacturing by adding a new requirement for final assembly in North America for the Clean Vehicle tax credit.

There is growing awareness of the need for domestic supply chains for critical minerals, but the path forward for developing mineral extraction and processing on a time scale consistent with climate goals remains challenging. There are positive trends in this area as international partnerships ramp up as a result of the Minerals Security Partnership (MSP) launched in June 2022.[109] The MSP aims to ensure that critical minerals are produced, processed, and recycled in a manner that benefits the partners with the goal of attracting public and private investment, increasing transparency, and promoting high environmental, social, and governance (ESG) standards throughout critical minerals supply chains. In addition, the Department of Defense's Office of Local Defense Community Cooperation granted a consortium of companies $5 million to accelerate the development of domestic manufacturing supply chains for critical minerals.[110]

Key Accomplishments

- The CHIPS and Science Act established a National Supply Chain Database to assist with minimizing disruptions to the U.S. supply chain through an assessment of U.S. manufacturers' capabilities, thereby ensuring robust access to resources across all sectors, improving manufacturing efficiency by reducing redundant travel and materials, and supporting resilient U.S. supply chains in the context of increased disruptions from extreme weather events.
- The CHIPS and Science Act identified climate change as a key national challenge as part of the Office of Science and Technology Policy's National Science and Technology Strategy along with national security, increasing domestic manufacturing, workforce development, and advancing equitable access to education and opportunity.
- The IRA included an electric vehicle (EV) tax credit with final assembly in North America requirements.
- The BIL invested $75 million for Critical Material Supply Chain Research Facility.

Opportunities for Future Congressional Action[111]

- Develop a national clean energy, decarbonization, and advanced vehicle manufacturing strategy.
- Incentives for domestic manufacturing should be paired with workforce development investments that provide high-quality and good-paying jobs and create the necessary talent pipeline to reach their full potential.

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[108] The White House, "The Biden-Harris Plan to Revitalize American Manufacturing and Secure Critical Supply Chains in 2022," February 24, 2022.
[109] Department of State, "Minerals Security Partnership Convening Supports Robust Supply Chains for Clean Energy Technologies," *Office of the Spokesperson*, September 22, 2022.
[110] "SAE Government Technologies and the SCORE Consortium Received a Grant to Accelerate Supply Chains for Critical Minerals," *Market Screener*, November 8, 2022.
[111] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Develop and implement a national strategy and research program for critical minerals in the clean energy and EV supply chains.
- Develop a strategy to extract and process critical minerals on a time scale consistent with climate goals, while ensuring mining maintains strong environmental standards, protects special and sacred public lands, and that incorporates the Free, Prior, and Informed Consent of tribal nations who are near where many of these critical minerals will be mined.*

Align Federal Innovation and Procurement Policy with Domestic Manufacturing Objectives
The war in Ukraine highlighted the necessity to use the Defense Production Act to meet energy security needs. In June 2022, President Biden invoked the Defense Production Act for solar energy components, transformers and grid components, heat pumps, insulation, electrolyzers, fuel cells, and platinum group metals.[112]

Key Accomplishments

- The CHIPS and Science Act authorized increased funding for the Manufacturing USA program aimed at promoting domestic production of semiconductors that will be vital in the energy transition.
- The IRA provides $500 million through the Defense Production Act to bolster domestic manufacturing of clean energy technologies, including energy-efficient heat pumps, solar panel components, and large-capacity batteries.

Opportunities for Future Congressional Action[113]

- Prioritize federal innovation funding for applicants that submit U.S. manufacturing plans and connect DOE awardees with Department of Commerce manufacturing programs.
- Procure bulk domestic clean energy, energy efficiency, and decarbonization technologies and products.

Develop, Manufacture, and Deploy Cutting Edge Carbon Removal Technology

Develop a Robust, Coordinated Federal RD&D Strategy on Carbon Removal Technologies
The BIL delivers the largest investment in tackling RD&D on CCUS technologies with over $8.4 billion geared toward deploying pilot projects and demonstration programs to prove the viability of CCUS technology in addressing the climate crisis. The CHIPS and Science Act and Energy Act of 2020 established the foundation for the research and development needed to develop carbon capture technologies.

The federal government has launched several efforts to develop robust strategies to develop carbon removal technologies, bringing on public-private action and investment and taking an "all R&D community" approach. In June 2021, 23 governments, including the United States, announced Mission Innovation 2.0, the second phase of a global initiative to catalyze action and

[112] The White House, "Fact Sheet: President Biden Takes Bold Executive Action to Spur Domestic Clean Energy Manufacturing," June 6, 2022.
[113] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

investment in RD&D to make clean energy affordable, attractive, and accessible to all this decade.[114] Furthermore, as part of the DOE's Energy Earthshots Initiative announced in September 2022, the Carbon Negative Shot called for innovations and technologies that would remove CO_2 from the atmosphere and durably store it at meaningful scales for less than $100/net metric ton of CO_2-equivalent (CO_2e).[115]

Key Accomplishments

- The BIL invested significantly in projects to advance direct air capture, including:
  - $3.5 billion for direct air capture hubs;
  - $115 million for a direct air capture prize competition; and
  - $500 million for demonstrations of clean energy technologies on current and abandoned mine land, including direct air capture.
- The CHIPS and Science Act authorized direct air capture research.
- The FY23 NDAA provides funding for applied research in direct air capture and carbon removal technology program.
- The Energy Act of 2020 delivered substantial growth for carbon capture, utilization, and storage research, including direct air capture, and established an RD&D program to examine the methods, technologies, and strategies to remove carbon dioxide from the atmosphere at a large scale.

Opportunities for Future Congressional Action[116]

- Continue to fund RD&D on carbon removal technologies. Federal support for CCUS, including carbon removal, should ensure clear climate benefits.

Provide Financial Incentives for Carbon Removal

The IRA extended and expanded the tax credit for carbon capture, which makes it easier for hard-to-decarbonize industries like steel and cement to use. In addition, it provided an increased credit for direct air capture of carbon pollution to support carbon removal and a direct pay option for all taxpayers for the carbon capture credit.

Create Markets for Products Made from Carbon Captured from the Atmosphere

Given the potential demand for carbon capture projects worldwide, it is crucial to adopt policies that will encourage the private sector to use the byproducts of carbon capture to the fullest extent possible. The 117th Congress provided funding for states that procure materials made from captured carbon and provided funding for federal procurement initiatives. The BIL authorized more than $3.8 billion for advances in direct air capture. At the United Nations Framework Convention on Climate Change (UNFCCC) 26th Conference of the Parties (COP26), the Biden-Harris Administration launched the First Movers Coalition, a new platform for companies to harness their purchasing power and supply chains to create early markets for climate solutions,

[114] "Mission Innovation launches a decade of clean energy innovation to accelerate achieving the Paris Agreement Goals," *Mission Innovation*, June 2, 2021.
[115] Office of Policy, "Energy Earthshots Initiative," *Department of Energy*.
[116] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

including carbon removal. The private sector has made a start with Stripe organizing a $15 million advanced market commitment for carbon removal,[117] but more remains to be done.

Key Accomplishments

- The BIL provided over $300 million for states that procure materials made from captured carbon.
- The IRA included funding for federal procurement initiatives.

Opportunities for Future Congressional Action[118]

- Expand any federal fuel standard to include fuels made from captured carbon.
- Continue supporting the development of military fuels and products from captured carbon.
- Establish federal procurement of fuels made from captured carbon.
- Federal support for reuse of captured carbon should ensure clear climate benefits.

Cut Emissions of Super-Pollutants and Support Next-Generation Coolant Manufacturers

Congress has helped drive major progress in this area since the release of the 2020 Climate Crisis Action Plan. At the end of 2020, Congress passed the bipartisan American Innovation and Manufacturing (AIM) Act which required the Environmental Protection Agency (EPA) to issue a final rule for phasedown of hydrofluorocarbons (HFCs) by 85% over next 15 years. EPA finalized the rule which also establishes initial methodology for allocating and trading HFC allowances in 2022 and 2023 in September 2021.[119] The Senate then ratified the Kigali Amendment to the 1987 Montreal Protocol in September 2022, demonstrating bipartisan support for international climate measures that support U.S. industry, while also reducing the use of super-pollutants. However, recent reports that China and India may be under-reporting their HFC emissions show that the issue remains challenging internationally.[120]

Key Accomplishments

- As part of the AIM Act, Congress directed EPA to phase down the production and consumption of super-pollutant HFCs as part of global efforts, which would avoid up to 0.5 °C of increased average temperatures.
- The IRA invested over $38 million for the implementation of the AIM Act.
- In September 2022, the Senate ratified the Kigali amendment to the Montreal Protocol.

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[117] Stripe, "Stripe Climate increases carbon removal commitments to $15 million, adding four new companies," news release, December 15, 2021.
[118] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[119] EPA, "U.S. Will Dramatically Cut Climate-Damaging Greenhouse Gases with New Program Aimed at Chemicals Used in Air Conditioning, Refrigeration," September 23, 2021.
[120] Phil McKenna, "China, India Emissions Pledges May Not Be Reducing Potent Pollutants, Study Shows," *Inside Climate News*, January 22, 2020.

Opportunities for Future Congressional Action[121]

- Provide resources for states to facilitate transition and replacement of HFC equipment.
- Increase agency enforcement and education pertaining to HFCs.
- Provide tools and resources for industry actors for reporting and reducing HFC emissions.

[121] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Pillar 4: Break Down Barriers for Clean Energy Technologies

Private sector investment in clean energy, clean vehicles, and climate solutions continues to grow, but the power of private sector capital is limited by the distorting impact of federal subsidies for polluting fossil fuels and lack of any consistent mechanism to internalize the external costs of climate pollution. A recent International Monetary Fund (IMF) analysis concluded that global fossil fuel subsidies totaled nearly $6 trillion, or nearly 7% of global Gross Domestic Product in 2020.[122] The IMF calculation includes the implicit subsidies for the unaccounted-for external costs of fossil fuels like climate and public health impacts.

There is an urgent need to correct this misalignment. Subsidies for fossil fuels are a burden on taxpayers by continuing our reliance on volatile fossil fuel prices, stifling competition, limiting economic growth in clean energy and clean vehicle sectors, increasing harmful pollution that contributes to climate change, creating hazardous waste, and causing negative health impacts like asthma and respiratory disease, leading to increased hospital visits and premature deaths. These subsidies appear even more unjustified in the context of the war in Ukraine which has helped lead to record profits for oil and gas companies, while families are struggling to make ends meet.[123] According to the International Energy Agency, the world's oil and natural gas producers are set to achieve a new high in profits of $4 trillion in 2022, double the previous year's profits.[124]

In the Inflation Reduction Act (IRA), the 117th Congress reinstated the Superfund tax on oil and petroleum producers, which was a long-sought achievement. This tax will provide a permanent dedicated revenue stream of about $11 billion over the next ten years to clean up contaminated sites, ensuring that polluters, not taxpayers, cover the bill for cleaning up waste and pollution.[125] In the IRA, the 117th Congress also created a new Methane Emissions Reduction Program to immediately reduce methane pollution from oil and natural gas infrastructure by holding companies accountable for wasted methane pollution and providing incentives to find and fix leaks and stop wasteful venting and flaring.

There are international policy efforts to internalize climate pollution externalities as well. The European Union (EU) is developing a carbon border adjustment mechanism to avoid EU energy intensive industries moving operations elsewhere and to encourage countries to set carbon pricing policies.[126] The proposal would impose a fee on imports produced with more carbon dioxide than if they were made in the EU. As a complementary effort, in October 2021, the United States and the EU reached a trade deal on steel and aluminum.[127]

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[122] Ian W.H. Parry, Simon Block, and Nate Vernon, "Still Not Getting Energy Prices Right: A Global and Country Update of Fossil Fuel Subsidies," *International Monetary Fund*, September 24, 2021.
[123] Clifford Krauss, "Oil Giants, With Billions in Profits, Face Criticism and an Uncertain Outlook," *New York Times* October 28, 2022.
[124] Ibid.
[125] Office of Rep. Frank Pallone, Jr., "Pallone Helps Secure Inclusion of Superfund Tax on Oil and Petroleum Companies in Inflation Reduction Act," press release, August 12, 2022.
[126] Council of the European Union, "Council agrees on the Carbon Border Adjustment Mechanism (CBAM)," press release, March 15, 2022.
[127] Office of the United States Trade Representative, "Joint US-EU Statement on Trade in Steel and Aluminum," October 31, 2021.

These are positive steps, but much more needs to be done. To ease the burden on U.S. taxpayers and help accelerate the transition to a just and resilient clean energy economy, Congress should align the tax code with a net-zero goal, eliminate outdated tax breaks for oil and gas companies, and put a price on carbon pollution.

Key Accomplishments

The IRA started to align the U.S. tax code with climate and environmental justice goals and began to price climate pollutants:

- Reinstated the Superfund tax on chemical producers, which provides a permanent dedicated revenue stream (an estimated $11 billion over the next ten years) to clean up contaminated sites.
- Established a new Methane Emissions Reduction Program to immediately reduce methane pollution from oil and natural gas infrastructure by holding companies accountable for wasted methane pollution and providing incentives to find and fix leaks and stop venting and flaring. The charge for wasted methane pollution begins at $900 per ton in 2024 and ramps up to $1,500 per ton by 2026.

Opportunities for Future Congressional Action[128]

- Align the U.S. tax code with the national goal of achieving net-zero emissions by no later than 2050. Repeal outdated tax breaks and subsidies for the oil and gas industry.
- Any carbon price should follow the principles in the 2020 Climate Crisis Action Plan:
    - Achieve America's economy-wide greenhouse gas emissions reduction goal of net-zero by no later than 2050.
    - Consider a carbon price as a tool to complement a suite of policies to achieve deep pollution reductions and strengthen community resilience to climate impacts. Carbon pricing is not a silver bullet.
    - Ensure that energy-intensive, trade-exposed domestic industries that are working to reduce pollution remain on a level playing field with foreign competitors that use dirtier technologies to cut costs and undercut efforts to reduce pollution.
    - Ensure low- and moderate-income households benefit from any national carbon price.
    - Pair a carbon price with policies to achieve measurable air pollution reductions from facilities located in environmental justice communities, which face chronic and acute health impacts from a legacy of industrial development in their neighborhoods.
    - Respect states and localities that have led the nation in climate action, ensure that a national carbon price complements and builds on their initiatives, and apply the lessons learned from their experiences and other international approaches.
    - Do not offer liability relief or nullify Clean Air Act authorities or other existing statutory duties to cut pollution in exchange for a carbon price.

[128] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Pillar 5: Invest in America's Workers and Build a Fairer Economy

With major investments in the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA), the 117th Congress demonstrated how investments to tackle the climate crisis and transition to a just, resilient, clean energy economy can create good-paying jobs and benefit workers and communities. At the same time, due to larger forces like the COVID-19 pandemic, disaster-related disruptions, and rising costs, many workers and communities are under extreme pressures. Continued federal investments will be required to help overcome these ongoing challenges.

Ensure the Clean Energy Economy Benefits Current and Future Workers

The COVID-19 pandemic increased unemployment rapidly and significantly. Though overall employment numbers have largely rebounded as of November 2022, the number of people who are not in the labor force but want a job is higher than it was before the pandemic.[129] In some sectors, there are major staff shortages, such as in durable goods manufacturing, wholesale and retail trade, and education and health services, but in other sectors there is a surplus, such as in transportation, construction, and mining.[130] Rising interest rates and economic instability injects uncertainty into the near-term labor market.[131]

In this context, creating jobs and investing in workers in clean energy, clean vehicle, and climate solutions sectors is more important than ever. Thus, the 117th Congress made major investments in workers and workforce development. The House of Representatives passed the PRO Act, which would empower workers to secure good-paying jobs with strong labor standards. Through the BIL, the 117th Congress ensured that Davis-Bacon prevailing wage requirements apply to most of the funds provided by the law and also invested in workforce development through building, training, and assessment centers and career skills training. Through the IRA, the 117th Congress provided bonuses for high road labor standards in key clean energy and clean vehicle tax provisions, which will help incentivize prevailing wages, apprenticeships, and using domestic content. There have already been some positive developments, including the North America's Building Trades Unions securing a landmark offshore wind Project Labor Agreement.[132]

Make a Federal Commitment to Workers and Communities

In addition to the economic costs of the COVID-19 pandemic, many communities are facing other challenges. It is critical that the federal government invest in community-led and place-based solutions to help revitalize economic development and that the federal government prioritize communities in economic transition and environmental justice communities for federal spending and investment. Through the IRA, the 117th Congress made major investments targeted at areas that need it the most like brownfields sites and communities with significant levels of fossil fuel-related employment, or where a coal mine or coal plant closed recently. The new Greenhouse Gas Reduction Fund will finance the rapid deployment of zero-emission

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[129] Bureau of Labor Statistics, "The Employment Situation – November 2022," news release, December 2, 2022.
[130] Stephanie Ferguson, "Understanding America's Labor Shortage: The Most Impacted Industries," *U.S. Chamber of Commerce*, September 7, 2022.
[131] Lucia Mutikani, "U.S. job openings drop sharply, labor market starting to loosen," *Reuters*, October 4, 2022.
[132] Kenneth Quinnell and Aaron Gallant, "Service + Solidarity Spotlight: NABTU Secures Landmark Offshore Wind Project Labor Agreement," *American Federation of Labor and Congress of Industrial Organizations*, May 6, 2022.

technologies, with more than half of these investments going to low-income and disadvantaged communities.

On the administrative side, the Biden-Harris Administration's Justice40 Initiative will ensure that 40% of the benefits of key infrastructure investments will flow to disadvantaged communities. President Biden also created an Interagency Working Group on Coal and Power Plant Communities to specifically coordinate federal resources, increase access to energy, and grow the economy, especially in environmental justice communities.[133]

More focus is needed on workforce development to take advantage of these federal investments and initiatives. A critical next step will be expanding and improving the quality of registered apprenticeship programs, a policy that was in the House-passed Build Back Better Act but was not included in the IRA. It will also be important to work with states to help fossil fuel workers transition their skills into new clean energy applications and industries.

Support the Health Needs of Energy Workers

Throughout U.S. history, coal miners have played a significant role in enabling the economic growth of the United States, and it is important to ensure that they are not left behind as we transition towards cleaner energy sources. Through the IRA, the 117th Congress succeeded in permanently extending the primary source of revenue for the Black Lung Disability Trust Fund, the excise tax on underground and surface-mined coal, which will continue to benefit miners with black lung disease and their families. The U.S. Department of Labor (DOL) is also working to further reduce health hazards to miners through an initiative that will reduce exposure to silica, which has been shown to increase risks of developing serious lung diseases like black lung.

Additional focus is needed to ensure that clean energy jobs remain safe and healthy for workers. Some clean energy technologies are developed using raw materials that must be mined and then processed, each step of which is associated with potential occupational safety and health hazards. In some cases, toxic exposures have been reported from sources such as foam insulations sprayed in energy efficient buildings and solar panel production.[134]

Create Jobs Through Conservation and Reclamation and Restoration of Coal Mines and Abandoned Wells

There are over 52,000 abandoned mine sites on public lands in the Western United States as of 2017, with almost 80% still needing further investigation or remediation.[135] Several large coal companies have transferred coal mines to smaller companies that cannot afford the cleanup, leading the companies into bankruptcy and putting the burden of the cost of cleanup on taxpayers.[136] There is also a known inventory of 56,600 orphaned wells, but some estimates for

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[133] The White House, "Readout of the Interagency Working Group on Coal and Power Plant Communities Meeting for Economic Growth That Benefits Everybody," September 27, 2021.
[134] Bouchra Bakhiyi and France Labrèche, "The photovoltaic industry on the path to a sustainable future — Environmental and occupational health issues," *Environment International, Volume 73*, December 2014; Tristan Roberts, "EPA Raises Health Concerns with Spray Foam Insulation," *Building Green*, June 1, 2018; Department of Labor, Occupational Safety and Health Administration, "Green Job Hazards," 2022.
[135] Bureau of Land Management, "AML Inventory," *Department of the Interior*, Accessed December 12, 2022.
[136] Josh Saul, et al., "The Coal Is Gone, But the Mess Remains," *Bloomberg*, October 17, 2022.

the total number of abandoned wells reach up to 3 million.[137] While a federal program to identify and plug abandoned wells may cost between $12 billion and $24 billion, it could create up to 120,000 jobs. The BIL provided significant investments of nearly $11.3 billion for abandoned mines and $4.7 billion to plug abandoned wells. Some of this funding will support displaced coal workers and help mining communities diversify their economies.[138]

Another opportunity to create jobs in conservation and climate resilience is to reimagine the Civilian Conservation Corps through a Civilian Climate Corps, as laid out in the 2020 Climate Crisis Action Plan recommendations.

Protect Workers from Extreme Weather Conditions

Deaths of workers from extreme weather have been highly publicized, such as a tornado at an Amazon facility and deaths to farmworkers in heatwaves, emphasizing the need for better planning, preparedness, and protections for workers during extreme weather events. Fortunately, the Biden-Harris Administration has taken steps to strengthen protections. This includes an Occupational Safety and Health Administration (OSHA) program for workplace inspections to protect indoor and outdoor workers from heat stress. OSHA is also in the rulemaking process for a national heat standard to protect workers. As extreme weather events become more frequent and more intense, further steps must be taken to protect all workers from other types of extreme weather events and their harms, including flooding and wildfire smoke, regardless of their employers.

Key Accomplishments

Ensure the Clean Energy Economy Benefits Current and Future Workers

- The BIL applied high road labor standards to certain infrastructure investments and provided investments in workforce development including $10 million for Building, Training, and Assessment Centers and $10 million for Career Skills Training.
- The IRA provided bonuses for high road labor standards in key clean energy and clean vehicle tax provisions, which will help incentivize prevailing wages, apprenticeships, and using domestic content.

Make a Federal Commitment to Workers and Communities

The BIL made investments in communities experiencing economic and energy transitions, including $3.5 billion for direct air capture hubs, with a set-aside for two hubs to be located in economically distressed communities in regions of the United States with high levels of coal, oil, or natural gas resources. Under this provision, priority will be given to projects that are likely to create opportunities for skilled training and long-term employment to the greatest number of residents of the region.

The BIL also provided $65 billion for grants to states for broadband deployment to make broadband access more affordable for low-income families, which could help address the digital divide and enable access to smart technologies. The BIL also provided $1 billion for the Energy Improvement in Rural or Remote Areas Program.

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[137] Center on Global Energy Policy, "Green Stimulus for Oil and Gas Workers: Considering a Major Federal Effort to Plug Orphaned and Abandoned Wells," *Columbia University*, July 20, 2020.
[138] Nichola Groom, "U.S. to spend $725 mln this year on abandoned coal mine cleanup," *Reuters*, February 7, 2022.

The IRA provided major investments in workforce development and communities, including:

- Tax incentives to help attract clean energy and manufacturing investments to energy communities that need it the most, including brownfields sites and communities with significant levels of fossil fuel-related employment, or where a coal mine or coal plant closed recently;
- $200 million for states to develop training and education programs for contractors to install energy efficiency and electrification improvement;
- Workforce development and training on zero-emission heavy-duty vehicle maintenance funded through the Environmental Protection Agency (EPA);
- $27 billion for the Greenhouse Gas Reduction Fund that will finance the rapid deployment of zero-emission technologies, with more than half of these investments going to low-income and disadvantaged communities;
- $1 billion for improving affordable housing energy efficiency, water efficiency, and climate resilience; and
- $145.5 million for the Tribal Electrification Program to help electrify homes.

Support the Health Care Needs of Coal Miners

The IRA provided a permanent extension of the excise tax on underground and surface-level mined coal, which provides the primary source of revenue for the Black Lung Disability Trust Fund.

Create Jobs Through Conservation, Reclamation, and Restoration of Coal Mines and Abandoned Wells

The BIL provided $21 billion in environmental remediation, the largest investment in addressing legacy pollution ever, including $1.5 billion to help communities cleanup and reuse brownfields sites; $3.5 billion for remedial actions at Superfund sites; nearly $11.3 billion for abandoned mines; and $4.7 billion to plug orphan oil and gas wells on federal, state, and tribal lands.

Opportunities for Future Congressional Action[139]

- Empower workers to secure good-paying jobs with strong labor standards.
- Secure adequate funding for the National Labor Relations Board for the agency to protect workers' rights to organize and bargain for strong labor standards.*
- Support the reauthorization of the National Apprenticeship Act and the Workforce Innovation and Opportunity Act to address workforce needs; invest in registered apprenticeships, pre-apprenticeships, and youth employment programs to build a skilled, diverse, and qualified pipeline of workers with access to good-paying jobs; and develop workforce training programs for women, people of color, and dislocated, transitioning, and reentering workers.
- Continue to ensure that federally funded construction and infrastructure projects meet the highest labor standards. Federal spending should strengthen communities and improve the quality of life for working Americans. Congress should require that recipients of federal funding negotiate Community Benefits (or Workforce) Agreements (CBAs), where relevant. CBAs are legal agreements between community organizations and

[139] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

project developers that specify the actions the developer will take, such as local hire commitments, to ensure specific benefits accrue to the community in which the project is located and to low-income workers.

- Continue to incentivize high road labor standards in clean energy and clean vehicle tax policy.
- Expand registered apprenticeship programs in the clean energy economy.
- Expand financial aid for trade programs.
- Continue to invest in community-driven and place-based solutions for workers and communities in transition and continue to prioritize communities in economic transition and environmental justice communities for federal spending and investment.
- Direct the DOL to consult with federal agencies, labor unions, community and technical colleges, clean energy companies, state and local officials, local workforce boards, economic development organizations, institutions of higher education, and other stakeholders to identify skills and competencies needed in the clean energy economy and develop targeted training programs to fill those needs and to strengthen the diversity and inclusivity of our workforce.
- Protect coal miners by requiring operators to make full disclosure of all relevant medical evidence, provide miners with financial support to obtain quality legal representation in the claims process, establish criminal penalties for individuals who use false information to challenge a black lung benefit claim, and ensure the solvency of the Black Lung Disability Trust Fund. Specifically, explore a higher tax rate or an alternative funding mechanism for the transition to clean energy to ensure adequate and long-term funding for miners.
- Reimagine the Civilian Conservation Corps through a Civilian Climate Corps.
- Continue to fund abandoned mine cleanup and reclamation and remediation of orphaned wells.
- Ensure workers are protected from all extreme weather conditions, for example protections to leave job sites in advance of a disaster.*
- Establish a standard on prevention of occupational exposure to excessive heat and require employers to implement a workplace excessive heat prevention plan to protect employees from heat-related injuries and illnesses.

Pillar 6: Invest in Disproportionately Exposed Communities to Cut Pollution and Advance Environmental Justice

While the consequences of the climate crisis affect us all, it does not affect us all equally. The 2020 Climate Crisis Action Plan emphasized environmental justice as a cornerstone of environmental and climate policy, and integrated equity and environmental justice into its recommendations for building a cleaner and more resilient economy. The Climate Crisis Action Plan also provided targeted recommendations to reduce harmful air and water pollution in environmental justice and frontline communities, to empower these communities in federal policymaking, and to achieve a just transition. To advance environmental justice, the 117th Congress invested in a number of programs in both the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) including $7.5 billion for clean school buses and electric ferries (BIL) and $3 billion for Environmental and Climate Justice Block Grants for community-led projects (IRA). Additionally, the CHIPS and Science Act provides funding to diversify the U.S. Science, Technology, Engineering, and Math (STEM)/Science, Technology, Engineering, Arts, and Math (STEAM) workforce to be more inclusive. The Biden-Harris Administration has committed to prioritizing environmental justice through the Justice40 Initiative and is taking steps to "narrow the racial wealth gap" by supporting underserved entrepreneurs and small businesses in federal procurement.[140]

While some progress has been made, environmental justice communities continue to bear the brunt of pollution and climate impacts, and new concerns are emerging. For example, the harms of plastic pollution, which impacts communities from production to disposal, is growing. Pollution from plastics threatens the health and wellbeing of people and the environment across the planet. The impact of plastics is now unavoidable, with studies suggesting that the average person consumes 5 grams of plastics, the equivalent of a credit card's worth of plastic, every week.[141] The entire lifecycle of plastics has consequences for human and environmental health, with impacts felt most acutely on vulnerable populations around the world.

In addition to being an environmental and public health disaster, plastics are increasingly a major driver of the climate crisis. Plastics are a petrochemical product, primarily manufactured from fossil fuels like crude oil and natural gas.[142] In 2019, plastics were the source of 3.4% of global carbon emissions, generating over 1.8 billion tons of carbon pollution, primarily from the production and conversion of oil and gas.[143] In addition, the manufacturing and disposal of plastics also causes emissions and other harmful pollutants to be released in fenceline communities. Despite decades of recycling programs, plastic waste continues to be primarily landfilled or incinerated, with over 7 million tons of plastic waste flowing into rivers, lakes, and

[140] The White House, "FACT SHEET: Biden-Harris Administration Advances Equity And Economic Opportunity Through Federal Procurement And State And Local Infrastructure Contracting," July 6, 2022.
[141] Dalberg Advisors and the University of Newcastle, "No Plastic in Nature: Assessing Plastic Ingestion from Nature to People," 2019.
[142] The National Academies of Science, Engineering, and Medicine, "Reckoning with the U.S. role in global ocean plastic waste," December 2021.
[143] Organization for Economic Co-operation and Development, "Plastic leakage and greenhouse gas emissions are increasing."

the ocean.[144] In 2021, the United States generated an estimated 40 million tons of plastic waste,[145] maintaining its rank as the number one producer of plastic waste globally.[146]

In response to the climate crisis, policy makers have focused on transitioning away from fossil fuel-based energy production. However, the demand for plastics, and therefore fossil fuels, is still increasing, having nearly doubled since 2000.[147] Plastics and other petrochemicals are anticipated to account for over one-third of oil demand by 2030, and half of demand by 2050.[148] The drilling and production facilities for plastics are commonly located near environmental justice communities, exposing residents to toxic chemicals and polluted air and water. Landfilled and incinerated plastics not only release carbon pollution but can leak toxic chemicals in the soil, air, and water.

In February 2022, countries around the world committed to establishing a treaty to tackle plastic waste by 2040. The Biden-Harris Administration has set a goal to minimize waste and promote a transition to a circular economy,[149] and agencies such as the Department of the Interior have already begun to eliminate single use plastics.[150] As negotiations progress, it is imperative to consider the climate and environmental justice components of the plastic waste problem. Domestically, Congress can continue to take actions to strengthen protections for communities impacted by plastic facilities, invest in a circular economy that phases out single-use plastics, and support research into understanding the health impacts of plastics.

Similarly, another new challenge is the growth of cryptocurrency mining.[151] Crypto assets can require considerable amounts of electricity that can result in more climate and air pollution, noise, and other detrimental impacts to communities living near mining facilities, which often are already burdened by pollution. In the Finger Lakes region of New York, a once closed coal-fired power plant was converted to natural gas and is now powering cryptocurrency mining, utilizing over half of the plant's generated electricity to power 15,300 computer servers onsite, equivalent to enough electricity to power over 35,000 homes.[152] More work is needed to identify strategies to limit these detrimental impacts.

These new challenges compound the impacts of energy generation from fossil fuels and associated legacy pollution, which disproportionately fall on communities that are marginalized,

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[144] Organization for Economic Co-operation and Development, "Plastic pollution is growing relentlessly as waste management and recycling fall short, says OECD," February 2, 2022.
[145] The Last Beach Cleanup and Beyond Plastics, "The Real Truth About the U.S. Plastic Recycling Rate: 2021 U.S. Facts and Figures," May 2022.
[146] Laura Parker, "U.S. generates more plastic trash than any other nation, report finds," *National Geographic*, October 30, 2020.
[147] IEA, "The Future of Petrochemicals," October 2018.
[148] Ibid.
[149] The White House, "Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability," December 8, 2021.
[150] Department of the Interior, "Secretary Haaland Issues Order to Phase Out Single-Use Plastics, Protect Public Lands and Waters," June 8, 2022.
[151] The White House, "Fact Sheet: Climate and Energy Implications of Crypto-Assets in the United States," September 8, 2022.
[152] Michael Hill, "Bitcoin-mining power plant raises ire of environmentalists," *AP News*, October 16, 2021.

disadvantaged, overburdened, and underserved. It is critical to continue to build a clean energy economy that advances environmental justice for all Americans.

Strengthen Enforcement of Cornerstone Environmental Laws in Environmental Justice Communities

Fifty years ago, the United States enacted bedrock environmental laws – including the Clean Air Act, the Clean Water Act, and the National Environmental Policy Act (NEPA) – to ensure all communities had the ability to live in a clean, safe, and healthy environment.

There have been some positive trends to support enforcement of environmental laws and address environmental justice since the Climate Crisis Action Plan was released. Through the American Rescue Plan and the IRA, the 117th Congress allocated millions to support data collection on environmental burdens and climate impacts on frontline communities, and millions more for increased enforcement of air pollution requirements and air quality monitoring. President Biden issued an Executive Order on Tackling the Climate Crisis at Home and Abroad, directing agencies to develop programs and policies addressing cumulative impacts on disadvantaged communities.[153]

However, during the Trump Administration, the Environmental Protection Agency (EPA) lost many staff and is still working to rebuild its capacity to enforce environmental laws. The 117th Congress did increase appropriations for the EPA, but much more is needed to enable the agency to launch and fund an enforcement surge with a focus on environmental justice communities.

In addition, actions by the Supreme Court raise the possibility of new constraints on executive authority by invoking a new "major questions" doctrine in *West Virginia v. EPA*. In that case, the Supreme Court held that the EPA could not issue greenhouse gas (GHG) regulations for power plants requiring "beyond the fence line" approaches like generation shifting because in their view that would be a highly consequential power that Congress needs to expressly authorize. The Supreme Court has also taken up a Clean Water Act case this term and is expected to narrow the definition of "Waters of the United States" to limit the law's applicability, which could put an even larger burden on environmental justice communities.

Embed Environmental and Climate Justice in Federal Government Decision-Making

The 117th Congress made major strides to invest in environmental justice communities and communities in economic transition through the American Rescue Plan, the BIL, the IRA, and the CHIPS and Science Act. Through the BIL, the 117th Congress made the largest-ever investment in public transit, and also invested in electric school busses, and on modern and clean infrastructure such as ports and airports to support clean and healthy air around environmental justice communities. Through the BIL, the 117th Congress also invested in environmental remediation, in clean drinking water and wastewater infrastructure, and in lead service line pipeline replacement. The BIL and the IRA invested billions to reconnect environmental justice communities divided by highways.

[153] The White House, "Executive Order on Tackling the Climate Crisis at Home and Abroad," January 27, 2021.

Through the IRA, the 117th Congress provided tax incentives to help attract clean energy and manufacturing investments to energy communities that need it the most, including brownfields sites and communities with significant levels of fossil fuel-related employment, or where a coal mine or coal plant closed recently; as well as bonus tax incentives for solar and wind energy projects in low-income and tribal communities, on affordable housing, and for community solar serving low- and moderate-income individuals. The IRA also funded environmental and climate justice block grants, a new greenhouse gas reduction fund with set-asides for disadvantaged communities, climate pollution reduction grants, and grants for zero-emission heavy-duty vehicles and infrastructure, with a set-aside for areas with poor air quality.

Through the CHIPS and Science Act, the 117th Congress helped environmental justice communities and communities experiencing energy and economic transitions by authorizing billions for regional technology hubs, grants for communities needing economic development assistance, and policies to diversify the U.S. STEM/STEAM workforce to be more inclusive.

Complementing these new laws targeting needed investments to environmental justice communities, the Biden-Harris Administration created the White House Environmental Justice Advisory Council and launched the Justice40 Initiative. In addition, in November 2022, the Biden-Harris Administration released version 1.0 of the Climate and Economic Justice Screening Tool (CEJST) to help federal agencies better identify communities that can benefit from the Justice40 Initiative by incorporating new datasets, which include tribal nations and U.S. territories, adding new indicators of burden, updating methodology, and enhancing the user interface.[154]

Individual federal agencies also made strides in integrating environmental justice concerns into their work. The EPA created a new Office of Environmental Justice and External Civil Rights to better enforce civil rights laws in overburdened communities, deliver technical assistance and new grants, and advance environmental justice.[155,156] The EPA is moving quickly to implement investments, programs, and initiatives from the new laws, while targeting and prioritizing resources for disadvantaged communities.[157] FERC has taken administrative steps to increase opportunities for addressing social and environmental impacts, including establishing the Office of Public Participation, issuing an Equity Action Plan, and hiring a Senior Counsel for Environmental Justice and Equity.[158] The Department of Justice created a new Office of Environmental Justice which will advance a new environmental justice enforcement strategy.[159]

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[154] Climate and Economic Justice Screening Tool, "Frequently Asked Questions," *Council on Environmental Quality*, 2022.
[155] Environmental Protection Agency, "About the Office of Environmental Justice and External Civil Rights," accessed December 9, 2022.
[156] The White House, "CEQ Restores Three Key Community Safeguards during Federal Environmental Reviews," April 19, 2022.
[157] U.S. Environmental Protection Agency, Letter to Governors, December 2, 2021.
[158] FERC, "FERC Establishes Office of Public Participation," news release, June 24, 2021; FERC, "FERC Issues Equity Action Plan," news release, April 15, 2022; FERC, "Glick names Montina Cole to Top Environmental Justice Post at FERC," news release, May 20, 2021; U.S. Department of Energy, "Office of Economic Impact and Diversity," accessed December 9, 2022.
[159] U.S. Department of Justice, "Justice Department Launches Comprehensive Environmental Justice Strategy," May 5, 2022.

There are still many opportunities available for further progress, including addressing data gaps to improve the effectiveness of environmental justice screening tools; continued meaningful investment in environmental justice communities; codifying the Interagency Working Group on Environmental Justice, the 1994 Executive Order on Environmental Justice, and the National Environmental Justice Advisory Council to strengthen agency requirements for comprehensive environmental justice strategies; and continued meaningful engagement with environmental justice communities on how best to accomplish these goals. Furthermore, requiring federal agencies to screen proposed regulations for environmental and climate impacts in frontline communities and training staff at relevant agencies in environmental and climate justice could go a long way in supporting and empowering communities.

Ensure Meaningful Engagement and Consultation with Environmental Justice Communities

The Biden-Harris Administration has also advanced changes to NEPA regulations, finalizing the first phase of changes in April 2022, which restored three key provisions that had been modified in 2020 under the Trump Administration. Of the key provisions, one restored the prior definitions of "direct", "indirect", and "cumulative" effects, which are essential for determining the true impact of projects, particularly in disadvantaged communities.[160] The Council on Environmental Quality is currently working on a Phase 2 to propose additional changes that will increase public involvement and address environmental justice challenges.[161] Additionally, in the IRA, the 117th Congress provided over a billion dollars to help agencies conduct environmental review and permitting, which should also help improve the NEPA process.

At the same time, as the war in Ukraine continues, the oil and gas industry and its allies are pushing to quickly expand fossil fuel infrastructure and to limit the ability of communities to participate in the permitting process for that infrastructure. This presents a false choice. It should be possible to improve the permitting process for clean energy and climate solutions while also ensuring the meaningful engagement of environmental justice communities. In November 2022, the House Sustainable Energy and Environment Coalition released a policy brief on permitting reform for the clean energy future with two pillars: transmission reform and increased community engagement in the permitting process.[162]

Improving the process for permitting and infrastructure development so that cumulative impacts are considered, and the processes are consistent with the principles of environmental justice, is important to ensure environmental justice is at the center of the decision-making process. Ensuring technical assistance and funding is available for communities to participate in the public engagement of federal projects is also critical. To maintain strong relationships with community organizations and better engage with local communities, the EPA should hold biennial public meetings on environmental and climate justice at each regional office.

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[160] Federal Register, "National Environmental Policy Act Implementing Regulations Revisions," April 20, 2022.
[161] The White House, "CEQ Restores Three Key Community Safeguards during Federal Environmental Reviews," April 19, 2022.
[162] House Sustainable Energy and Environmental Coalition, "SEEC releases Policy Brief on Permitting Reform for the Clean Energy Future," press release, November 21, 2022.

Build the Capacity of Organizations and Communities Working Toward Environmental Justice

The 117th Congress provided air quality monitoring grants to build technical capacity in the American Rescue Plan. Through the IRA, the 117th Congress invested in environmental and climate justice block grants to prioritize community-led projects. Continued investments are needed in technical assistance and funding to help build the capacity of environmental justice communities and organizations. It will also be helpful to support institutions of higher education in starting or expanding environmental justice programs and in increasing the participation of underrepresented youth in STEM/STEAM programs. Continued funding for Historically Black Colleges and Universities (HBCUs) and tribal colleges can also help support pathways for young students.

Finally, Congress should direct the EPA to create an online clearinghouse for environmental and climate justice information, training materials, and other resources for community groups to use. IRA resources and federal grant resources should be available in multiple languages to help increase accessibility and the overall effectiveness of programs by allowing them to reach a more diverse audience. This is especially important for federal disaster preparedness, public health information, and other agency planning.

Key Accomplishments

Strengthening Enforcement of Environmental Laws

The Fiscal Year 2022 appropriations bill provided $9.56 billion for the EPA, which was a $323 million increase above the 2021 enacted level. The House bill for Fiscal Year 2023 appropriations would provide $11.5 billion for the EPA, which is an increase of almost $2 billion over the 2022 enacted level. Increased funds would support stronger enforcement of environmental laws.

The IRA invested $25 million to increase enforcement of air pollution requirements, $32.5 million to support data collection tracking disproportionate environmental burdens and climate impacts on frontline communities and making mapping and screening tools accessible, and more broadly, over $230 million for air quality monitoring and advancing state climate pollution standards for mobile sources.

Embedding Environmental and Climate Justice in Government Decision-Making

The BIL provided $21 billion for environmental remediation, the largest investment in addressing legacy pollution ever, including:

- $1.5 billion to help communities clean up and reuse brownfields sites;
- $3.5 billion for remedial actions at Superfund sites;
- Nearly $11.3 billion for abandoned mines; and
- $4.7 billion to plug orphan oil and gas wells on federal, state, and tribal lands.

The BIL provided $23 billion for water infrastructure through both the general Clean and Drinking Water State Revolving Funds, $15 billion for lead service line replacement, and $10 billion to address Per- and Polyfluoroalkyl Substances (PFAS).

The BIL and the IRA together provided $4 billion to reconnect environmental justice communities divided by highways.

The IRA advanced environmental justice by prioritizing the needs of historically overburdened communities, including:

- Bonus tax incentives for solar and wind energy projects in low-income and tribal communities, on affordable housing, and for community solar serving low- and moderate-income individuals;
- Tax incentives to help attract clean energy and manufacturing investments to energy communities that need it the most, including brownfields sites and communities with significant levels of fossil fuel-related employment, or where a coal mine or coal plant closed recently;
- $27 billion for the Greenhouse Gas Reduction Fund which will finance the rapid deployment of zero-emission technologies, with more than half of these investments going to low-income and disadvantaged communities;
- $3 billion to reduce air pollution at ports using zero-emission equipment and technology;
- $1.5 billion for the U.S. Forest Service's Urban and Community Forestry Program to help reduce the effects of extreme heat and air pollution in all communities;
- $1 billion for zero-emission heavy-duty vehicles and infrastructure like electric school and transit buses and garbage trucks, with a set-aside for areas with poor air quality;
- $60 million to reduce diesel emissions from goods movement in low-income communities;
- $50 million to reduce air pollution at schools in disadvantaged communities;
- $15 million for climate change planning in U.S. territories, to provide technical assistance to Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Marianas Islands;
- $25 million for the Office of Management and Budget to support implementation and track the environmental, equity, and labor standards and performance of the Act;
- $25 million for the Government Accountability Office to track the equitable distribution of the environmental, economic, and social impacts of the Act; and
- Reinstatement of the Superfund tax on chemical producers, which provides a permanent dedicated revenue stream (an estimated $11 billion over the next ten years) to clean up contaminated sites.

The CHIPS and Science Act prioritized environmental justice communities and communities experiencing energy and economic transition by authorizing:

- $11 billion to advance regional technology hubs;
- $1 billion in the RECOMPETE grant program for economic development; and
- Programs to diversify the U.S. STEM/STEAM workforce to be more inclusive.

Building Capacity of Environmental Justice Organizations and Communities

The American Rescue Plan provided air quality monitoring grants to help build the capacity of environmental justice organizations.

The IRA invested significant resources in initiatives that could help build the capacity of environmental justice organizations and communities:

- $3 billion for Environmental and Climate Justice Block Grants for community-led projects;
- $5 billion for climate pollution reduction grants for air pollution planning and implementation;
- Nearly $255 million for climate pollution reduction planning and implementation grants that will identify how they will benefit low-income and disadvantaged communities; and
- $87 million for the Low Emission Electricity Program to educate consumers on reducing climate pollution from electricity generation and use, with set-asides for disadvantaged communities.

Opportunities for Future Congressional Action[163]

- Fund an enforcement surge at the EPA with a focus on environmental justice communities.
- Amend the Civil Rights Act to define discrimination based on disparate impact to protect victims of climate and environmental injustice.
- Support the EPA's efforts to consider cumulative pollution impacts in its implementation of environmental laws.
- Adequately fund the newly established office of Environmental Justice and External Civil Rights at the EPA.*
- Continue to prioritize advancing environmental justice as part of implementation of the BIL, the IRA, and any new federal spending and increase investments in workforce development programs targeted towards environmental justice communities.
- Increase federal funding for air quality and climate research to reduce the impacts of climate change on human health and welfare, support community-based responses to climate-driven extreme events, and better understand cumulative impacts of pollution and climate on low-income and disadvantaged communities.*
- Increase federal funding for energy-efficient and affordable housing and continue to strengthen local and intergovernmental fair housing enforcement including to advance environmental justice in housing and community development.*
- Increase federal funding for transit, particularly to support access to affordable housing, access to work and educational opportunities, and to enhance mobility for residents of disadvantaged communities. This should include expansion of service areas, improved frequency on existing routes, and funding for zero-emission transit buses*
- Address data gaps to improve the effectiveness of environmental justice screening tools, including more granular data for environmental justice assessments.*
- Codify the Interagency Working Group on Environmental Justice, the 1994 Executive Order on Environmental Justice to strengthen agency requirements for comprehensive environmental justice strategies, and the National Environmental Justice Advisory Council.

[163] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Require federal agencies to screen proposed regulations for environmental and climate impacts in frontline communities and train staff at relevant agencies in environmental and climate justice.
- Strengthen NEPA to require deeper analysis of environmental and climate justice impacts and ensure technical assistance and funding is available specifically for environmental justice communities to participate in public engagement of federal projects.
- Support the EPA in using all available tools to address the direct and cumulative impacts of plastics production and disposal, including pyrolysis and gasification, especially in fenceline communities.
- Direct the EPA to hold biennial public meetings on environmental and climate justice at each regional office and maintain strong relationships with community organizations in order to better engage with local communities.
- Continue to provide technical assistance and funding to help build the capacity of environmental justice communities and organizations, to help them develop climate action plans, and to assist communities in navigating federal grants and other funding opportunities.*
- Create an ombudsman role for climate programs for economically disadvantaged communities.*
- Support institutions of higher education to start or expand environmental justice programs, support participation of underrepresented youth in STEM/STEAM programs, and provide funding for HBCUs and tribal colleges to help support pathways for young students.
- Increased funding for Environmental and Climate Justice Block Grants for community led projects.
- Direct the EPA to create an online Environmental and Climate Justice clearinghouse to provide information, training materials, and other resources for environmental justice communities and organizations to use. Ensure that IRA resources and federal grant resources generally are available in multiple languages to help increase accessibility and the overall effectiveness of programs by allowing them to reach a more diverse audience.* This is especially important for federal disaster preparedness, public health information, and other agency planning.

Pillar 7: Improve Public Health and Manage Climate Risks to Health Infrastructure

Americans are increasingly grappling with the personal and public health impacts of the climate crisis. Since the publication of the Select Committee's Climate Crisis Action Plan in 2020, the world has seen a major shift and learned countless lessons within the public health sector due to COVID-19. The pandemic and its tragedies have emphasized the need to build a resilient public health system and infrastructure to withstand both further physical climate impacts and the influx of medical issues resulting from disasters, increased demands on public health systems, and long-term climate impacts. The pandemic has also highlighted the inequalities in health risks faced by communities and people on the front lines of the climate crisis. Climate impacts are often seen as a health threat multiplier for other chronic conditions and vulnerable populations, exacerbating issues like diabetes, cardiovascular issues, and asthma, and building on top of harms that disadvantaged communities face from chronic pollution and disinvestment. Similarly, the recurring billion-dollar disasters, from wildfires to extreme winter storms to hurricanes and flooding, have shown what and how health infrastructure needs to be improved. In addition, the health sector overall contributes approximately 10% of the country's climate pollution.[164]

The Biden-Harris Administration has led in the climate and health space by establishing the Office of Climate Change and Health Equity (OCCHE) within the Department of Health and Human Services (HHS) to address the impacts of climate on all Americans' health. In addition, several federal tools have been released to help provide communities and health care professionals with additional information to prepare for different health impacts, including Heat.gov, the Center for Disease Control's (CDC) Heat and Health tracker, and the HHS Climate and Health Outlook.[165,166,167] Advancements have also occurred in partnership with the private sector, with over 61 health sector companies, representing over 650 hospitals and thousands of other providers, committing to OCCHE's Health Sector Climate Pledge to reduce greenhouse gas emissions 50% by 2030.[168]

While the 117th Congress delivered on some public health sector investments, there is still much that Congress should do to provide all communities with reliable access to resilient public health care and infrastructure following climate-fueled disasters and long-term climate impacts.

Strengthen National Planning on Climate Threats to Public Health and the Health Care Sector and Ensure Resilient Public Health Supply Chains

The past two and a half years of the COVID-19 pandemic have only emphasized the importance of a strong national plan for physical and operational threats to the public health system, including the supply chain. It is vital to plan for the known impacts of the influx of injuries and mental health crises following climate-fueled disasters, including wildfire events, hurricanes, or

[164] U.S. House of Representatives Ways and Means Committee Majority, *Health Care and the Climate Crisis: Preparing America's Health Care Infrastructure*, September 15, 2022.
[165] National Integrated Heat Health Information System, "HEAT.gov," Accessed December 9, 2022.
[166] Center for Disease Control and Prevention, "Heat and Health Tracker," Accessed December 9, 2022.
[167] U.S. Department of Health and Human Services Office of Climate Change and Health Equity, "Climate and Health Outlook," Accessed December 9, 2022.
[168] Assistant Secretary for Health, "Health Care Sector Commitments to Emissions Reduction and Resilience," *U.S. Department of Health and Human Services*, Accessed December 9, 2022.

inland flooding. It is also equally important to prepare the health care sector for a future where daily impacts, like extreme heat, will become a normal occurrence for many. National planning to address climate threats to public health should incorporate the range of co-benefits, including reducing harmful climate pollution, improving indoor air quality, increasing energy efficiency, and electrification, as described elsewhere in this report. This kind of national strategy will allow for better collaboration, communication, and recovery planning across federal, state, and local agencies, when fast, efficient health response are key to prevent even more tragedy.

While advancements have occurred to build more resilient supply chains in other sectors, particularly with investments from the CHIPS and Science Act, the public health supply chain has been transformed due to the impacts of the COVID-19 pandemic. Many lessons have been learned about the importance of personal protective equipment, medicine, and medical devices, which has only emphasized the need to plan for and secure these supply chains against both expected and unexpected threats and climate-driven disasters.

The Inflation Reduction Act's (IRA) overarching clean energy and air pollution reduction investments make great advancements towards improving public health as the air becomes healthier to breathe. One study found that the avoided air pollution that results from the IRA could lead to 3,700 to 3,900 avoided deaths in 2030 and 99,000 to 100,000 avoided asthma attacks, particularly in disadvantaged communities where polluting facilities have historically been concentrated.[169] Reducing air pollution is essential to address climate-related health impacts.

Key Accomplishments

- The IRA included more than $8 billion for air and climate pollution reduction grants, along with $3 billion for the Neighborhood Access and Equity Grant Program to reduce negative health impacts from transportation facilities.

Opportunities for Future Congressional Action[170]

- Develop and fund a national strategy to advance research and preparedness for climate threats to public health and public health system operations and infrastructure.
- Ensure health equity plays a significant and central role in all aspects of federal planning for climate impacts on the health care sector, recognizing the disproportionate burden of negative health effects from climate change on disadvantaged communities, and ensure that all communities, particularly underserved or disadvantaged communities, have access and can contribute to the planning process.*
- Continue to support and fund research into all aspects of climate change impacts on human health, including transgenerational impacts, social determinants of health, and continued fossil fuel usage.
- Increase health data transparency and uniformity across all federal, state, tribal, and local systems to improve data sharing and accessibility for research and to inform policy planning.

[169] Mahajan et al., "Modeling the Inflation Reduction Act Using the Energy Policy Simulator," *Energy Innovation*, August 2022.
[170] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Ensure increased and dedicated funding for all climate and health programs, including research, and technical assistance grants for state, local, and tribal health planning.
- Identify key climate-related threats to the public health supply chain, both following major disaster events and in normal operations, and assess and plan for these disruptions.
- Ensure increased coordination between the Federal Emergency Management Agency and other health agencies to support supply chain integration during a disaster and in post-disaster recovery.

Restore and Enhance U.S. Global Leadership on Climate and Public Health

Over the past two years, the Biden-Harris Administration has followed through on their global commitments on climate and public health. On his first day in office, President Biden resumed the U.S. participation and financial contributions to the World Health Organization and other global health institutions.[171] The past and continued U.S. commitments will also help push other countries to act as well. While the 117th Congress contributed much to the global health efforts, Congress should sustain and deepen U.S. support for global climate and health initiatives.

Key Accomplishments

- Over $800 million for global climate and public health related issues, including neglected tropical diseases and global health security, in FY2022 Appropriations.

Opportunities for Future Congressional Action[172]

- Increase funding for the Global Health Security Agenda to advance global public health goals, including global monitoring and surveillance, containing global health threats before they compromise national security, and sharing of data and best practices for disaster preparedness, climate resilience, and mitigation.
- Increase collaboration across research facilities, international agencies, and task forces on global public health and climate issues.*

Support Community Preparedness for the Health Impacts of Disasters

Community preparedness is an important aspect of preventing the worst of health impacts following a climate-fueled disaster. In just 2021, nearly half of all Americans lived in an area that experienced an extreme weather event.[173] Not only can disasters cause physical injury that communities and health facilities need to prepare for, but disasters, and the post-disaster recovery period, can also disrupt daily care of other pre-existing conditions, like dialysis treatment, use of electricity dependent medical devices, mental health, and access to medication. Disruptions in reliable electricity, physical damage to health infrastructure, and health professional shortages, can further prolong a community's access to health care in a post-disaster period.

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[171] The White House, "Fact Sheet: The Biden Administration's Commitment to Global Health," February 2, 2022.
[172] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[173] Carly Funk and Alec Tyson, "67% of Americans perceive a rise in extreme weather, but partisans differ over government efforts to address it," *Pew Research Center*, October 14, 2021.

When facing long-term climate and weather impacts, like extreme heat, community support and education is key to help prevent many health issues from becoming critical to the point of needing professional care. Many health departments are implementing education and prevention programs, like the National Integrated Heat Health Information System's website Heat.gov, which provides information and tools to identify heat illness, reduce risks to prevent heat illness, and community programs that can be implemented to address urban heat.[174] These long-term behavioral changes support resilience in the face of climate change health impacts and are as important as health infrastructure improvements.

Though the Biden-Harris Administration and the 117th Congress made much progress to support community preparedness to protect people's health, particularly in air pollution monitoring and reduction, more needs to be done to integrate public health in community preparedness and resilience.

Key Accomplishments

- The IRA provided over $5 billion for climate pollution reduction grants, tax incentives for solar and wind energy projects, including affordable housing, in low-income and tribal communities, and provides incentives for low-carbon and net-zero energy projects in post-disaster recovery to further increase community resilience for future disasters.
- The IRA provided over $4 billion for domestic water supply projects and drought mitigation projects for communities to mitigate impacts of drought and provide reliable access.
- The IRA also provided millions more to reduce air pollution specifically in disadvantaged communities.

Opportunities for Future Congressional Action[175]

- Increase funding for the HHS Public Health Emergency Fund and the CDC Public Health Emergency Preparedness Cooperative Agreement to strengthen the federal, state, and local public health response and coordination following disasters or public health emergencies. Designate funding for the HHS Assistant Secretary for Preparedness and Response to prepare for, and respond to, public health emergencies.
- Increase and expand medical and public health training and education, including the National Institute of Environmental Health Sciences' Worker Training Program, to include climate driven threats to public health, and how climate impacts can compound other illnesses, chronic conditions, or mental health issues.*
- Ensure all communities receive education, information, and tools to prepare for health impacts of climate driven disasters and long-term impacts like drought and extreme heat, including the potential of climate impacts to compound current illness or chronic conditions; and ensure communities are engaged in planning and prevention programs.*
- Ensure all medical facilities and health care institutions, including nursing homes, urgent care, private and public hospitals, receive support and funding to improve climate resilience and preparedness.

[174] National Integrated Heat Health Information System, HEAT.gov, Accessed December 9, 2022.
[175] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Ensure disaster preparedness and response planning incorporates measures to address the compound threats of climate impacts on pre-existing and chronic health issues and integrates solutions to help reduce these compounding effects, including the wider deployment of clean energy strategies.*
- Continue to fund and advance research on wildfire smoke and its impacts on human health and air quality, and how to better address both the short- and long-term impacts, and improve community resilience to wildfire smoke.
- Continue to build on investments to address air pollution and community air monitoring, particularly in underserved and disadvantaged communities, to improve public health.

Increase the Preparedness and Resilience of the Nation's Hospitals and Health Infrastructure

The nation's health infrastructure faces compound risks to the increasing impacts of climate change. As seen with recent extreme weather events, many hospitals and other health infrastructure were not built to withstand the impacts being faced. Closures and evacuations were needed to ensure the safety of patients pre- and post-disaster. A recent Request for Information on impacts of climate change to the health sector by the House Committee on Ways and Means found that over half of the 63 responding health care providers experienced five or more extreme weather events in the past 5 years.[176] Some health care providers are responding to these impacts by creating climate action plans and working to build in measures that will increase their resilience. Congress should support these advancements by encouraging and incentivizing resilient development, retrofits, and rebuilding of health sector assets.

Key Accomplishments

- Major investments through the Bipartisan Infrastructure Law (BIL) and IRA will support overall increased resilience in building infrastructure across the nation, including renewable energy, energy efficiency, and sustainable technologies.
- The FY23 NDAA would support readiness of designated medical facilities to respond to declarations of natural disasters and other national emergencies.

Opportunities for Future Congressional Action[177]

- Encourage development of climate action or preparedness plans for both public and private hospitals and other health system infrastructure to identify vulnerabilities of operations and infrastructure during disasters or in preparation for more intense and frequent impacts.
- Allow for federal funding to be used for pre-disaster mitigation, including retrofitting and rebuilding, to use the latest editions of building codes and climate-informed standards to build the resilience of health infrastructure.
- Ensure rural and tribal communities' health infrastructure receive the same support in technical assistance and funding as that in urban areas.

[176] U.S. House of Representatives Ways and Means Committee Majority, "Health Care and the Climate Crisis: Preparing America's Health Care Infrastructure," September 15, 2022.
[177] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Designate funding for CDC to support core public health infrastructure, including all-hazards public health and preparedness, and increase funding and capacity-building for renewable energy deployment, microgrids, and battery storage at hospitals and health centers.*

Ensure the Climate Resilience of Veterans Health Systems

The Veterans Health Administration serves over 9 million veterans in almost 1,300 health care facilities across the country.[178] It is the largest integrated health care system in the United States. The U.S. Department of Veterans Affairs (VA) published their Climate Action Plan in August 2021.[179] It established the Department's goals, specifically highlighting the vulnerabilities of health care operations to climate change impacts and vulnerabilities of veterans and employees to feeling adverse health impacts. Congress should continue to support the VA's efforts to protect veterans' health and access to adequate healthcare in response to evolving climate impacts.

Key Accomplishments

- The American Rescue Plan Act of 2021 provided $100 million for supply chain modernization, in part directed to the Veterans Health Administration for the service of medical care and treatment for veterans.

Opportunities for Future Congressional Action[180]

- Update, rebuild, and construct all facilities within the Veterans Health Administration to comply with latest codes and standards, and designate funding for VA facilities for construction and improvements, including integration of climate resilience and energy efficiency into buildings and infrastructure.*
- Routinely update the VA Climate Adaptation Plan to ensure the resilience of all operations and infrastructure following disasters and to match advancements in adaptation and resilience research.
- Routinely update the VA Sustainable Design Manual to match advancements in sustainable and resilient design technology and research.

Strengthen Mental Health Capabilities for Climate Resilience and Preparedness

The COVID-19 pandemic and the intensified racial justice movement in 2020 have highlighted the equal importance of mental health care alongside physical health. Further, the impacts of extreme weather events that have occurred across the country have illustrated the mental harms that all Americans have faced and could continue to face as climate-driven disasters and long-term threats continue.[181] Some long-term threats include intensifying and extended periods of drought and extreme heat, and the forced migration and displacement of people after impacts

[178] U.S. Department of Veteran Affairs, "Veterans Health Administration," Accessed December 9, 2022.
[179] Office of the President, Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," February 1, 2021; U.S. Department of Veterans Affairs, "Climate Action Plan," August 2021.
[180] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[181] American Psychiatric Association, "How Extreme Weather Events Affect Mental Health," Accessed December 9, 2022.

make their homes and communities no longer habitable, as what happened with many after Hurricane Katrina.[182,183] Youth are especially impacted, with over 60% globally feeling "very worried" or "extremely worried" about climate change, with many already conflicted about their future careers, family planning, and life in general if inaction continues.[184]

The 117th Congress invested in mental health care services for both adults and children, but Congress can do even more specifically to assist communities to address mental health and care for those undergoing mental health crises because of the impacts of climate change.

Key Accomplishments

- Through Fiscal Year 2021 appropriations, almost $100 million was dedicated to the Substance Abuse and Mental Health Services Administration (SAMHSA) National Suicide Prevention Lifeline and the National Child Traumatic Stress Network to assist both adults and young people undergoing any type of mental health crises.
- The American Rescue Plan Act of 2021 and Fiscal Year 2021 appropriations provided over $100 million for Project AWARE to help increase awareness, education, and training for children's mental health.

Opportunities for Future Congressional Action[185]

- Improve access to mental health telehealth services in the wake of a disaster.*
- Increase funding for youth mental health programs, to help increase accessibility and education, particularly in underserved communities.
- Invest in mental health resources specifically for climate induced mental health issues for youth affected by extreme weather and other climate-related stressors, including forced migration.*
- Increase number and accessibility of mental health professionals available following a disaster, and ensure it is incorporated into disaster response, alongside physical health.
- Support educational programs, including financial aid, to increase the number of mental health professionals, especially for youth.
- Increase availability of education and tools for adults to help identify and support treatment for mental health issues in children.*
- Incorporate mental health assessment, assistance, and treatment into typical health care services.*

[182] The White House, "Report on the Impact of Climate Change on Migration," October 2021.
[183] An estimated 1.5 million people fled from their homes and communities during Hurricane Katrina, representing the largest movement of people in the U.S. forced to migrate due to a climate event since the Dust Bowl. 40% of the people who fled from Hurricane Katrina were unable to return to their homes. More recently, in 2012, Superstorm Sandy had left an estimated 39,000 people still displaced three years post-storm. This loss of home, community, and displacement of social groups can have a detrimental impact on mental health, particularly when the stressors accumulate.
[184] Tosin Thompson, "Young People's Climate Anxiety Revealed in Landmark Survey," *Nature*, September 22, 2021.
[185] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Pillar 8: Invest in American Agriculture for Climate Solutions

America's agricultural sector – our farmers, ranchers, forest owners, and other producers – are at the forefront of the climate crisis and need tools to become more resilient, efficient, and productive. The agricultural sector is being battered by the harsh impacts of drought, floods, unprecedented heatwaves, and the changing climatic conditions that impact reliability and affordability. Global forces such as supply chain disruptions and Putin's invasion of Ukraine have further demonstrated the precariousness of our food supply system: coupled with the climate crisis, food prices will continue to rise. However, climate-smart agricultural practices can increase the resiliency of the food supply system and sequester harmful emissions while also lowering input costs and saving farmers and ranchers money. Transforming the food supply system, including the ways we grow, move, buy, and dispose of food, can also increase food access, make the food system more equitable, and cut emissions.

Throughout the 117th Congress, investments have been made to support farmers, ranchers, and forest owners in implementing climate-smart practices, including the unprecedented investment in voluntary conservation programs funded in the Inflation Reduction Act (IRA). These programs will provide producers with tools and resources to enact practices that provide multiple co-benefits, including resiliency to drought and climate mitigation, while decreasing costs or increasing yields. The Select Committee's Climate Crisis Action Plan in 2020 charted a path forward that builds on the successes in the 2018 Farm Bill to work with farmers and ranchers to increase climate stewardship. As Congress prepares to enact the next Farm Bill, it is imperative that Congress continue to implement the Select Committee's 2020 Climate Crisis Action Plan recommendations and invest in assisting American agriculture in responding to changing conditions and implement practices that can build a resilient, equitable, and long-lasting agricultural sector.

Key Accomplishments

- The IRA included $19 billion for U.S. Department of Agriculture (USDA) conservation initiatives.
- The IRA also included $2 billion for the Rural Energy for America Program, which provides loans and grants to agricultural producers and rural small businesses for renewable energy systems or to make energy efficiency improvements.
- The Biden-Harris Administration's $3 billion Partnerships for Climate-Smart Commodities is supporting projects to provide technical and financial assistance to develop, quantify, and disseminate climate-smart practices and markets.

Opportunities for Future Congressional Action[186]

- Ensure climate-friendly agricultural practices are supported in future Farm Bills.
- Increase research and development and investments to support implementation of climate-based solutions that provide multiple co-benefits and expand economic opportunities for producers.

[186] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Account for and address emissions throughout the food supply chain – not only emissions resulting from production, but also from processing, transportation, distribution, consumption, and disposal.
- Invest in research to ensure that accounting of climate-smart practices is accurate and that supported practices provide measurable, long-term climate benefits.
- Increase investments to ensure that climate-smart agricultural policy is fair and equitable.

Increase Agricultural Carbon Sequestration and Resilience and Reduce Emissions

The agricultural sector is responsible for approximately 11% of U.S. emissions,[187] including carbon dioxide, methane, and nitrous oxide. Ample opportunity exists for farmers, ranchers, and forest owners to reduce emissions while at the same time increase productivity or decrease input costs. Farming practices that promote healthy soils, such as cover crops or agroforestry, can benefit producers by decreasing fertilizer use, preventing erosion, and increasing water retention, all while also capturing and storing carbon pollution. Diet and feed management can decrease methane emission from livestock, while cooperative methane digesters can generate clean fuels from agricultural waste for small and mid-scale livestock operations.

Many producers across the country are already interested in adopting conservation practices with climate co-benefits, and current USDA conservation programs – including the Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), and Regional Conservation Partnership Program (RCPP) – are oversubscribed. The many co-benefits of regenerative agricultural and other conservation practices increase resilience to drought and other climate impacts. Many soil management practices that increase soil carbon, such as no-till farming, cover crops, and crop rotations, can also reduce moisture loss and increase the capacity for soil to hold water.[188] Research by the USDA Economic Research Service shows that producers in areas with high drought risk are more likely to enroll in conservation programs like EQIP.[189] The section of this report titled "Invest in Water Infrastructure to Provide Clean Water and Prevent Catastrophic Flooding" offers additional recommendations for addressing drought.

It is critical to develop effective quantification and monitoring programs to properly evaluate the climate benefits of conservation practices. Additional research in this area can assist in the revision of conservation practices standards that emphasize climate-smart practices and ensure that federal dollars are targeted to practices that result in quantifiable outcomes. Congress should continue to support efforts to incentivize producers to adopt voluntary measures with climate co-benefits, including through the continued access to technical assistance. The adoption of conservation practices that increase resiliency to climate impacts should also be accounted for in crop insurance programs.

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[187] Economic Research Service, "Agriculture, including electricity use, accounted for an estimated 11.2 percent of U.S. greenhouse gas emission in 2020," *USDA*, July 11, 2022.
[188] Steven Wallander, Elizabeth Marshall, and Marcel Aillery, "Farmers Employ Strategies to Reduce Risk of Drought Damages," *Amber Waves, USDA Economic Research Service*, June 5, 2017.
[189] Ibid.

Key Accomplishments

- The IRA provided over $16 billion for EQIP, CSP, and RCPP conservation programs, and $1 billion for conservation technical assistance. This investment prioritized projects that utilized diet and feed management to address livestock (enteric) emissions, practices that directly improve soil carbon, reduce nitrogen emissions, and includes region-specific bundles of conservation activities.
- The IRA included $300 million for the Natural Resource Conservation Service (NRCS) carbon sequestration and emissions quantification program.
- The Bipartisan Infrastructure Law (BIL) provided $2 billion for the ReConnect program to expand broadband access in rural areas, allowing more producers to utilize precision agriculture tools that can decrease use of emissions-releasing inputs like fertilizers.
- The CHIPS and Science Act includes authorizations for programs at the National Science Foundation to promote scientific research and development for connected technologies that advance precision agriculture.
- The IRA invests $450 million in competitive grants for state and private forest landowners to adopt climate mitigation or forest resilience practices.

Opportunities for Future Congressional Action[190]

- Codify climate mitigation and adaptation as central purposes for USDA conservation programs.
- Revise conservation practice standards to include climate practices while maintaining flexibility within the standards to account for local and regional differences.
- Incentivize adoption of climate-smart practices, including through support for market opportunities, and provide additional technical assistance to assist producers in implementing practices.
- Integrate climate stewardship practices into the crop insurance program, including by adjusting rates to consider climate practices and increase offerings of programs like Whole Farm Revenue Protection.

Support On-Farm Renewable Energy and Energy Efficiency

Fuel and electricity are a significant portion of agricultural production expenses, which can account for 15% of annual costs for a farm.[191] Increasing energy efficiency of farm operations, including efficiency upgrades to buildings and transitioning to low-emissions equipment, can save producers hundreds to thousands of dollars per year. Increasing efficiency can also help farmers and landowners decrease other input costs or mitigate for climate-related changes, including drought. More efficient irrigation technologies can both decrease energy use and reduce water lost to evaporation or run-off, resulting in critical savings, increased water availability, and decreased carbon emissions.[192] Many conservation practices, including practices supported by EQIP such as no-till farming, can also decrease fuel and electricity use, further helping farmers save money and decrease harmful emissions from farm operations.

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[190] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[191] Drew Schiavone, "Understanding Farm Energy (FS-1138)," *University of Maryland Extension*, September 2020.
[192] Lorenzo Rosa, "Adapting agriculture to climate change via sustainable irrigation: biophysical potentials and feedbacks," *Environmental Research Letters,* June 10, 2022.

While the need to rapidly develop new renewable energy projects can pressure farmers, ranchers, and forest owners to convert land away from production, new innovations provide opportunities to develop renewable energy projects, including dual-use solar and methane digesters, that work in conjunction with agricultural uses. On-farm renewable energy projects can also benefit producers through lowering electricity costs and providing an additional income stream. Additionally, there is evidence that projects like dual-use solar (also called agrivoltaics), where land is used for both agriculture and solar energy production, can increase resiliency to climate-driven impacts on agricultural production, such as reduced stress on plants from drought.[193] While these types of systems are currently more expensive than traditional installations, increased research, investment, development, and deployment can decrease costs and make dual-use renewable energy more accessible.

Key Accomplishments

- The IRA provided $2 billion for the Rural Energy for America Program (REAP), which provides loans and grants to agricultural producers and rural small businesses for renewable energy systems or to make energy efficiency improvements.
- The IRA also provided $9.7 billion for rural electric cooperatives to purchase and deploy clean energy.

Opportunities for Future Congressional Action[194]

- Increase adoption of energy efficiency and low-emissions farm equipment upgrades and ensure adequate infrastructure to support use.
- Increase research, development, and deployment of renewable energy projects that work in conjunction with agricultural production.

Preserve Working Farmland from Development

Working lands are an integral part of America's landscape, and when appropriately managed, can provide ecosystem services, support biodiversity, and sequester harmful emissions. Unrestricted development can squeeze out farmland, straining food production and reversing emissions mitigation and adaptation benefits. The IRA provided funding to the Agricultural Conservation Easement Program (ACEP) to help farmers permanently protect working lands from development and the RCPP, which leverages partner resources to increase resources for innovative projects, including easements. Working lands also play a crucial role in the larger landscape and must be integrated into biodiversity and landscape-scale conservation strategies, including efforts to conserve at least 30% of lands by 2030 and to protect wildlife. The section of this report titled "Protect and Restore America's Lands, Waters, Ocean, and Wildlife" offers additional recommendations for protecting and conserving public and private lands.

Key Accomplishments

- The IRA provided $1.4 billion for ACEP and $4.95 billion for RCPP.
- The IRA provided $250 million for grants and loans to improve land access for underserved farmers, ranchers, and forest landowners.

[193] Greg A. Barron-Gafford et al., "Agrivoltaics provide mutual benefits across the food-energy-water nexus in drylands," *Nature Sustainability*, September 2, 2019.

[194] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- The IRA provided $700 million for grants to States to acquire land for forest conservation through the Forest Legacy Program.

Opportunities for Future Congressional Action[195]

- Continue funding for conservation programs, including ACEP and RCPP, and prevent federal projects from converting farmland to other uses.
- Ensure working lands are integrated into natural resource and biodiversity planning and management efforts, including expansion and designation of wildlife corridors.*

Address Climate Through a Fair and Equitable Food System (Support Next Generation of Farmers, Ensure Fairness and Equity, Reduce Food Waste)

While farmers, ranchers, and other producers continue to lead by integrating climate-smart agricultural practices into their operations, opportunities exist to reshape our current food system to make it more affordable and resilient through voluntary actions by producers, distributors, and consumers. The food supply system is increasingly strained from climate-related disruptions, which are felt most acutely in underserved communities that already experience increased rates of food insecurity. USDA has mapped out an ambitious effort to transform our food system, with goals to build a more resilient food supply chain, create a fairer food system, make nutritious food more accessible and affordable, and emphasize equity in creating economic opportunities.[196]

Addressing climate throughout the food supply system – including through delivery, consumption, and disposal – can also increase access to food. For example, reducing food loss and waste can not only reduce methane emissions, but significantly increase food access. Globally, the UN Food and Agriculture Organization (FAO) estimates that food waste could feed over 1 billion people every year.[197] In the United States, the USDA estimates that one-third of all food produced for human consumption is lost or wasted – over 130 billion pounds of food in 2010.[198] Simple changes, such as updating food date labelling standards to be clearer can reduce disposal of edible foods and increase food donations or increasing access to composting programs, can support consumers and businesses in making climate-smart decisions and reduce the amount of food that ends up in landfills.

A key channel to building a more resilient food supply system is expanding access to agriculture, including new agricultural modalities such as urban farms, vertical farms, and local and regional food systems, as well as encouraging new populations to engage in agriculture. Federal support for farmers and producers who are traditionally underserved by federal agricultural programs, including small and beginning producers, producers of color, veterans, and tribes, helps build a food system that works for all Americans and ensures access to safe, healthy food for generations to come. However, Congress should help ensure that accessing these programs is not overly

[195] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[196] USDA, "Transforming the U.S. Food System: Making It Better for Farmers and Families," June 23, 2022.
[197] Food and Agriculture Organization, "Tackling food loss and waste: A triple win opportunity," *United Nations*, September 9, 2022.
[198] EPA, "Sustainable Management of Food Basics," July 14, 2022.

burdensome and work to make applying for and receiving federal aid easier and accessible to all communities.

The federal government spends billions of dollars on food every year, for programs across a range of departments including school nutrition, military installations, and federal prisons. Congress should direct federal agencies to make climate-smart procurement decisions when purchasing food for federal programs in order to incentivize adoption of climate friendly practices and spur transformation of a food system into one that is healthier and more equitable.

Key Accomplishments

- In the American Rescue Plan (ARP) Act of 2021, Congress included $1 billion in outreach and support for socially disadvantaged farmers and $5 million for education support for disadvantaged farmers. The ARP also increased investments in infrastructure to support food processors, farmers markets, food banks, local food systems, and producers to build resiliency in the food supply.
- The IRA invests $125 million for outreach, training, and other technical assistance to underserved farmers, ranchers, and forest owners.
- As part of its Food System Transformation Framework, USDA has committed $75 million to support a fairer food system and expand access to nutritious food.
- The IRA provides $250 million to support and supplement agricultural research, education, and extension to boost agricultural sector jobs at 1890 and 1994 Institutions, Alaska Native and Native Hawaiian serving institutions, Hispanic serving institutions, and insular areas institutions.

Opportunities for Future Congressional Action[199]

- Utilize federal procurement and other federal programs to support sustainable agricultural systems that provide safe and healthy food, including support for local and urban farms and school nutrition programs.
- Standardize and update food date labels to decrease food waste and support other changes to assist schools, businesses, and consumers in making climate-smart purchasing decisions.
- Decrease barriers to access federal funding opportunities by providing materials in multiple languages and making proposals easier to prepare.*

[199] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

Pillar 9: Make U.S. Communities More Resilient to the Impacts of Climate Change

Given the climate impacts we are already seeing, greater priority must be placed on climate adaptation, resilience, and preparedness.[200] Communities are on the front lines of the climate crisis, confronting rising temperatures, increasingly severe storms, damaging wildfires, persistent droughts, acute river flooding, and chronic tidal inundation. These impacts are hitting low-income households, farmers, and communities of color hardest, driving a downward trend in livability and social resilience. In 2021 alone, the United States faced 20 extreme weather and climate-related disaster events with losses exceeding $1 billion each, with a cumulative price tag of more than $145 billion. Although many communities are working to prepare for worsening conditions through changes to land use, codes, and standards, they need a strong federal partner to match local leadership and accelerate the deployment of climate risk information, tools, technical assistance, and finance.

Launch the National Climate Adaptation Program and Commission

The 117th Congress delivered more than $50 billion through the Bipartisan Infrastructure Law (BIL) to strengthen U.S. infrastructure against catastrophic floods, wildfires, and heat, and $4.5 billion for drought preparedness. Despite massive public investments to shore up the nation's infrastructure and help communities prepare for and recover from disasters, the United States lacks a comprehensive plan to address the nation's need to adapt and build resilience to climate impacts. The federal government lacks a unified strategy to coordinate across multiple departments, agencies, and programs to develop actionable climate risk information and provide urgently needed technical and financial assistance.[201]

Opportunities for Future Congressional Action[202]

- Establish a National Climate Adaptation Commission tasked with development of overarching principles, goals, and objectives and a National Climate Adaptation Plan.
- Establish a National Climate Adaptation Program that provides grants, finance capacity, and skilled technical assistance to states, local governments, tribes, and territories to finance and insure projects identified through hazard mitigation and climate adaptation plans, prioritizing low-income communities and communities of color that have been disproportionately affected by climate impacts.
- Create an Office of Climate Adaptation and Resilience within the White House and a Climate Resilience Equity Advisory Board to guide work across the federal government and ensure that equity is embedded in policy and progress is measured against identified metrics for resilience and equity.*

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[200] The USGCRP Glossary defines these terms. Adaptation is defined as the "[a]djustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects." Resilience refers to the "[c]apability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment." Preparedness refers to "[a]ctions taken to build, apply, and sustain the capabilities necessary to prevent, protect against, and ameliorate negative effects."

[201] GAO, "Climate Change: Enhancing Federal Resilience," September 2022.

[202] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Create a Climate Resilience Workers Commission and a Center for the Climate Resilience Workforce to serve as a public resource to support job creation, quality, and training for the climate resilience workforce and to disseminate information, conduct research, and recognize achievements and contributions toward resilience.*
- Authorize a new long-term climate adaptation funding program that supports the National Climate Adaptation Plan.
- Fund Climate Resilience Workforce Grants to reduce unemployment and help communities hire and train individuals to implement local projects that serve frontline communities and populations facing barriers to employment.*
- Deploy skilled, sustained, and multidisciplinary technical assistance to help states, tribes, and local communities develop climate adaptation and resilience plans that assess climate risks to homes, public assets, infrastructure, major employers, public health, and vulnerable areas and populations; identify resilience projects and funding strategies; assure meaningful public engagement and input from environmental justice communities are integrated into broader community planning processes; and facilitate regional and watershed-scale planning.
- Deploy and maintain an accessible inventory of resources as a knowledge bank for hazard mitigation and climate adaptation and resilience training and education.
- Create Climate-Ready Communities as a recognition program for communities that complete resilience and adaptation plans and projects; adopt, and enforce robust development plans, codes, and standards; and achieve risk-reduction benchmarks for climate resilience and preparedness.
- Establish a Climate Resilience Service Corps to carry out national service projects that improve community adaptation, mitigation, preparedness, response, and recovery from disasters and other climate-driven threats.

Develop and Deploy Actionable Climate Risk Information

Families, businesses, and decisionmakers at all levels of government need accurate and precise information about climate hazards of all types – from extreme weather to slow-onset changes such as sea level rise and drought. Data, analyses, and tools about natural hazards and climate risks emanate from multiple sectors, including federal agencies, states and local governments, academia, and private entities such as catastrophe modeling agencies and insurance firms. The 117th Congress and the Biden-Harris Administration have made significant strides to drive and keep pace with advancements in observational data, computing power, and analytic methods that are enabling more informed decision making. For example, the launch of the newly redesigned Climate Resilience Toolkit and the new Climate Mapping for Resilience and Adaptation (CMRA) platform provide real-time information and maps documenting where people, property, and infrastructure are exposed to the range of hazards.[203,204] The CMRA also provides information about future climate impacts under both lower and higher emissions scenarios. These resources can help inform land use, hazard mitigation, emergency preparedness, and decision-making about purchasing and insuring property. They also position the federal

[203] U.S. Federal Government, "U.S. Climate Resilience Toolkit," 2014.
[204] U.S. Climate Resilience Toolkit, "Climate Mapping for Resilience and Adaptation," *United States Global Change Research Program*, Accessed December 9, 2022.

government to help the public access a rapidly expanding body of climate-risk science and tools more effectively.

In June 2022, U.S. Commerce Secretary Gina Raimondo announced that the National Oceanic and Atmospheric Administration (NOAA) will administer funding from the BIL to address the climate crisis and increase coastal communities' resilience to climate change.[205] Over the next five years, NOAA's Climate Data and Services will use nearly $1 billion to support a whole-of-government effort to address the climate crisis by getting critical information and tools in the hands of decision-makers, particularly to address floods, wildfire, drought, heat, and ocean health.[206] The Climate Ready Coasts initiative will invest more than $1.4 billion to build coastal resilience, restore coastal habitats, and advance climate data and services through Sea Grant and National Estuarine Research Reserve System, among other coastal and climate science programs.[207]

The 117th Congress provided significant investments toward the development and deployment of climate information and resources, including Earth monitoring, weather and climate prediction, and high-resolution mapping.

Key Accomplishments

The BIL included:

- $492 million for NOAA mapping, observations, and modeling that can protect lives and property during extreme weather events; and
- $492 million to the NOAA National Oceans and Coastal Security Fund to support planning, restoration, and strengthening of natural infrastructure to protect coastal communities while also enhancing habitats for fish and wildlife.

The Inflation Reduction Act (IRA) provided:

- $200 million for oceanic and atmospheric research, including $50 million in grants to fund NOAA climate research in weather, ocean, coasts, and the atmosphere;
- $290 million for advancing weather information capacity at NOAA through investments in high performance computing and acquiring new hurricane hunter aircraft to improve severe weather forecasting ability; and
- $23.5 million to improve 3D elevation data to support mapping tools, including basemaps for flood and other climate-related data.

The CHIPS and Science Act authorized:

- Funding for Earth science programs under the National Aeronautics and Space Administration (NASA) by creating an Earth System Observatory and maintaining a Climate Architecture Plan for Earth Observations and Applications to improve data collection and observations;

[205] In June 2022, U.S. Commerce Secretary Gina Raimondo announced that NOAA will administer funding from the BIL to address the climate crisis and increase coastal communities' resilience to climate change. NOAA, "Biden Administration announces historic coastal and climate resilience funding," June 29, 2022.
[206] NOAA, "Infrastructure Law: Climate data and services," June 28, 2022.
[207] NOAA, "Infrastructure Law: Climate ready coasts," June 28, 2022.

- Support for academic research for climate change research, sustainable chemistry, climate risk and resilience, critical minerals, precision agriculture, and clean water;
- Support for research programs at the Department of Energy (DOE) on biological systems science, climate and environmental science, and carbon sequestration; and
- Expanded greenhouse gas measurement research under National Institute of Standards and Technology (NIST) to improve practices for measuring climate pollution.

Opportunities for Future Congressional Action[208]

- Establish and codify the Climate Risk Information Service in partnership with other sectors and launch a climate risk interagency working group.
- Bolster Earth monitoring and observations for weather forecasting, forecasting for changes in precipitation, and ocean conditions, including for temperature and chemistry.
- Significantly expand the deployment of real-time monitoring instruments for streams, lakes, shorelines, and near-shore locations to improve analyses, refine modeling, and strengthen preparedness and early warning, with priority on rural and environmental justice communities.
- Regularly update precipitation maps and integrate data into Atlas products, particularly following extreme precipitation events.
- Strengthen the development, analysis, and application of data and information about climate risks and impacts to communities of color and low-income communities to improve public health and safety and to support the intentional prioritization of federal technical and financial assistance.*
- Leverage federal and nonfederal capabilities for mapping flood, wildfire, heat, drought, and other climate-influenced hazards, including through partnerships with academia and private sector modeling.
- Advance flood hazard mapping and produce high-resolution topographic and flood risk maps for the entire United States.
- Establish a Climate Change Insular Research Grant Program to leverage local data, insight, and capabilities and support research and technical assistance for climate planning, mitigation, adaptation, resilience, and preparedness.
- Expand support for National Weather Service Rural, Tribal, and Insular Offices.
- Provide federal climate projections to support development and implementation of updated building codes and development standards.

Partner with Tribes and Indigenous Communities for Climate Adaptation and Resilience

Indigenous peoples in the United States are diverse and distinct political and cultural groups. Tribal nations, Alaska Natives, and Native Hawaiians have lived on their ancestral homelands for hundreds – or thousands – of years and have cultivated cultural, spiritual, and ecological practices accumulated over generations to be adaptive to seasonal and interannual environmental changes. The climate crisis is already taking a devastating toll on tribal, Alaska Native, and Native Hawaiian communities and lands, threatening sacred ancestral homelands, burial sites, and cultural traditions, health, and livelihoods. Coastal communities are facing flooding, erosion,

[208] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

permafrost subsidence, sea level rise, and storm surges, while inland communities are facing worsening drought and extreme heat. Indigenous Traditional Ecological Knowledge (ITEK), including systems of monitoring, recording, and adjusting to and preparing for a warming world, are indispensable to their continued survival and can provide essential insight into climate-related threats and adaptive strategies.

The Biden-Harris Administration has worked to strengthen Nation-to-Nation relationships, honor trust and treaty obligations with federally recognized tribes, and advance tribal sovereignty and self-determination. In November 2021, the White House released a memorandum for the heads of U.S. Departments and Agencies instructing them to include ITEK into federal decision making including the White House Office of Science and Technology Policy (OSTP) and the White House Council on Environmental Quality (CEQ).[209] The White House launched a new Community-Driven Relocation Subcommittee, which will convene agencies to explore key considerations, issues, and strategies for working in partnership with communities to support voluntary movement away from high-risk regions. In May 2022, the White House released a BIL Tribal Playbook to help tribal governments unlock the benefits from the historic investments in our nation's infrastructure, including the more than $13 billion set aside in the BIL for Indian Country.[210] The Tribal Playbook provides tribal communities with information on the more specific tribal funding available under the law, in addition to the hundreds of billions available to tribes, Alaska Native, and Native Hawaiian communities on a competitive basis. In December 2022, the White House released new government-wide guidance for federal agencies on recognizing and including Indigenous Knowledge in federal research, policy, and decision making.[211] The guidance also identifies opportunities and promising practices for collaborating with tribal nations and Indigenous peoples based on agency experience and tribal and Indigenous input.

Key Accomplishments

The 117th Congress worked to prioritize resources and investments for tribes, Alaska Native, and Native Hawaiian communities to help overcome barriers to access, accelerate adaptation, and integrate Tribal Ecological Knowledge into the design and deployment of federal programs. The BIL will send billions of dollars to Indian Country to support adaptation and resilience through safer roads and bridges, modern wastewater and sanitation systems, clean drinking water, affordable high-speed internet, reliable and affordable electricity, and good paying jobs in every tribal community. Specifically, BIL includes:

- $3.5 billion for water infrastructure in tribal communities;
- $4.7 billion to plug orphan oil and gas wells on federal, state, and tribal lands; and
- $466 million to the Bureau of Indian Affairs over five years, including $216 million for climate resilience programs providing $130 million for community relocation and $86 million for tribal climate resilience and adaptation projects.

[209] The White House, "White House Commits to Elevating Indigenous Knowledge in Federal Policy Decisions," November 15, 2021.
[210] The White House, "Bipartisan Infrastructure Law Tribal Playbook," May 2022.
[211] The White House, "White House Releases First-of-a-Kind Indigenous Knowledge Guidance for Federal Agencies," December 1, 2022.

Additionally, the IRA will support tribes, Alaska Native, and Native Hawaiian communities through investments to support climate adaptation, resilience, and preparedness, including:

- New direct pay option for non-profit organizations, rural cooperatives, state or local governments, tribal governments, Alaska Native Corporations, and the Tennessee Valley Authority for most clean energy tax credits and the commercial electric vehicle (EV) credit, with some clean energy tax credits that are also transferrable;
- Bonus tax incentives for solar and wind energy projects in low-income and tribal, Alaska Native, and Native Hawaiian communities, on affordable housing, and for community solar serving low- and moderate-income individuals;
- $150 million for a Tribal Electrification Program for tribes and tribal organizations to provide electricity to unelectrified tribal homes through zero-emission energy systems, and to transition electrified homes to zero-emission energy systems;
- $75 million for Tribal Energy Loan Guarantee Program;
- Increasing loan guarantees for tribal energy development from $2 billion to $20 billion; and
- $12.5 million for emergency drought relief for tribes for near-term relief actions for tribes impacted by Bureau of Reclamation water projects.

Opportunities for Future Congressional Action[212]

- Establish and codify a Tribal Government Task Force to coordinate with federal departments and agencies that make community development, planning, and infrastructure grants to states, local governments, tribes, and territories to evaluate the full complement of programs to provide greater access and equitable baseline funding to tribal nations and Indigenous communities across their programs for climate adaptation and resilience.
- Create and codify a federal relocation framework in collaboration with tribes, Indigenous communities, and Insular Areas that provides for the planned transition for communities seeking relocation assistance and protects access to traditional lands and waters for tribes and Indigenous communities, as well as rights to culture, health, safe drinking water, food, and adequate housing. There has been some administration work on this, but more work is needed and needs to be codified.
- Significantly increase funds to support adaptation and migration planning and implementation, particularly for tribal and Indigenous communities at greatest risk.

Reduce Climate Disaster Risks and Costs

The United States has sustained 338 weather and climate disasters since 1980 where overall damages and costs reached or exceeded $1 billion (including Consumer Price Index adjustment to 2022).[213] The total cost of these 338 events exceeds $2.295 trillion. Researchers are increasingly able to connect a warming world to worsening conditions, storm intensity, and disaster damage.[214] More frequent and intense extreme weather and climate-related events are

[212] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[213] National Centers for Environmental Information, "Billion-Dollar Weather and Climate Disasters," *NOAA,* 2022.
[214] See, e.g., Kevin A. Reed, Michael F. Wehner, and Colin M. Zarzycki, "Attribution of 2020 hurricane season extreme rainfall to human-induced climate change," *Nature Communications,* April 12, 2022; Copernicus, "Prototype extreme events and attribution service," *European Centre for Medium-Range Weather Forecasts.*

expected to continue to damage communities, ecosystems, and social systems.[215] Climate impacts already disrupt many areas of life, exacerbating existing challenges to prosperity posed by aging and deteriorating housing and infrastructure, stressed ecosystems, and economic inequality. People who are already vulnerable have lower capacity to prepare for, insure against, and cope with extreme weather and climate-related events, and are expected to experience greater impacts.

Since pre-disaster mitigation investments provide an average sixfold return, the 117th Congress and the Biden-Harris Administration have prioritized the delivery of technical and financial assistance to strengthen community resilience and preparedness to worsening climate-fueled storms and impacts before they occur.[216] For example, OSTP, NOAA, and the Federal Emergency Management Agency (FEMA) were tasked under Executive Order 14008 to outline the ways the federal government will improve access to climate tools and services.[217] In October 2021, FEMA, OSTP, and NOAA released the Opportunities for Expanding and Improving Climate Information and Services for the Public report that focuses on holistically expanding and improving climate information and services to better inform public decision-making on climate risks and hazard mitigation opportunities.[218] In December 2021, FEMA announced the agency's Resources for Climate Resilience as a roadmap of programs and initiatives that advance community climate resilience with a focus on equity and nature-based solutions in pre-disaster mitigation.[219] In September 2022, FEMA and the Economic Development Administration in the Department of Commerce issued guidance to improve alignment between the agencies' hazard mitigation and economic development missions, which will help communities better integrate pre-disaster mitigation in planning and decisions on how and where best to invest for resilient economies, tax revenues, and workforces.[220]

Extreme heat has caused the greatest number of weather-related deaths since 1992 and was responsible for the highest number of weather fatalities in 2021.[221] Heat-related injury and mortality can be significantly reduced through education, preparation, and mitigation measures, such as increasing shade trees and opening community cooling centers during seasonal heatwaves. In July 2022, the Biden-Harris Administration launched Heat.gov as a web-based resource through the interagency National Integrated Heat Health Information System, which is developed by NOAA and the Centers for Disease Control.[222] As a centralized repository and outreach platform for extreme heat and health-related information, this novel website works to

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[215] "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II," *U.S. Global Change Research Program*, revised June 2019.
[216] K. Porter, Principal Investigator, "Natural Hazard Mitigation Saves: 2019 Report," *National Institute of Building Sciences*, December 1, 2019.
[217] Office of the President, Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," February 2, 2021.
[218] U.S. Climate Resilience Toolkit, "Opportunities for Expanding and Improving Climate Information and Services for the Public," *OSTP, NOAA, and FEMA*, October 2021
[219] FEMA, "FEMA Resources for Climate Resilience," *Department of Homeland Security*, December 2021.
[220] FEMA and the Economic Development Administration, "Comprehensive Economic Development Strategy and Hazard Mitigation Plan Alignment Guide," *Department of Homeland Security* and *Department of Commerce*, September 2022.
[221] NOAA National Weather Service, "Weather Related Fatality and Injury Statistics," Accessed December 9, 2022.
[222] National Integrated Heat Health Information System, "HEAT.gov," Accessed December 9, 2022.

provide resources to the public and decision makers across sectors to reduce the health, economic, and infrastructural impacts of extreme heat.

Agencies across the federal government are subject to the Federal Flood Risk Management Standard and are working to implement those responsibilities to reduce flood risk to all federally-supported building and rebuilding, as well as through the range of federal actions such as permitting decisions.[223] Through the investments of the BIL and the IRA, the administration is working to ensure that programs deliver projects that will increase resilience. For example, the White House guidance supporting implementation of the BIL compiles comprehensive information on resources to support resilience to all hazards.[224]

Key Accomplishments

The 117th Congress provided more than $50 billion through the BIL to strengthen resilience against drought, heat, floods, and wildfires, in addition to major investments in weatherization, including:

- $1 billion to FEMA for Building Resilient Infrastructure and Communities (BRIC);
- $3.5 billion for FEMA Flood Mitigation Assistance;
- $8.7 billion for the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) grant program;
- $500 million for STORM Act, which supports FEMA hazard mitigation through state-led revolving loan programs;
- $207 million to NOAA for Coastal Zone Management, which can be used to support planning for sea-level rise and coastal flood risks, ocean planning, and planning for energy facilities and development;
- $3.3 billion for wildfire risk reduction;
- $2 billion for forest management;
- $375 million for new Clean Water and Drinking Water resilience and sustainability programs;
- $3.4 billion for ecosystem restoration and resilience projects;
- $300 million for Drought Contingency Planning;
- $2.55 billion to U.S. Army Corps of Engineers (USACE) for coastal storm risk management, hurricane, and storm damage reduction projects;
- $2.5 billion to USACE for inland flood risk management projects;
- $1.9 billion to USACE for Aquatic Ecosystem Restoration Projects;
- $465 million to USACE for Continuing Authorities Program (under Flood Control Act and Rivers and Harbors Act);
- $251 million to USACE for Flood Control and Coastal Emergencies Program;
- $30 million to USACE Planning Assistance to States, which can support flood resilience planning in support of future flood control projects;
- $45 million to USACE for Floodplain Management Services program;

[223] The White House, "Readout of the First White House Flood Resilience Interagency Working Group Meeting on Implementation of the Federal Flood Risk Management Standard," August 27, 2021.
[224] The White House, "Building a Better America: A Guidebook to the Bipartisan Infrastructure Law for State, Local, Tribal, and Territorial Governments, and Other Partners," May 2022.

- $500 million to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) for Watershed and Flood Prevention Operations, which provides funding for planning, design, and construction of measures that address resource concerns in a watershed;
- $2.8 billion for dam safety, hydropower retrofits and upgrades, removal of unneeded dams, and NRCS watershed restoration, flood prevention, and emergency watershed protection programs;
- $21 billion in environmental remediation to help reduce risk of hazardous and toxic releases in extreme weather events; and
- $5 billion for upgrading the electric grid and ensuring reliability and resiliency.

The 117th Congress made additional investments in resilience through the IRA, including:

- $4 billion for drought mitigation projects at the Bureau of Reclamation to mitigate the impacts of drought on communities, including funding compensation for voluntary reductions in water use, conservation projects that reduce water demand, and ecosystem restoration projects that address drought issues;
- $243 million for tribal and Native Hawaiian climate resilience and adaptation programs and $15 million for climate change planning in U.S. territories, to provide technical assistance to Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Marianas Islands;
- Incentivize low-carbon and net-zero energy projects in post-disaster recovery through providing financial assistance;
- Reinstatement of the Superfund tax on oil and petroleum producers, which provides a permanent dedicated revenue stream (an estimated $11 billion over the next ten years) to clean up contaminated sites; and
- $225 million for Cost-effective Codes Implementation for Energy Efficiency, which can help reduce risk in power interruption.

Opportunities for Future Congressional Action[225]

- Significantly increase and strengthen pre-disaster mitigation programs to reduce disaster risks and costs.
    - Increase the set-aside for the BRIC Pre-Disaster Mitigation program from 6% to 12% to provide funding and technical assistance to states, local governments, tribes, and territories.
    - Set a minimum funding level of $2 billion for the BRIC program to ensure that FEMA maintains a steady funding stream and staffing capacity to support multi-year planning and implementation.
    - Dedicate a specific percentage of BRIC funds to address mitigation needs for housing and public facilities with greater emphasis on pre-disaster buyouts and relocation of multiple properties.*
    - Adjust project approval methodologies to ensure adequate funding is available to support property buyouts and relocations, including providing greater than fair

[225] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

market value when necessary to address shortfalls and incentivize relocations within communities where feasible.*
    - Prioritize BRIC funds for projects that restore and protect flood-prone areas as open space, including providing funding and technical assistance for buyouts and relocation projects and for the establishment of land trusts to maintain open space as high-quality habitat and outdoor recreation areas.
- Strengthen the resilience of America's housing stock.
    - Ensure that home construction or retrofits supported through federal housing loans and grants use climate-resilient codes and standards for flooding, wildfire, extreme heat, and other climate-influenced disasters.
    - Increase housing assistance program funds, including the National Housing Trust Fund and the Community Development Financial Institutions Fund, to support affordable construction and retrofits to mitigate and adapt to the increased risks of floods, wildfires, extreme heat, and other impacts of climate change.
    - Establish a new National Housing Stabilization Fund to provide assistance to households facing property damage, displacement, or rising housing costs due to the impacts of climate change.
    - Require that the U.S. Department of Housing and Urban Development (HUD), USDA, the Treasury Department, and other agencies that manage federal housing initiatives provide clear guidance and technical assistance to housing assistance agencies and communities to enable adoption and enforcement of climate-resilient building and retrofitting practices for affordable housing.
- Reduce toxic releases in storms.
    - Establish financial assurance requirements under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) for the toxic releases likely to occur at industrial facilities and coal ash ponds because of extreme weather associated with climate change.
    - Increase funding at the Environmental Protection Agency (EPA) to provide grants and technical assistance to communities, states, tribes, and others to identify and eliminate ash ponds, hazardous waste storage and disposal, and other toxic sites that pose risks to human health and the environment under severe weather or slow-onset conditions; communicate those risks to fenceline communities and others who could be affected; and prioritize sites for clean-up and enforcement action.*
- Support rural communities.
    - Create a new program to provide long-term federal investment to help rural communities overcome barriers to support comprehensive and locally driven community and economic development for resilience, including projects to strengthen housing, upgrade infrastructure, and provide skills training and job placement.
    - Increase the availability of grants to address housing, wastewater, and public health challenges in rural areas experiencing persistent poverty.
    - Increase funds to the NRCS Emergency Watershed Protection Floodplain Easements Program to help communities quickly address serious and longstanding damage to infrastructure and land and help communities cope with

adverse impacts of the climate crisis, without having to wait for a federal disaster declaration.
    - Expand the NRCS Watershed and Flood Prevention Program and the Emergency Watershed Protection Floodplain Easements Program to target additional assistance specifically for the purposes of helping states establish and implement agricultural operation buyouts and waste lagoon conversion in flood- and wildfire-prone areas, including the 500-year floodplain.
- Help small businesses prepare for and adapt to climate impacts.
    - Direct the Small Business Administration (SBA) to promote more lending by banks and other lenders for projects that help small businesses adapt to climate change.
    - Direct the SBA to work with resource partners to provide support to small businesses that have experienced or will experience the impacts of climate change to ensure that their business models are considering these risks.
- Address economic risks and catalyze mitigation investment.
    - Require that Government Sponsored Enterprises (GSEs) perform audits of the financial viability of loans that have been affected by extreme weather and report on whether federally backed loans in flood- and wildfire-prone areas are secured with hazard insurance as well as the post-disaster default trends on loans in their portfolios. Ensure that GSEs apply federal flood and wildfire standards in their lending criteria for new loans.
    - Direct FEMA to require use of the annually updated discount rates in benefit-cost calculations, as published in Appendix C of Office of Management and Budget (OMB) Circular A-94, to reflect the future value of investments more accurately in hazard mitigation. Although the administration is exploring options, this should be codified.
    - Revise the federal tax code to make state and local disaster mitigation grants for projects to strengthen homes and businesses against flood, wildfire, earthquake, and windstorm hazards non-taxable for federal income tax purposes. Provide a tax deduction to individuals and small businesses for hazard mitigation expenditures to strengthen homes and buildings to better withstand flooding, wildfire, and windstorms.
    - Establish financial assurance requirements under CERCLA for the toxic releases likely to occur at industrial facilities and coal ash ponds because of extreme weather associated with climate change.

Accelerate Resilient Disaster Recovery

Throughout 2022, communities across the nation were battered by major climate disasters: wildfires and drought across the West, both severe flooding and drought in the Midwest, and severe storms from Hurricanes Ian in Florida and Fiona in Puerto Rico to Typhoon Merbok remnants in Alaska. In the past, post-disaster recovery was characterized by attempts to rebuild infrastructure that had already proved vulnerable to extreme weather phenomena. The 117th Congress has worked to address resilient disaster recovery, but it is crucial that Congress continue to support battered communities by enabling them to build – and rebuild – to withstand future and ever-worsening effects of climate disasters, ensure fair and equitable access to disaster funding, and that such recovery measures do not continue to fuel the climate crisis.

Key Accomplishments

The 117th Congress appropriated funds and direction to support disaster recovery through several bills.

- The September 2021 Extending Government Funding and Delivering Emergency Assistance Act, which provided $1.189 billion to SBA Disaster Loans, and $50 million for FEMA Emergency Management Performance Grants. The bill also appropriated $5 billion for the HUD Community Development Block Grant Disaster Recovery (CDBG-DR) program, which provides significant additional funding to communities for long-term disaster recovery needs. The program's flexibility and scope make it a powerful tool for communities to recover from and build resilience to climate hazards and natural disasters. For instance, it requires grantees to establish measures that will be taken to address natural hazards that could be influenced by climate change in order to build climate resilience in the face of climate hazards such as sea level rise and flooding, severe storms, heat stress, or wildfire risk.
- The BIL provided $234 million for Emergency Preparedness Grants, including the public transportation emergency relief program, which funds activities for protecting, repairing, and/or replacing equipment and facilities that may suffer or have suffered serious damage as a result of an emergency, including natural disasters such as floods, hurricanes, and tornadoes.
- The IRA provided $15 million for climate change planning in the U.S. territories – Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Marianas Islands – to ensure they would receive technical assistance funding to support climate action and increase resilience to extreme weather events. The IRA also allowed FEMA to incentivize low-carbon and net-zero energy projects in post-disaster recovery through providing financial assistance.

Opportunities for Future Congressional Action[226]

- Permanently authorize the HUD CDBG-DR program to reduce payment delays, prioritizing funds and technical assistance to low- and moderate-income survivors and ensuring funds are distributed equitably and benefit hardest hit communities.
- Designate funds to HUD for CDBG, including funding for colonias and manufactured housing communities to support climate resilient, sustainable, and equitable communities, including funding to provide technical and financial assistance to support the development of community climate resilience plans.*
- Develop forgivable SBA disaster recovery loans to bridge uninsured costs to rebuild for energy efficiency and resilience.*
- Amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) to:
    - Provide protection and assistance to low- and moderate-income people who are seeking federal disaster recovery assistance to relocate from flood- or wildfire-prone areas to comparable replacement housing in less risky areas.
    - Require all FEMA disaster recovery grants provided for replacing or repairing significantly damaged buildings to meet the latest codes and standards for

[226] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

resilience and energy efficiency, including the International Energy Conservation Code.*
    - Ensure disaster recovery funds are available to fund energy efficiency, renewable energy, and storage upgrades as part of replacing or repairing significantly damaged buildings for states and applicants that include those measures in their requests for assistance.*
- Allow states, local governments, tribes, and territories to use pre-disaster mitigation funds and disaster recovery funds for the payment of insurance premiums and deductibles where payouts will be obligated toward community-based buyouts, relocation, and resettlement projects.
- Direct FEMA to develop a strategy to incentivize insurance coverage against weather perils to Stafford Act Category E assets (public buildings and infrastructure), including schools, public health facilities, and public safety facilities, and to investigate and report to Congress on the trends in insurance available and being obtained to cover those assets. Direct FEMA to evaluate and report on the use of innovative risk transfer mechanisms such as parametric insurance and catastrophe bonds to cover assets that are eligible for Stafford Act Category E funds.
- Direct FEMA to collaborate with insurance industry experts to support the creation of a private all-hazards insurance program that would cover all natural hazards, be available for purchase directly from insurers, and meet the federal mandatory purchase requirements for flood insurance and disaster recovery programs.
- Increase funds to the FEMA Flood Mitigation Assistance Program to support floodplain, coastal, and stream restoration projects as part of buyout projects. Allow Flood Mitigation Assistance Grants and BRIC Grants to support the establishment of open-space land trusts or similar arrangements for the ongoing management and maintenance of cleared lands.
- Clear the backlogs of unprocessed tax returns at the Internal Revenue Service so that disaster-affected individuals and small businesses can receive disaster recovery funds in a timely manner.*
- Strengthen civil rights response to disasters based on the recommendations of the U.S. Commission on Civil Rights report on Hurricanes Maria and Harvey:[227]*
    - Clarify guidelines to apply for aid, streamline the portal for the intake of all federal disaster assistance, and develop a process to share data across all responding agencies on the federal, state, and local level.
    - Increase collaboration across federal agencies, local governments, and aid organizations. Disaster recovery experts assert that this type of public engagement with stakeholders should begin with emergency planning and response and continue through the closeout of recovery and mitigation programs.
    - Focus the recovery and mitigation process on survivors with the greatest needs, particularly people of color, low-income people, people with disabilities, immigrants, LGBTQ communities, and other marginalized individuals, and provide a sufficient number of staff fluent in the various languages spoken in the affected areas.

[227] U.S. Commission on Civil Rights, "Civil Rights and Protections During the Federal Response to Hurricanes Harvey and María," September 21, 2022.

- The lack of electricity and internet had a significant impact on survivors' ability to access assistance and federal relief programs. The report recommends that federal agencies adopt a flexible policy to provide aid to those in need, including providing access to technology to address the digital divide, and adopting a paper application process when survivors are without access to electricity or internet.

Strengthen the National Flood Insurance Program for Climate Resilience

Floods are the most common natural hazard in the United States and cause more federal disaster declarations than all other hazards combined. All 50 states, plus DC, Puerto Rico, Guam, American Samoa, the U.S. Virgin Islands, and the Northern Mariana Islands have experienced flood events since May 2018.[228] The National Flood Insurance Program (NFIP) functions as a 3-legged stool composed of mapping, hazard mitigation, and insurance. The program operates in 22,000 communities with nearly 5 million flood insurance policies providing almost $1.3 trillion in coverage. Over the past two years, FEMA has introduced a new pricing methodology, known as Risk Rating 2.0, which represents the biggest change to the way the NFIP calculates flood insurance premiums since the program began in 1968. Under the change, premiums for individual properties are tied to their actual flood risk and the premium is calculated based on the specific features of an individual property. Risk Rating 2.0 incorporates a broader range of flood frequencies and sources than the legacy rating system, including flooding from rivers, storm surge, and heavy rainfall.

Despite the widely recognized value of the NFIP in improving flood risk awareness and in operating as a strong vertical partnership among FEMA and communities, Congress needs to address persistent and significant challenges with the program. As the NFIP increasingly operates through actuarially based principles, including more accurate pricing of risk, policyholders are increasingly demanding federal assistance to reduce their risk and insurance costs. For lower-income policyholders and those on fixed incomes, increasing flood insurance costs can pose hardship as climate-fueled flood risks and premiums continue to rise. Moreover, federal disaster aid is still not well-aligned to maximize opportunities to reduce flood risk as part of recovery investments. Flood risks associated with levees continue to pose challenges both for levee system owners working to address needed maintenance and improvements and for policyholders behind unaccredited levees. The most acute challenge continues to be in devising ways to bridge the national protection gap, as uninsured losses devastate families, businesses, and communities, storm after storm.[229]

Key Accomplishments

The 117th Congress enacted key investments to reduce flood risk, including $3.5 billion for FEMA Flood Mitigation Assistance through the BIL. Additional investments help underpin the NFIP, particularly through strengthening the nation's hazard mapping capabilities.

[228] CRS-IF10988, "A Brief Introduction to the National Flood Insurance Program," *CRS*, October 3, 2022.
[229] Andrew Moore, "Many Americans Lack Flood Insurance Despite Rising Risks — Here's Why," *NC State University*, November 1, 2022.

Opportunities for Future Congressional Action[230]

- Strengthen Flood Risk Mapping and Information
    - Require disclosure of flood hazards for properties for sale or lease, including flood insurance requirements, claims, and any known history of flood damage before contracts to lease or purchase property become binding.
    - Increase funding for NFIP mapping and direct FEMA to enhance and ensure the technical integrity and usefulness of NFIP flood hazard and risk information taking into account changing storm and flood frequency and severity due to climate change, update and maintain maps, and expand flood risk analysis and mapping to the entire United States.
    - Incorporate urban flooding hazards in flood risk analyses, accounting for the effects of sea level rise, early reduced snowpack, and increasingly extreme precipitation events on urban drainage and stormwater systems.
- Secure all federal loans and loan guarantees for housing with flood insurance. Create a community-wide flood insurance program under the NFIP available for purchase by communities, states, tribes, and territories, as well as levee districts, utilities, and other infrastructure owners and operators.
- Address flood insurance affordability for low-income households and small businesses through a combination of means-tested discounts, mitigation loans, and revolving loans, and allow policyholders to pay flood insurance premiums in monthly installments. Information about the full risk rate should accompany discounts, so that discount recipients understand the full cost of their flood insurance. Pilot a grant program to provide temporary premium assistance for policyholders who have requested buyouts that are pending funding and implementation.
- Direct FEMA to conduct studies to estimate the avoided flood losses and other benefits of not allowing new development and redevelopment of Special Flood Hazard Areas (SFHAs). Studies should also identify barriers and other challenges to implementing measures to preserve floodplains as open space.
- Enhance incentives to states, local governments, tribes, and territories that adopt higher resilience standards, including prohibiting new development in SFHAs.
- Improve alignment of the NFIP with federal disaster recovery programs to remove barriers and accelerate voluntary buyouts and relocations, including assistance to help owners of repetitive-loss properties who wish to relocate, and to restore and preserve floodprone areas as open space buffers against rising flood risks.*

Reduce Wildfire Risks and Support Community Resilience Against Wildfires

Similar to other climate-fueled disasters, the size, duration and destruction of wildfires in the United States, and particularly in the West, has increased over the last 20 years.[231] Climatic changes, including higher temperatures and more arid conditions have fueled wildfires and expanded the season when fires are more likely to occur. These conditions are expected to continue or worsen: projections indicate that an average increase of 1˚C in temperate annually would increase the median area burned by fire ever year by as much as 600% in some places in

[230] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[231] U.S. Forest Service, "Confronting the Wildfire Crisis: A Strategy for Protecting Communities and Improving Resilience in America's Forests," January 2022.

the West.[232] From 2012 to 2021, the United States experienced an average of 61,289 wildfires and an average of 7.4 million acres impacted annually.[233] In 2021, 58,968 wildfires burned 7.1 million acres. As of December 2, 2022, more than 64,000 wildfires have burned nearly 7.4 million acres.[234] This is the most wildfires reported to-date in the past ten years.[235]

While many fires occur in remote, uninhabited federal forests as part of the natural fire regime, increases in events along the wildland-urban interface (WUI) and in non-wildland habitats amplify community risk. Even locations not directly impacted by wildfire feel the effects, including negative health impacts from smoke. Effectively building resilience against wildfires requires a joint effort between federal, state, tribal, and local governments, land managers, and communities. Congress recognizes the various pathways to supporting community resilience to wildfires, and through the BIL and IRA, has made billions of dollars of investments to support community action, firefighters, and forest management activities that will balance ecological needs with protecting lives and property. In February 2022, the U.S. Forest Service (USFS) announced a 10-year strategy to address wildfires, focusing treatment on high-risk areas in the WUI or areas otherwise likely to impact communities.[236]

Building on the over $3 billion in funding the 117th Congress has designated for wildfire response, further support to communities to address vulnerabilities is still needed. Wildfire response and planning should be based on a broad array of expertise from scientists, planners, firefighters, tribes, and public health professionals, among others. Implementing fire-smart building codes and standards can reduce wildfire risks to homes, buildings, and other infrastructure. Hazard mitigation and climate adaptation plans can help vulnerable communities identify wildfire risk and concurrent public health issues and undertake mitigation activities, especially for critical infrastructure. Mitigation funds can help communities utilize and share best practices for reducing risk and improving public health outcomes. Increased science, data, and information can further help policy makers, firefighters, land managers, and local communities plan for and respond to wildfires. Modernizing the wildfire risk mapping systems to provide accessible, actionable information can ensure that buildings and other critical infrastructure are sited and designed to be resilient. To help drive risk mitigation and help communities rebuild, Congress should look for ways to enhance community insurability against wildfire risk. Congress needs to take steps to strengthen and improve the wildland firefighting workforce. Finally, climate-smart management of forest land that can decrease the incidence of catastrophic wildfires near communities cannot be forgotten and Congress should continue to fund management and restoration activities to ensure healthy forestlands.

Key Accomplishments

The BIL included:

- $3.4 billion to reduce wildfire risk to support a variety of wildland fire fighting efforts at both the Department of Interior (DOI) and USFS, including funding for community

[232] NOAA, "Wildfire climate connection," August 8, 2022.
[233] Congressional Research Service, "Wildfire Statistics (IF10244)," November 4, 2022.
[234] National Interagency Fire Center, "Incident Management Situation Report," December 2, 2022.
[235] Ibid.
[236] U.S. Forest Service, "Confronting the Wildfire Crisis: A Strategy for Protecting Communities and Improving Resilience in America's Forests," January 2022.

wildfire defense grants, mechanical thinning, controlled burns, the Collaborative Forest Landscape Restoration program, the Joint Chiefs Landscape Restoration Program, and firefighting resources.

- $1.138 billion in total funding to reduce hazardous fuels such as brush, small trees, and other vegetation that can fuel fires to burn hotter and grow faster. Funding supports work from DOI, USFS, Tribal Forestry Protection Act projects, and State and Private Forestry grants.
- $600 million in pay raises and other job changes for federal wildland firefighters.
- $500 million for the Burned Area Rehabilitation Programs at DOI and USFS to repair and improve wildfire damaged areas that can contribute to landslide and mudslide risks and will not recover without intervention.
- $100 million to support the further expansion and development of NOAA's fire weather activities through the upgrade and replacement of data collection systems, enhanced modeling for better forecasts and hazard prediction, and improved tools that support land management agencies and emergency managers.
- $80 million in funding to increase NOAA's High Performance Computing capacity for climate-related modeling, prediction, and forecasts.
- $5 billion establish a Grid Infrastructure and Reliability grant program at DOE to support activities that reduce the likelihood and impacts to the electric grid due to extreme weather, wildfire, and natural disaster, and includes wildfires in the eligibility for the Stafford Act hazard mitigation program.

The IRA provided:

- $2 billion to support forest management and restoration at the USFS, including funding of hazards fuel reduction and vegetation management.
- $100 million for wood innovation program grants to expand the use of wood and other material removed from forests to reduce hazardous fuels.

Opportunities for Future Congressional Action[237]

- Enhance community insurability against wildfire risk, including metrics for wildfire resilience and certification strategies that insurers may use to reflect resilience and mitigation achievements that reduce risk.
- Ensure that federally supported development, redevelopment, and rebuilding in the WUI use the minimum wildfire-resilient standards contained in the International WUI Code or similar federal wildfire resilience standards. Codify Executive Order 13728, "Wildland-Urban Interface Federal Risk Mitigation," and direct federal departments and agencies to implement the requirements of the Executive Order to ensure that federal buildings are built to comply with the WUI Code or similar federal wildfire resilience standards, consistent with their missions and authorities, to help ensure the resilience of federal buildings against wildfires.
- Significantly increase wildfire mitigation funds to:
    - Develop and implement at 10-Year Wildfire Response Plan;*

[237] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

    - Reduce wildland fuels and assist communities, including through strategic prescribed burns in coordination with local leaders and consistent with the best science to prevent escape of prescribed burns;* and
    - Help communities, households, and businesses assess wildfire hazards, increase use of wildfire-resistant strategies and materials, and share best practices for wildfire risk reduction.
- Increase funding for wildfire science and modernize the wildfire risk mapping system to provide planning-scale, actionable information about seasonal fire risk and trigger requirements for the use of wildfire resilience codes and standards for federally supported projects, including informing siting and design of buildings and infrastructure.
- Require Hazard Mitigation and Climate Adaptation Plans to identify the WUI and other wildfire-vulnerable areas, as well as the specific actions that the communities will undertake to mitigate wildfire risks to vulnerable populations. Adjust cost-shared mitigation programs to incentivize adoption of the WUI Codes and discourage development in the WUI.
- Ensure timely and adequate disaster recovery funding to help survivors rebuild using the latest codes and standards for energy efficiency and resilience.*
- Develop and fund resilience strategies against wildfire risks to critical infrastructure such as transportation, water supplies, communications, and the electric grid.
- Integrate tribes and Indigenous cultural knowledge into land management practices, including expanded use of prescribed and cultural burns.*
- Strengthen and improve the wildland firefighting workforce by building on the pay increases enacted in the 117th Congress and enhancing benefits, health, and safety of federal wildland firefighters.*

Build - and Rebuild - Using Resilience-Based Codes and Standards

Although there is no federal "building code," catastrophic events such as the Surfside Condominium collapse and multiple disasters have sharpened federal awareness of and engagement in ensuring that federally funded projects are sited and designed to comport with standards for safety and resilience. Congress directed FEMA, NIST, and stakeholders to recommend ways to make buildings hazard resilient, with the aim of reducing disaster losses and enhancing community resilience.[238] In 2018, Congress amended Section 203 of the Stafford Act to provide FEMA grant funding to communities to help them adopt and enforce the "latest published editions of relevant consensus-based codes, specifications, and standards that incorporate the latest hazard-resistant designs."[239] In 2018 and 2021, agency reports to Congress recommended that the federal government and stakeholders enhance hazard-resilient designs in model building codes and facilitate adoption and enforcement of these codes at the community

[238] Senate Committee on Appropriations, in S.Rept. 114-239 accompanying the Consolidated Appropriations Act, 2017 (P.L. 115-31).
[239] Division D, Disaster Recovery Reform Act of the Federal Aviation Administration Reauthorization Act of 2018 (DRRA; P.L. 115-254). See also 42 U.S.C. §5172(e)(1)(A).

level.[240,241] The recommendations in these reports encouraged more research and development in four areas to move toward more hazard-resilient buildings: (1) building design, (2) community planning, (3) economic and social feasibility, and (4) adoption of building codes. In addition, the reports recommended that the federal government lead development of a national framework to increase hazard-resilient building stock nationwide.

The Biden-Harris Administration has worked to advance federal policy and practice toward greater alignment with the latest codes and standards for resilience and energy efficiency through a National Initiative to Advance Building Codes that will help state, local, tribal, and territorial governments adopt the latest, current building codes and standards, enabling communities to be more resilient to hurricanes, flooding, wildfires, and other extreme weather events that are intensifying due to climate change.[242] As part of this initiative, FEMA and HUD are working to ensure that their disaster resilience and recovery programs align with the latest hazard-resistant codes and standards. Agencies are also working to implement their responsibilities to comply with the Federal Flood Risk Management Standard as directed by Executive Orders 11988, 13690, and 14030.

Key Accomplishments

The 117th Congress provided funding to support codes-related efforts through:

- The BIL, which provided $225 million to DOE to support implementation of updated building energy codes. DOE is using those funds to launch the National Initiative to Advance Building Codes; and
- The IRA, which provided $1billion for DOE to provide technical assistance to states to support adoption and implementation of the latest building energy conservation and zero energy codes.

Opportunities for Future Congressional Action[243]

- Codify the Federal Flood Risk Management Standard and accelerate implementation across federal agencies and programs.
- Direct the General Services Administration to inventory all federal assets located in designated floodplains, including critical facilities in the 0.2% annual chance floodplain.
- Direct agencies to develop and deploy federal standards for wildfire-resilient homes, buildings, and infrastructure, and ensure that federally supported building, retrofits, and recovery comport with those standards.
- Significantly increase technical and financial assistance to FEMA and other agencies to help states, local governments, tribes, and territories adopt and consistently enforce the latest building codes and standards to increase resilience and energy efficiency.

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[240] Siamak Sattar et al., "Research Needs to Support Immediate Occupancy Building Performance Objective Following Natural Hazard Events," *National Institute of Standards and Technology (NIST), NIST Special Publication 1224*, August 2018.

[241] NIST-FEMA, "Recommended Options for Improving the Built Environment for Post-Earthquake Reoccupancy and Functional Recovery Time," *NIST-FEMA Special Publication FEMA P-2090/NIST SP-1254*, January 2021.

[242] The White House, "FACT SHEET: Biden-Harris Administration Launches Initiative to Modernize Building Codes, Improve Climate Resilience, and Reduce Energy Costs," June 1, 2022.

[243] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Reauthorize and increase funding to the National Windstorm Impact Reduction Program to improve research into climate system variability and change as it relates to wind hazards and to translate this research into better engineering design of the built environment.
- Investigate major disasters and produce reports that are publicly available, including findings regarding failure modes of buildings and infrastructure and recommendations for changes to codes, standards, and risk management protocols to reduce the risk of loss of life and property in catastrophic weather events. This includes following up on recent events, including the Surfside Condo collapse.
- Direct FEMA, HUD, SBA, and other agencies involved in pre-disaster mitigation and post-disaster rebuilding to ensure projects comport with the latest codes and standards for resilience and energy efficiency, including supporting electrification of homes and public buildings.*

Make Climate Resilience Planning an Essential Element of Federal Agency Operations

In 2021 alone, the United States faced 20 extreme weather and climate-related disaster events with losses exceeding $1 billion each – a cumulative price tag of more than $145 billion. The federal government's employees, operations, and assets (including more than 300,000 buildings and 600,000 vehicles) are exposed to these same impacts. In October 2022, the Biden-Harris Administration announced new actions by more than 20 agencies to bolster the federal government's resilience to the worsening impacts of climate change.[244] These actions are detailed in annual agency adaptation progress reports and highlight an administration-wide commitment to confronting the climate crisis by integrating climate-readiness across every agency's mission and programs.[245] These include measures to reduce risks to federal facilities, infrastructure, and critical assets; incorporate climate risk requirements into several major solicitations; strengthening the reliability of key supply chains; enhancing institutional adaptation capacity; expanding and deepening agencies' resilience efforts, including in partnership with states, local leaders, tribes, and territories; and incorporating environmental justice and equity in federal adaptation efforts.

Key Accomplishments

The 117th Congress supported these efforts through IRA investments, including $975 million for the use of emerging and sustainable technologies in federal buildings and $500 million for sustainability and environmental programs under the Department of Homeland Security Office of Chief Readiness Support.

Opportunities for Future Congressional Action[246]

- Codify direction to federal departments and agencies to update and maintain their Climate Adaptation Plans and describe how agencies are (1) evaluating climate risks to

[244] The White House, "FACT SHEET: Biden-Harris Administration Strengthens the Federal Government's Resilience to Climate Change Impacts," October 6, 2022.
[245] Office of the Federal Chief Sustainability Officer, "Climate Resilient Infrastructure and Operations," *Council on Environmental Quality*, Accessed December 9, 2022.
[246] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

their missions and operations, and (2) ensuring that program implementation does not exacerbate climate risks.

- Direct the Federal Acquisition Regulatory Council to require major suppliers, those who received $7.5 million or more in federal contract awards in the previous year, to publicly disclose their greenhouse gas emissions and climate risks to their supply chains and operations, including risks posed by floods, wildfires, drought, and extreme heat.
- Designate funding to support agency adaptation, resilience, and preparedness efforts.*

Pillar 10: Protect and Restore America's Lands, Waters, Ocean, and Wildlife

America's natural resources – our lands, waters, ocean, and wildlife – are fundamental to sustaining life, but they are stressed and suffering from harsh climate impacts. Using nature-based solutions – protecting, conserving, and restoring ecosystems across the country that store carbon and provide clean air, water, and other ecosystem services – are one of the most cost-effective strategies for addressing climate change and the associated crisis. The Select Committee's Climate Crisis Action Plan in 2020 offered recommendations on enhancing the climate benefits derived from specific habitats, including grasslands, forests, and ocean and wetland ecosystems. In addition to continuing efforts to implement the Climate Crisis Action Plan, Congress must protect and manage our lands, waters, ocean, and wildlife in an interconnected way and embed climate adaptation and mitigation as a foundation of our natural resource policies.

The 117th Congress, recognizing the critical role nature plays in American life, provided unprecedented funding increases to federal initiatives that restore and conserve habitats, including coastal wetlands, forests, and parks. These efforts build on other recent Congressional actions, such as the passage of the Great American Outdoors Act in 2020, which fully funded the Land and Water Conservation Fund (LWCF) and authorized up to $9.5 billion for maintenance and repairs projects on public lands. The Biden-Harris Administration has also taken significant strides toward safeguarding our lands and waters, highlighting the need to invest in nature as a key strategy for promoting the nation's economy, security, health, and environmental justice. Combined, these actions make significant strides toward the goal to protect or conserve at least 30% of our lands and waters by 2030 ("30by30"), which scientists estimate is the minimum level needed to ensure the continued health of the environment and the planet.[247]

The challenges facing our natural environment, including declining biodiversity, are inextricably linked to climate change. Nature-based solutions have immense potential for both adaptation and mitigation to the impacts of climate change. Federal management of lands, waters, and wildlife must ensure that climate change is incorporated into decision-making regarding resource management, and federal agencies should likewise work with state, local, and tribal managers to incorporate climate change in planning and management. To derive the needed climate, biodiversity, economic, and socio-cultural benefits from nature-based projects, additional funding, science, and workforce training are necessary. The United Nations Environment Program estimates that in order to meet international climate and biodiversity targets, annual investments in nature-based solutions will need to triple by 2030.[248]

Finally, communities are deeply rooted in their lands and waters, and nature-based solutions should further environmental and social justice. Full accounting of the impacts of development on frontline communities must be incorporated into management decisions by ensuring meaningful engagement and consultation with impacted communities. Working with tribes as full co-managers of traditional resources, as well as integrating Indigenous Traditional

[247] E. Dinerstein *et al.* "A Global Deal for Nature: Guiding principles, milestones, and targets." *Science Advances,* April 19, 2019.
[248] UNFCCC, "Finance for Nature-Based Solutions Must Triple by 2030," October 18, 2022.

Ecological Knowledge (ITEK) and management practices such as prescribed fire, can further enhance resiliency in landscapes.

Key Accomplishments

- Congress passed the Great American Outdoors Act in 2020, which included permanent funding of $900 million a year for the LWCF, which supports recreation and conservation projects on federal, state, tribal, and private lands and directed up to $9.5 billion over five years to address the maintenance backlog of critical facilities and infrastructure in national parks and other public lands.
- Congress appropriated conservation funding to restore, protect, and conserve critical ecosystems on public, private, state, and tribal lands through the Bipartisan Infrastructure Law (BIL), Inflation Reduction Act (IRA), and annual appropriations bills.
- Authorized increased investments in foundational science to support development and effective implementation of nature-based solutions in the CHIPS and Science Act.

Opportunities for Future Congressional Action[249]

- Strengthen community input and use of the best available science and ITEK into decision-making and ensure greater equity in land-use decisions.
- Codify climate as a critical element in all federal natural resource management policies and ensure sustained levels of funding to meet resource management needs.
- Codify actions by the Biden-Harris Administration on key nature-based solutions that both protect our natural environment and strengthen our economy and communities,* including:
    - Safeguard mature and old-growth forests on federal lands and strengthen reforestation partnerships;
    - Initiate the first U.S. National Nature Assessment;
    - A national goal to conserve or protect 30% of lands and waters and conserving additional public lands and waters;
    - Reestablish the Northern Bering Sea Climate Resilience Area to facilitate tribal stewardship; and
    - Develop and implement an Ocean Climate Action Plan.

Capture the Full Potential of Natural Climate Solutions Through Conservation and Restoration

Healthy, functioning ecosystems are critical, cost-effective tools in addressing the climate crisis, providing both adaptation to negative impacts and mitigation by storing carbon pollution. Ecosystems such as forests, grasslands, and wetlands are natural carbon sinks, which could provide up to one-third of mitigation needed to keep warming below 2˚C by 2030.[250] Sustained long-term efforts, including funding, science, and workforce development, to restore degraded ecosystems and protect and conserve healthy habitats are necessary to achieve these benefits. As part of the America the Beautiful Initiative, the Biden-Harris Administration has taken important

[249] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[250] Griscom, Ellis and Fargione, "Natural Climate Solutions," October 2017.

steps including adopting the 30by30 goal, restoring protections to, and designating new. national monuments, beginning the first national nature assessment, and protecting old-growth forests.

A key aspect of restoration and conservation of habitats as a climate solution is engaging at the landscape scale, which can bolster the resilience of the ecosystem against changing environmental conditions.[251] A landscape-scale conservation strategy integrates efforts on federal, state, tribal, and private lands and waters and considers ecological, social, economic, cultural, and institutional perspectives at each location. Understanding and incorporating connections with a landscape allows managers to address large-scale issues, including wildfire risk, watershed protection, invasive species, and biodiversity decline. This broad approach also allows for solutions like wildlife corridors that provide safe migration routes and can also enhance habitat to accommodate for potential range shifts due to climate change.

In order to effectively implement landscape-scale conservation approaches and ensure that federal dollars are targeted to provide the greatest climate adaptation and mitigation benefits, Congress should require the federal government to develop and regularly update national strategies for landscape scale conservation and these strategies should be a cornerstone of the 30by30 goal, enhancing climate and biodiversity benefits.

Ocean and coastal habitats are particularly vulnerable to climate impacts and external factors, including the massive amount of plastic waste in the ocean, which can further inhibit the ability of habitats to function. These ecosystems also provide one of the greatest opportunities for climate action. Protection and restoration of blue carbon coastal ecosystems, including coral reefs, mangroves, kelp, seagrass beds, and other wetland habitats, provide significant benefits to coastal communities, including helping to mitigate the impacts of sea level rise and severe storms, providing nurseries to support fish populations, and store carbon pollution. Offshore habitats are ripe for scientific investigation regarding carbon capture and sequestration and other climate mitigation benefits. Just as on land, landscape scale (or "seascape" scale) conservation planning is important to balance multiple uses of ocean resources for the greatest benefit. The 116th Congress permanently established the Ocean Policy Committee (OPC) to coordinate federal action on ocean-related issues, including science, technology, and resource management. While Congress has continued to support additional research and science of ocean and coastal habitats, continued investment in expanding our understanding of these ecosystems is vital to prepare for climate-induced changes. In addition to science, many of the 2020 Climate Crisis Action Plan recommendations toward strengthening ocean and coastal programs and policies remain to be implemented.

The economic value of ecosystems services contributed by nature – including food, water, energy, and hazard mitigation – to the United States is estimated to be worth $5.3 trillion annually.[252] The Biden-Harris Administration announced an effort to develop natural capital accounts and related environmental statistics to measure the economic value of nature. This effort should be codified to ensure the development of metrics is completed. Congress should

[251] Betsy von Holle, Stephanie Yelenik, and Elise S. Gornish, "Restoration at the landscape scale as a means of mitigation and adaptation to climate change," *Current Landscape Ecology Reports*, July 22, 2020.
[252] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, "The IPBES regional assessment report on biodiversity and ecosystem services for the Americas," 2018.

also direct federal agencies to include ecosystem services, including carbon sequestration, drought mitigation, and other climate benefits, as part of managing for multiple-use of natural resources on public lands and waters. Additionally, this accounting can help identify environmental issues that result in economic impacts. For example, eliminating marine plastic waste could increase tourism revenue and recreational spending for coastal communities. One study found that Orange County, California would add $137 million to the regional economy without plastic waste, while an increase in marine debris could cost the County more than $304 million.[253]

Key Accomplishments

- Congress provided over $8 billion for ecosystem restoration and resilience projects on public, state, tribal, territorial, and private lands through the IRA and BIL, including restoration and protection of forests, rivers, estuaries, and rangelands.
- Congress provided over $4 billion for coastal community and climate resilience, including restoration of wetlands, through unprecedented investments in both the BIL and IRA.
- The BIL permanently authorized the Forest Service Legacy Road and Trails Remediation Program and updated the Federal Reforestation Trust Fund to ensure the U.S. Forest Service has permanent and dedicated funding to reforest national forests.
- The IRA and BIL together allocated $475 million for biodiversity conservation, including addressing endangered species recovery, invasive species, and creating wildlife crossings.
- Congress permanently established the Ocean Policy Committee in the FY2021 National Defense Authorization Act (NDAA) to coordinate federal ocean-related actions, including advancing ocean research and management of ocean resources.
- The CHIPS and Science Act authorized increased investments in research on ocean acidification, including impacts of acidification on communities.
- The FY2023 NDAA included multiple provisions to strengthen ocean and coastal ecosystem health and resilience, including the reauthorization of the Coral Reef Conservation Act, marine mammal health monitoring and conservation, and regional ocean partnerships.
- The FY2023 NDAA also included language to expand data collection and monitoring of the Great Lakes, ocean, bays, estuaries, and coasts. The provisions are designed to increase science and innovation in ocean and coastal research and support development of a stronger, more diverse workforce.

Opportunities for Future Congressional Action[254]

- Develop national strategies for addressing biodiversity and landscape scale conservation that incorporate climate and use strategies to guide investment in climate and conservation planning, with a priority on habitats with increased climate or biodiversity value. Congress should direct that these strategies be regularly updated to reflect changing climate conditions. Strategies include:
    - Ocean-Climate Action Plan and Ocean Sustainability Plan;

[253] National Academies of Sciences, Engineering, and Medicine, "Reckoning with the U.S. Role in Global Ocean Plastic Waste," *The National Academies Press*, 2022.

[254] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

    - Landscape Scale Conservation Plan;
    - A federal strategy for replanting native species, especially in forests and grasslands, with consideration for changing climate and habitat conditions; and
    - National Nature Assessment and Federal Biodiversity Plan.
- Include climate as part of agencies' missions, including as a priority for grants and other federal funding opportunities.
- Expand multi-use policies that guide natural resources management to include climate benefits and other ecosystem services.
- Protect and conserve at least 30% of lands and waters, particularly key carbon capturing ecosystems like grasslands, old growth forests, mangroves, kelp, seagrasses, and wetlands.
- Support and invest in increased scientific understanding of the impacts of climate change on the ocean, wetlands, and other blue carbon ecosystems as well as the climate benefits these blue carbon ecosystems can provide.
- Codify Biden-Harris Administration efforts on developing natural capital accounts and environmental statistics to capture the full value of nature to the American economy.*

Make Public Lands and Waters Part of the Climate Solution

The United States' public lands and waters should benefit all Americans. Currently, public lands and waters release approximately 1.4 billion metric tons of carbon dioxide equivalent per year, a quarter of annual U.S. greenhouse gas emissions.[255] Instead of adding to the climate crisis, our public lands and waters should be managed to be part of the climate solution. All Americans should have equal opportunities to participate in planning and management of public lands and waters through a robust, equitable consultation and environmental review process.

Public lands and waters are managed for multiple uses, including energy development, mining, recreation, and grazing. Federal agencies should prioritize uses that reduce emissions, such as renewable energy development or establishing more protected areas, over activities that increase carbon pollution. To minimize conflicts and support timely decision-making, federal agencies should engage in land-use planning as part of a smart-siting effort to identify areas of high renewable energy potential and low environmental friction. Renewable energy development should target areas that have already been degraded before looking to undeveloped lands and waters. As offshore wind development is a relatively new industry, developers have experienced challenges in receiving permits and approvals from federal agencies. There is an opportunity for improved coordination to accelerate offshore wind development consistent with climate and biodiversity goals. Agencies should also reconsider renewing existing oil and gas or mining leases in areas with marginal potential for development. They should safeguard from harmful development areas with unique biodiversity, or special ecological, cultural, or historical value.

Another important aspect of smart siting is robust public involvement, especially from frontline communities. Complete environmental reviews are also critical to allow managers, regulators, and local communities to fully understand the potential impacts of energy development. As oil and gas products shift from energy production to the production of plastics and other

[255] Nathan Ratledge, Laura Zachary and Chase Huntley, "Emissions from fossil fuel produced on US federal lands and waters presents opportunities for climate mitigation," *Climatic Change*, March 14, 2022.

petrochemical production, environmental reviews should incorporate full lifecycle accounting of emissions and pollutants.

Fossil fuel development on public lands and waters allows oil and gas companies to reap record profits from a commonly owned resource.[256] Through the IRA, Congress made strides to ensure that companies pay their fair share for extraction activities on public lands and waters by raising royalty rates and modernizing onshore leasing. However, additional efforts are needed, starting with reducing or eliminating tax breaks and subsidies provided to fossil fuel projects. Congress should also ensure that companies – not taxpayers – pay for remediation and clean-up by increasing bonding requirements and fees.

Key Accomplishments

- The IRA provided for offshore wind leasing in waters off the mid- and south-Atlantic, Florida's Gulf Coast, and the waters of the U.S. Territories.
- The Energy Act of 2020 provided authority for the Department of the Interior (DOI) to reduce rents and fees for renewable energy projects on federal lands to advance clean energy production on public lands; DOI enacted a rate reduction policy in June 2022.
- The IRA modernized onshore oil and gas leasing on public lands to ensure companies pay their fair share by increasing royalty rates, increasing minimum bids for leases, increasing rental rates, establishing a fee for submitting an expression of interest, and eliminated noncompetitive leasing.
- The IRA increased royalty rates for offshore oil and gas leases.
- The IRA established royalties for wasted methane released during natural gas production.
- The IRA provided $1 billion to nine federal entities to fund environmental reviews, including at the Department of Energy, DOI, Environmental Protection Agency, and the National Oceanic and Atmospheric Administration (NOAA). The BIL also provided $20 million to NOAA for environmental consultation and permitting, which will assist with offshore wind development.

Opportunities for Future Congressional Action[257]

- Congress should enact a moratorium on new fossil fuel leasing on public lands and waters in order to allow management agencies to develop and implement strategies to achieve a goal of net-zero emissions by 2040 at the latest. Congress should also direct resource agencies to equally balance biodiversity and landscape conservation with critical minerals mining, renewable energy development, and other uses.* The process for determining which lands are available for leasing is largely determined by the oil and gas companies themselves. Resource management agencies should take a landscape-scale view to determining leasing areas in order to protect multiple uses and special places.
- As part of smart siting, require public lands and waters management agencies to identify areas for renewable energy development, particularly for onshore wind and solar and offshore wind, in order to address conflicts early and minimize impact on habitats, wildlife, and cultural resources. Identifying renewable energy and infrastructure zones

[256] Associated Press, "Oil companies reap unprecedented profits as Americans struggle to pay for food and gas" *CBS News*, July 29, 2022.

[257] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

upfront will expedite permitting and avoid costly and time-consuming deliberations over inappropriately sited projects.

- Strengthen community and environmental review processes for projects on public lands and waters. This should be incorporated as part of smart siting efforts to address conflicts in the early stages of development.
- Eliminate outdated tax breaks and other subsidies for fossil fuel companies that achieve record profits from publicly owned lands and waters. Oil and gas companies receive billions of dollars in tax breaks, royalty relief, and other financial incentives that allow companies to operate when otherwise it would not be financially viable, all while recording record profits for shareholders.

Pillar 11: Confront Climate Risks to America's National Security and Restore America's Leadership on the International Stage

The climate crisis is a national security and defense threat multiplier, manifesting in multiple ways that affect U.S. strategic and security interests. For example, as the Arctic warms, competition for resources and influence in that region is accelerating. Extended drought in Honduras, Guatemala, and El Salvador is exacerbating social instability and driving migration to the U.S. southern border. Water resources are at risk in the Middle East due to extended drought and extreme heat conditions that threaten regional security and prosperity. Extreme flood events in Pakistan, China, South Africa, Eastern Australia, India, as well as areas of the United States and Europe have occurred in 2021 and 2022, causing significant economic harm and major disruption to communities. Stronger hurricanes and typhoons, flooding, droughts, heat waves and wildfires are adversely affecting military operations and exercises at home and abroad at an increasing and alarming rate. Although the 117th Congress and the Biden-Harris Administration are making important progress to advance energy security and climate preparedness, more work is needed to identify climate-related threats and embed response into policies, strategies, and partner engagements.

Advance Climate Resilience and Preparedness for a Strong National Defense

As required by Executive Order 14008, the Department of Defense (DoD) released its Climate Adaptation Plan (CAP) in October 2021 that established a roadmap to ensure its strategic goals could be met under changing climate conditions.[258] The DoD CAP outlined several adaptation and resilience strategies it would implement to ensure its readiness for climate-related effects, ranging from equipping forces with the knowledge, training, and equipment to operate in extreme and adverse conditions, to installing climate-ready facilities and infrastructure and enhancing climate literacy in its acquisition workforce.[259] The Fiscal Year 2021 (FY21) National Defense Authorization Act (NDAA) required the DoD to perform a minimum of five 'black start,' or energy resilience readiness exercises, per military department per year, to prepare military installations for extended power outages in the face of increasing climate disasters.[260,261] Numerous bases, from Fort Hood to Wright-Patterson Air Force Base, have already conducted such exercises to uncover resilience gaps and hidden infrastructure interdependencies to ensure our forces are prepared for and can effectively recover from an energy disruption.[262]

In October 2021, DoD, the General Services Administration (GSA), and the National Aeronautics and Space Administration (NASA) proposed amending the Federal Acquisition Regulation to ensure that major federal agency procurements minimize the risk of climate change and to require consideration of the social cost of greenhouse gas emissions in

[258] Office of the Deputy Assistant Secretary of Defense for Environment and Energy Resilience, "DOD Announces Plan to Tackle Climate Crisis," *Department of Defense*, October 7, 2021.
[259] Office of the Undersecretary of Defense (Acquisition and Sustainment), "Department of Defense Climate Adaptation Plan," Report Submitted to National Climate Task Force and Federal Chief Sustainability Officer, *Department of Defense*, September 1, 2021.
[260] NDAA for Fiscal Year 2021, H. Rept. 116-442 (117th Congress), Sec. 316.
[261] Daniel Cusick, "DoD's new climate drill: Kill the lights, see what happens," *EENews*, Sept. 16, 2022.
[262] Secretary of the Air Force Public Affairs, "Air Force demonstrates defense-wide leadership through energy resilience readiness exercises," Aug. 29, 2022.

procurement decisions.[263] The proposed amendment would require federal procuring agencies to give preference to bids and proposals from suppliers with a lower social cost of greenhouse gas emissions in order to leverage the federal government's power as the nation's largest spender to hasten the adoption of key climate-related financial risk measures across the private sector.[264] Previously, only major federal *suppliers* were required to publicly disclose greenhouse gas emissions and climate-related financial risk and to set science-based reduction targets. In addition, the DoD's messaging is emphasizing the effects the climate crisis will have on the Defense Department's missions, plans, and installations through the Tackling the Climate Crisis webpage that highlights climate-related stories and its Climate Actions plans.[265]

The 117th Congress has taken numerous steps to ensure the DoD is prepared for the challenges and threats posed by climate change as a destabilizing force both domestically and abroad. This includes incorporating and prioritizing climate-informed decision-making across DoD processes and lines of effort.

Key Accomplishments

The FY22 NDAA included multiple provisions aimed at mainstreaming climate change into DoD processes:

- Codified the National Security Climate Resilience Act, which directs DoD to incorporate climate resilience into acquisition; budgeting, planning and, execution; infrastructure planning and sustainment; force development; engagement strategy development and security assistance.
- Established the DoD Climate Resilience Infrastructure Initiative, a diverse set of programs and activities meant to harden military installations that can recover quickly from natural disasters and extreme weather. The Initiative requires the DoD to incorporate climate resilience into planning and engagement strategies and collaborate with local communities on planning for climate resilience and efficient responses to extreme weather. It also directs the Secretary of Defense to increase the use of low-emission, emission-free, and net-zero-emission energy technologies.
- Directed DoD to conduct mission impact assessments to evaluate the implications of climate change on readiness, training, testing, and operations; and to use those assessments to support development of Combatant Commander requirements.
- Ensured at least 10 percent of major military installations achieve energy net-zero and water or waste net-zero by fiscal year 2035.
- Amended the Unified Facilities Criteria (UFC) for military construction and planning to incorporate the latest consensus-based codes and standards for energy efficiency.
- Developed a framework for installation commanders to engage with local communities to improve preparation for, and response to, extreme weather and climate events.
- Used the 500-year flood standard for mission-critical facilities and consider projected changes in flooding over the expected service life of facilities.

[263] DoD, GSA, and NASA, "Federal Acquisition Regulation: Minimizing the Risk of Climate Change in Federal Acquisitions," *Federal Register*, Oct. 15, 2021.
[264] Ibid.
[265] Department of Defense, "Tackling the Climate Crisis," Accessed December 9, 2022.

- Required examination of acquisition practices and policies to identify the knowledge and tools needed for the DoD acquisition workforce to assess the benefits of selecting environmentally preferable, resilient, and resource-efficient goods or services.

The FY23 NDAA included numerous energy security and climate provisions to:

- Ensure electric vehicle (EV) charging capability and update the UFC for integrated solar roofing, expand electric vehicle charging infrastructure, and support the research, development, and production of electric battery technologies.
- Launch new pilot programs for sustainable aviation fuels and for the transition of nontactical vehicle fleets to electric vehicles.
- Assess military housing resilience and energy efficiency and address heat island effects of large-scale military installations.
- Establish operational energy programs that promote cost savings, enhance readiness, reduce energy-related strategic vulnerabilities, and promote energy-aware behaviors.
- Establish a pilot project to enhance resilience in defense communities by appointing four Interagency Regional Coordinators for Resilience to improve the resilience of a community that supports a military installation and serving as a model for community resilience before disaster strikes.
- Reauthorize the Wastewater Assistance to colonias programs and increase funding for each program.
- Direct departments to ensure prototype and demonstration projects for energy resilience are conducted at each military installation designated by the respective Secretary as an "Energy Resilience Testbed" with technologies including energy storage, tidal and wave power, tactical and nontactical electric vehicles, building and infrastructure resilience, building energy efficiency and control in a cyber-secure manner, carbon sequestration, on-site resilient energy generation, and port electrification.
- Require installation energy plans to include an assessment of energy resilience.
- Identify investments in technology required to improve energy resilience, reduce demand, strengthen energy conservation, and support mission readiness.
- Identify investments in infrastructure, including microgrids, to strengthen energy resilience and mitigate risk from grid disruptions and recommendations for use of renewable energy, clean energy, nuclear energy, and energy storage to reduce dependence on natural gas.
- Direct military departments to establish operational energy programs that promote cost savings, enhance readiness, and reduce energy-related strategic vulnerabilities.
- Issue reports and briefings to Congress on a range of climate topics, including DoD progress in implementing direction in previous NDAAs; alignment between the UFC and the latest codes and standards for resilience and energy efficiency; flood risk to installations; mainstreaming clean, resilient energy technologies; and ensuring preparedness and resilience as essential to national security, operational readiness, and combat capability.

Opportunities for Future Congressional Action[266]

Given the important progress on climate and clean energy in the last two NDAAs, Congress needs to ensure the Pentagon works toward timely and meaningful implementation of the enacted laws. Congress also needs to continue to address energy security and resilience for the military departments, including directing DoD to:

- Advance a more holistic implementation of climate resiliency considerations into the DoD installation management and military construction programs to include resilient design and climate aware siting of new projects;*
- Consider climate change adaptation when developing DoD's position for future negotiations with host-nation governments on cost-sharing activities, when relevant or appropriate;*
- Identify and address climate-related risks and potential health issues for personnel, including hazards associated with extreme heat, tropical disease, floods, and wildfires, including smoke and other air quality problems;*
- Issue guidance on incorporating climate projections into facilities' project designs and include life cycle cost implications along with initial cost of resilient design features;*
- Update its guidance, training, and benchmarks related to acquisition and supply to incorporate the provisions of the DoD directive on climate change and reduce climate risks and greenhouse gas emissions associated with DoD acquisitions and supply chains;
- Advance the research, development, and integration of sustainable aviation fuels and other technologies that will help reduce DoD's carbon footprint;*
- Accelerate the deployment of non-tactical electric vehicles and charging infrastructure both on-installation and in communities;*
- Pursue opportunities to develop tactical electric vehicles that can enhance warfighting and strategic advantage, including reducing dependence on fossil fuels;*
- Make the sustainment "key performance parameter" for new programs of record meaningful and include risks to sustainment in a contested logistics environment including fuel supply chain risk a part of program development;* and
- Require that domestic military installations coordinate their resilience planning with hazard mitigation and climate resilience planning by state, tribal, territorial, and local governments adjacent to and within commuting distance of their facilities. DoD also should coordinate with stakeholders, including environmental justice communities and other community organizations where installation plans and activities affect community resources, such as drainage or environmental impact.

Bolster Climate and Energy Security and Advance U.S. Leadership on the International Stage

Climate change exacerbates multiple risks to U.S. national security interests, from increased geopolitical tension over competition in the energy transition to flashpoints driven by physical, economic, and human rights impacts. A warming planet endangers food and water supplies, human health, and infrastructure. Events like Russia's invasion and war of aggression against Ukraine have made clear the urgent need to accelerate the transition away from fossil fuels to reduce exposure to volatile fossil fuel prices and enhance American energy security. Tensions

[266] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

with China and Russia underscore supply chain vulnerabilities, especially related to critical minerals and clean energy and clean vehicle components, which need to be addressed through development of alternative supply chains both domestically and with U.S. allies. National security and foreign policy need to reflect the aligned imperatives to take immediate global action to reduce climate pollution and prepare for further extreme heat and weather, rising seas, and biodiversity loss.

The 117th Congress and the Biden-Harris Administration have made transformational investments in energy security and domestic preparedness and resilience to climate threats, catalyzing clean energy market transformations, and incentivizing other countries to strengthen their own ambition and action. Through commitments and engagement at the UN Framework Convention on Climate Change Conferences of Parties (COP), including COP26 and COP27, and collaborative work in the International Energy Agency, the U.S.-European Union Task Force on European Energy Security, the Clean Energy Ministerial and Mission Innovation, the Partnership for Transatlantic Energy and Climate Cooperation, and other critical fora, the United States is working to drive concrete action to achieve a just, resilient, and energy-secure future for all.

In October 2021, the Office of the Director of National Intelligence issued the first-ever National Intelligence Estimate on Climate Change, which found that climate change will increasingly exacerbate risks to U.S. national security interests as the physical impacts create additional demands on U.S. diplomatic, economic, humanitarian, and military resources, and discussed how to respond to the challenge as geopolitical tensions mount. In October 2022, President Biden released the 2022 National Security Strategy, which introduced new ideas on navigating strategic competition with China and constraining Russia, the importance of industrial policy and investment at home, and a renewed focus on the climate crisis as among the greatest of the world's shared challenges, along with food insecurity, terrorism, and inflation.[267] The Strategy keeps the door open to strategic collaboration with China on shared interests, including on climate, pandemic threats, and global food crises. The Strategy notes that the United States is building on the Leaders' Summit on Climate, Major Economies Forum, and the Paris Agreement process to help countries meet and strengthen nationally determined contributions, reduce emissions (including of methane and other super pollutants), adapt to climate impacts, and end deforestation. As low-income and lower-income countries call for greater commitments of assistance, particularly for adaptation and unavoidable loss and damage, the Strategy firmly embeds efforts to provide more than $11 billion in annual climate funding in the national security context.

The recently concluded COP27 in Sharm El-Sheikh, Egypt, marked the 30th anniversary of the adoption of the United Nations Framework Convention on Climate Change and aimed to shift from pledging to implementation based on agreed workstreams in Paris and Glasgow. Targets for the COP27 host included delivering on adaptation and clarifying action and next steps on loss and damage given the increasing impacts of more frequent extreme weather events and accelerated slow onset events on those who are most vulnerable. The agenda also sought to mobilize climate finance for developing countries as an urgent priority ripe for refreshed strategies given the current financial crises, debt challenges, and increasing interest rates.

[267] The White House, "National Security Strategy," October 2022.

Developing nations and civil society participants renewed calls for reforms to international finance institutions to improve access to capital for climate mitigation and adaptation. A key objective was to avoid backsliding on commitments and pledges despite multiple challenges, in particular the energy crisis. In a major achievement, countries reached a historic decision to establish and operationalize a loss and damage fund to help nations that are most vulnerable to the climate crisis. Details about the fund will need to be worked out at the 2023 climate summit in the United Arab Emirates.

Key Accomplishments

- The FY2020 NDAA required the Director of National Intelligence to establish a Climate Security Advisory Council to facilitate coordination and analyses of climate change and climate security.
- The FY21 NDAA established a National Academies Climate Security Roundtable to support the Climate Security Advisory Council and direct the establishment of best practices for climate indicators and warnings to incorporate into operational planning and intelligence analysis.
- The FY23 NDAA required the Secretary of Defense to establish plans for all main operating bases in the U.S. European Command to reduce reliance on Russian energy with the goal of eliminating use of Russian energy within five years of beginning plan implementation. The law also directs DoD to establish a policy to ensure that any new military base in the U.S. European Command area of responsibility includes planning for energy security, resilience, and mitigation to reduce reliance on Russian energy.

Opportunities for Future Congressional Action to Bolster Climate and Energy Security[268]

- Strengthen interagency coordination on climate risks to national security, particularly among the intelligence, diplomatic, development, and research capabilities within the U.S. government, to assess global security implications of climate change and facilitate exchange of relevant climate information across agencies, including identifying and disseminating climate intelligence indications and warnings.
- Direct the Department of Homeland Security (DHS) to investigate and report to Congress on the implications of climate impacts to domestic security and the homeland, including safeguarding critical infrastructure, protecting public health, combating infectious disease, securing water and food, and preparing the homeland for internal and cross-border migration driven by climate change.
- Ensure DHS and Federal Emergency Management Agency (FEMA) strategic planning explicitly accounts for climate-related risks in its mission areas. These include identifying the increased concentration of populations in and around high-risk areas, advancing interagency coordination, and ensuring that the emergency management community adapts policies and practices to strengthen risk identification, hazard mitigation, emergency response, and disaster recovery.
- Improve interagency coordination on supply chain risks related to critical minerals and clean energy and clean vehicle components. Develop policies and investments to expand supply chains both domestically and with U.S. allies.*

[268] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Conduct periodic, scenario-based stress testing of countries, regions, and critical systems to measure their ability to cope with potentially disruptive climate events of concern.
- Develop a strategy and procedures to connect the research, development, and analysis capabilities present in unclassified environments to support the full range of national security assessments needed by the intelligence community.
- Direct the DHS to investigate and report to Congress on the implications of climate impacts to domestic security and the homeland, including safeguarding critical infrastructure, protecting public health, combating infectious disease, securing water and food, and preparing the homeland for internal and cross-border migration driven by climate change.

Opportunities for Future Congressional Action to Advance U.S. Leadership on the International Stage[269]

- Advance international climate adaptation and resilience and contribute the funds necessary to meet our financial commitment to the Green Climate Fund.
- Establish a Climate Security Envoy in the State Department and expand programs within the State Department, United States Agency for International Development (USAID), and the Peace Corps, including Fulbright and other educational and cultural affairs initiatives, to address the international humanitarian and security impacts of climate change.
- Establish a program in the State Department to monitor climate and social conditions to anticipate and prevent climate and environmental stressors from evolving into national security risks. Congress also should direct the State Department to address climate risks in its Quadrennial Diplomacy and Development Review.
- Support international efforts to increase financial and technical assistance to address Loss and Damage, multilateral development banks (MDBs), and new insurance and related risk mitigation mechanisms such as Global Shield.*
- Increase technical and financial assistance to expand lower cost clean energy, broaden cost saving adaptation initiatives, and grow strategic educational partnerships. International financial assistance needs to include banking system improvements for developing countries.*
- Encourage transformation of the financial system and its structures and processes, engaging governments, central banks, commercial banks, institutional investors, and other financial actors, to achieve the Paris Agreement's goals.*
- Support MDB reforms to significantly increase the deployment of climate finance, improve access to funding, better mobilize finance from other sources, and ensure funding is better tailored to the needs of developing countries.*
- Encourage MDBs and U.S. agencies that provide disaster response and recovery aid to accelerate the speed of resource disbursement following a disaster and change eligibility requirements so that all vulnerable countries can access concessional financing after a disaster.*
- Ensure that U.S. embassies and consulates continue to implement climate mitigation measures and are aligning economic development and U.S. trade promotion with clean energy and the Paris Agreement's goals.*

[269] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

- Discourage International Finance Institutions, including the Export-Import Bank and Development Finance Corporation, from subsidizing fossil fuel development projects.*
- Direct the State Department and other agencies engaging in international development, trade, and investment to encourage other countries to reduce their fossil fuel subsidies and attract private capital to invest in clean energy technologies.*
- Direct the Secretary of State and USAID Administrator to develop a Global Climate Resilience Strategy, designate a State Department official to manage federal efforts to address international climate impacts, and provide formal protections to Climate-Displaced Persons (CDPs), admitting at least 50,000 CDPs to the United States per year, on top of existing U.S. refugee programs.
- Increase foreign aid for international climate resilience through USAID and other U.S. development finance agencies to support the Global Climate Resilience Strategy. Congress should direct international development programs and investments to incorporate climate resilience considerations into agency decision-making, including strategies to support international capacity building and to ensure that U.S. investments result in climate-resilient buildings and infrastructure.
- Direct international development programs and investments to incorporate climate resilience considerations into agency decision-making, including strategies to support international capacity building and to ensure that U.S. investments result in climate-resilient and energy efficient buildings and infrastructure.
- Establish a Federal Interagency Working Group on Women and Climate Change within the State Department to implement a coordinated, evidence-based strategy on women and climate change.
- Support the International Methane Emissions Observatory, a UN Environment Program initiative to collect multiple methane emissions data streams and to ensure the transparency of methane emissions data.*
- Reduce black carbon pollution and develop new regulations if needed.
- Increase funding for international assistance programs, such as USAID's Office of Forestry and Biodiversity and Global Environment Facility, to stop illegal logging and deforestation and encourage reforestation and sustainable forestry efforts. Support innovative investments and financing of international forest conservation and restoration as effective ways to provide funding for building the resilience of vulnerable communities, lower the cost of mitigation for governments, and sequester carbon.
- Codify the Ambassador at Large for Arctic Affairs position to lead policy formulation and development and represent the United States in international diplomatic negotiations on Arctic issues.

Pillar 12: Strengthen America's Core Institutions to Facilitate Climate Action

Action on climate change requires robust science and strong democratic institutions to foster transparency, inclusion, and government accountability.

Strengthen Climate Science

The 117th Congress provided substantial investment into strengthening climate science as the world's top scientists advise that we have a rapidly closing window on avoiding the worst and most costly impacts of the climate crisis.[270] In addition, the Biden-Harris Administration's support and recognition for all science have further advanced the importance of climate science. The Administration also, for the first time, elevated the position of Director of the White House Office of Science and Technology Policy to a Cabinet level position, further emphasizing the Administration's support for science.[271] On the international stage, continual advancements and uplifting of climate research, as evidenced by recent publications from the Intergovernmental Panel on Climate Change, have emphasized the immediate need for continued support.[272] It is vital to maintain research, along with science infrastructure and a diverse workforce, to keep up with the speed at which the world is responding to climate change. Science should be the foundation on which decisions and actions across the different levels of government are formed; thus, it is critical for Congress to continue to expand climate science investments and to further advance knowledge and understanding of weather, climate modeling, and natural systems in order to better inform policy and implementation of climate actions.

Key Accomplishments

- The CHIPS and Science Act authorized significant support for climate science advancement within the federal government and education programs, including improved earth observations and data collection, academic funding for climate research, further support for Department of Energy (DOE) climate and environmental science research programs, and greenhouse gas emissions measurement research. It authorized over $50 billion to advance clean energy technologies under the DOE Office of Science and almost $15 billion to modernize and restore National Laboratories.
- The Inflation Reduction Act (IRA) provided $490 million for oceanic and atmospheric research, advancing weather information capacity at the National Oceanic and Atmospheric Administration, and an additional $23.5 million for improving 3D elevation data under U.S. Geological Survey to support flood and climate mapping tools.

Opportunities for Future Congressional Action[273]

- Continue and significantly increase funding for international, national, and localized climate science research, observations, monitoring and data collection, including weather

[270] The Intergovernmental Panel on Climate Change, "Working Group I Sixth Assessment Report," August 9, 2021.
[271] Sarah Kaplan, "Biden will elevate White House science office to Cabinet-level," *Washington Post*, January 16, 2021.
[272] The Intergovernmental Panel on Climate Change, "Working Group III Sixth Assessment Report," September 30, 2022.
[273] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.

and natural systems observations, atmospheric concentrations of heat-trapping pollution, impacts on human systems, and earth sciences, among others, to continually inform evolving baselines and improve modeling systems and scenario planning.

- Require the consideration of the most up-to-date climate modeling and projections in all federal mapping, projects, and decisions, with the goal to strengthen federal agency modeling and risk analytic capabilities, including incorporating the full range of warming scenarios, and to ensure appropriate assumptions based on risk.
- Strengthen funding and support for early career climate science and Science, Technology, Engineering, and Math (STEM)/Science, Technology, Engineering, Arts, and Math (STEAM) workforce development, while also ensuring accessibility and increased participation by underrepresented people and communities.
- Strengthen funding for early climate education in K-12 schools, including alternative forms of experiential learning that allow for children to gain exposure to nature and the outdoors.*
- Enhance collaboration, coordination, and dissemination of federal climate science research and data with governmental and nongovernmental partners at local, national, and international levels.*
- Strengthen and ensure scientific integrity to base policy and implementation on researched climate science and data and strengthen application of science-based policymaking across all sectors.
- Expand the use of local community and traditional knowledge in informing relevant science and research opportunities, including expanding and promoting the use of citizen science programs, both to increase engagement of the public and improve data collection in less accessed areas.*
- Enhance Congressional access to timely, non-partisan science and technology expertise by reviving the Congressional Office of Technology Assessment through annual appropriations and updating its mandate to increase accessibility and responsiveness.
- Increase funding for existing congressional support agencies, such as the Congressional Research Service and Government Accountability Office, to better address science and technology issues.
- Ensure adequate funding and oversight for the authorizations passed in the CHIPS and Science Act, and any other climate science authorizations in future legislation.*

Assess the True Value of Federal Climate Action

Federal investments to mitigate and adapt to climate change will return benefits for human health, economic productivity, and avoided disaster damage that far outweigh the cost of federal spending. For example, a study by the National Institute of Building Sciences has shown that each dollar spent in pre-disaster mitigation investments yields an average sixfold return.[274] Important advancements in climate data and computing power have enabled the development of climate projections that are increasingly refined, resulting in greater understanding of the range of physical, economic, and health risks in different regions of the United States and around the world. Even so, challenges remain in measuring the full benefits of climate action relative to the costs of inaction. Federal offices that calculate benefits and costs of proposed policies, including the Congressional Budget Office (CBO) for legislative action and the Office of Management and

[274] National Institute of Building Sciences, "Natural Hazard Mitigation Saves: 2019 Report," December 2019.

Budget (OMB) for executive action and rulemaking, need to continue efforts to develop and refine methodologies that fully account for climate change, including the long-term benefits of reduced greenhouse gas pollution and avoided disasters.

Recent research that can help inform updates to the Social Cost of Carbon (SCC) relies on data and models of socioeconomic and emissions trajectory, which predict how the global economy and CO_2 emissions will grow in the future, measurements of the effects of emissions on the climate, and damage models that translate these changes in climate to economic damage, along with cross-cutting modeling decisions on how to weigh factors of inequity and uncertainty.[275] Efforts are underway to update the social costs of carbon, methane, and nitrous oxide to ensure that federal policies fully account for the full range of emissions' costs to communities, human health, and society overall, and for the wide-ranging benefits of federal actions to reduce emissions. The Biden-Harris Administration has established an Interagency Working Group on Social Cost of Greenhouse Gases, issued an Executive Order calling for an update to the SCC, and announced an interim update to the social cost of heat-trapping emissions.[276,277] In February 2021, this Working Group published a Technical Support Document on the Social Cost of Carbon, Methane, and Nitrous Oxide, which the OMB first utilized to show the social climate benefits of the IRA.[278,279] In November 2022, the Environmental Protection Agency proposed its estimates for the societal cost of carbon and other greenhouse gases alongside a draft rule for oil and gas methane emissions.[280]

Congress needs to fully integrate consideration of climate risks and the use of the SCC and other greenhouse gases into policy and program analyses, to reflect the true costs and benefits of federal action. CBO's methodologies may need to be updated to reflect the modeling that suggests that the net negative impacts of climate and clean energy policies are much lower than CBO's 25% assumption.[281] To do so would allow for truly informed, science-based decision-making. This is especially important as climate-fueled disasters are becoming ever more prevalent, intense, and expensive. While the harmful human and economic costs of the climate crisis continue to compound, policies and actions that reduce carbon emissions and increase resilience to climate impacts offer opportunities to create jobs and propel the economy forward.

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[275] Carleton, T. and Greenstone, M., "Working Paper: Updating the United States Government's Social Cost of Carbon," *Energy Policy Institute at the University of Chicago*, January 2021.
[276] Executive Office of the President, Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis," January 27, 2021.
[277] Interagency Working Group on Social Cost of Greenhouse Gases, "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under Executive Order 13990," February 2021.
[278] Ibid.
[279] Office of Management and Budget, "OMB Analysis: The Social Benefits of the Inflation Reduction Act's Greenhouse Gas Emission Reductions," *The White House*, August 2022.
[280] Environmental Protection Agency, External Review Draft of "Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances," November 11, 2022.
[281] EESI, "How do Congressional Budget Office Scores Impact Climate Policy?," August 25, 2020; See also, Grist, "How CBO budget scoring devalues efficiency … WITH PUPPIES!," October 4, 2009.

Opportunities for Future Congressional Action[282]

- Codify updating the SCC and other greenhouse gas pollutants analyses that reflect the best available climate science, acknowledge that U.S. greenhouse gas emissions have a global impact, and factor in the impact of current policy on the future generations that will bear the brunt of unmitigated climate change.
- Strengthen the CBO's capacity to model and analyze the fiscal and economic effects of major climate risk impacts expected from proposed legislation, including potential savings from avoided costs and reduced risks associated with federal mitigation and resilience investments.
- Assess the state of scientific knowledge on evaluation of climate-related benefits and costs in federally supported projects, such as risks of flooding, wildfire, and extreme weather.
- Direct OMB to consider climate impacts and risks, including flooding, wildfire, tropical storms, and extreme heat, in the development and evaluation of federal programs and regulations, and to update guidance to agencies on the development of regulatory analyses. Federal benefit-cost analyses should evaluate the exposure of federal investments and assets to climate impacts, as well as how federal action can increase or reduce climate impacts.

Strengthen the Country's Democratic Institutions

The 117th Congress achieved transformational policy changes and investments to strengthen our nation's infrastructure, confront injustice, and advance clean energy across sectors and levels of government. Over the course of the 116th and 117th Congresses, more climate-related legislation has been enacted than any other time in our nation's history. Of more than 700 recommendations from the Select Committee's 2020 Climate Crisis Action Plan, the House has passed more than 430 and more than 300 have been signed into law. Even so, Congress needs to build on the momentum to accelerate the transition to a resilient, just, clean energy economy as part of the continued recovery from the COVID-19 pandemic and associated economic fallout.

Polls consistently show that a majority of Americans support action to address climate change and build a just and equitable clean energy economy.[283] Every year, more and more Americans experience the impacts of the climate crisis in their own communities, including extreme weather and economic disruption. The calls for climate action grow more urgent. Yet, the continued prevalence of misinformation about the causes and effects of the climate crisis continues to undermine Americans' health, safety, and economic interests.

On top of these challenges, the public's trust in the ability of the federal government to meet this challenge continues to wane. Of the last four presidential administrations, policy whiplash on the

[282] An asterisk indicates new recommendations that were not included in the 2020 Climate Crisis Action Plan. Please refer to the 2020 Climate Crisis Action Plan for additional context and the full list of recommendations.
[283] Anthony Leiserowitz et al., "Climate Change in the American Mind," Yale Program on Climate Change Communication, July 21, 2022; Jennifer Carman et al., "Exploring support for climate justice policies in the United States," Yale Program on Climate Change Communication, August 4, 2022; Matthew Ballew et al., "Experience with global warming is changing people's minds about it," Yale Program on Climate Change Communication, September 7, 2022.

role of federal agencies to act on climate, in the absence of major Congressional climate action prior to the 117th Congress, has created policy instability and lack of trust.

More recently, the Supreme Court, under an extreme conservative majority, has actively inserted itself into political debates, ignoring precedent, and in some cases creating new rules and challenges that have made responding to the climate crisis even harder. In the year since July 2021, three cases in particular have raised concerns by making it more difficult to stop discriminatory voting rights practices, potentially limiting the ability of federal administrative agencies from taking action despite clear guidance from Congress based on a newly created "major questions" doctrine, and disregarding 50 years of precedent and constitutional rights.

Further, action on the opportunities identified in the 2020 Climate Crisis Action Plan and amplified in this report will be more difficult to achieve if entrenched moneyed interests – those that do not want to invest in adaptation and transition to cleaner technologies – continue to have an outsized influence in the political process than average Americans. Lack of adequate campaign finance laws and weak federal ethics laws continue to allow a small block to affect federal policy in immense ways despite public support to act on climate.

For example, over the past few years many Americans across the country have seen the dearth of sufficient ethics and campaign finance laws firsthand. Major electric and gas utilities, providing critical public services, have used their resources to corruptly influence elections, stymie clean energy initiatives, and one even used their customer's money to bribe public officials.[284] Lawmakers and regulators at the state and federal levels need to ensure public utilities are transparent with ratepayer money and not using that money for unethical political purposes.

Congress must continue to assert its constitutional role and elevate all voices above those seeking to block action. Congress needs to pursue reforms to strengthen America's democratic institutions alongside the recommendations outlined in the 2020 Climate Crisis Action Plan and this report. Legislation could include the John R. Lewis Voting Rights Advancement Act, the Women's Health Protection Act, or avenues to reform the Supreme Court such as expanding the size of the court or implementing term limits for justices to help reestablish public support and faith in our democratic institutions.

[284] See, e.g., FERC, "Letter order to FirstEnergy Corporation approving the final audit report covering the period January 1, 2015 to September 30, 2021, under Docket No. FA19-1-000," February 2, 2022; Jeremy Pelzer, "Audit: FirstEnergy improperly used ratepayer money to fund HB6 dark money efforts," *Cleveland.com,* February 4, 2022; Mary Ellen Klas, "Revealed: the Florida power company pushing legislation to slow rooftop solar," *The Guardian,* December 20, 2021; Jason Garcia and Annie Martin, "Florida Power & Light execs worked closely with consultants behind 'ghost' candidate scheme, records reveal | Special Report," *Orlando Sentinel,* December 2, 2021; Annie Martin, "South Florida 'ghost' candidate pleads guilty in vote-siphoning scheme," *Orlando Sentinel,* August 24, 2021; Tony Arnold and Dave McKinney, "ComEd Charged With Bribery For Steering Jobs, Other Benefits For Speaker Michael Madigan. Speaker Denies The Feds' Claims," *WBEZ Chicago,* July 17, 2020.

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