CLIMATE POLICY PRIORITIES FOR THE NEW ADMINISTRATION AND CONGRESS

C2ES CLIMATE INNOVATION 2050

The start of a new Administration and a new Congress provides a vital opportunity to dramatically scale up the U.S. response to climate change. The Center for Climate and Energy Solutions has worked closely with leading companies to assess policy options for decarbonizing the U.S. economy. Drawing on these discussions, this policy brief recommends a comprehensive set of policy priorities to drive climate innovation, reduce emissions, strengthen climate resilience, remedy inequities and—in many cases—support the post-pandemic economic recovery. Taken together, these steps would establish the essential foundations of an ambitious, just, durable, bipartisan climate policy putting the United States on the path toward carbon neutrality.

INTRODUCTION

The United States and, by extension, the world stand at the most critical juncture ever in the effort against climate change. With the devastating human and economic toll of the climate crisis becoming ever clearer, and with the window for decisive action to avert far worse quickly narrowing, the start of a new Administration and a new Congress provides the United States with a vital opportunity to significantly scale up its climate response.

Over the past three years, through our Climate Innovation 2050 initiative, the Center for Climate and Energy Solutions (C2ES) has engaged closely with leading companies across diverse sectors to examine challenges and solutions in decarbonizing the U.S. economy. This ongoing collaboration has earlier produced *Getting to Zero: A U.S. Climate Agenda*, outlining the policies needed to put the United States on the path to climate neutrality, and *Restoring the Economy with Climate Solutions: Recommendations to Congress*, highlighting climate measures that can contribute to post-pandemic recovery.

Drawing and building on these previous efforts, this new policy brief presents a distilled and updated set of climate policy priorities for the Biden Administration and the 117th Congress (2021–2022).

Our *Getting to Zero* agenda outlined a range of objectives for an effective U.S. climate strategy. Beyond the overriding goal of carbon neutrality, these include reestablishing U.S. climate leadership globally, quickly mobilizing a broad array of low- and zero-carbon technologies, reducing emissions as cost-effectively as possible, strengthening U.S. competitiveness, and meeting the needs of workers, low-income households,

and marginalized communities.

In weighing immediate priorities for the new Administration and Congress, we have aimed for a set of recommendations that speak both to the scale and urgency of the climate challenge and to the present political moment. We believe that many of the steps outlined here could garner bipartisan support in the near term and that, taken together, they would establish the essential foundations of an ambitious, just, durable U.S. climate policy. Many would, in addition, make vital contributions to rebuilding the economy as the country emerges from the COVID-19 pandemic.

These recommendations span both the executive and legislative arenas. The legislative priorities could constitute a stand-alone climate package or, more plausibly, could be advanced in a more disaggregated fashion through a range of legislative vehicles. The recent enactment of the Energy Act of 2020 demonstrates growing bipartisan support for action. Going forward, Congress should pursue those avenues best suited to strengthening the bipartisan foundation needed for durable climate policy.

Box 1 and **Box 2** highlight the elements that would fit most naturally into an economic stimulus or an infrastructure package, respectively. Other potential legislative vehicles include, for instance, the farm bill, the surface transportation bill, and budget appropriations.

We offer recommendations in the following areas:

- Setting the course
- Economy-wide carbon pricing
- Innovation
- Power
- Transportation
- Industry
- Buildings
- Short-lived climate pollutants
- Nature-based solutions
- Digital infrastructure
- Climate justice
- Finance
- Trade
- Federal procurement
- Resilience

As with our earlier efforts under Climate Innovation

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A company's participation does not represent an endorsement of the full contents of this brief.

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2050, these recommendations have been informed though a series of discussions with companies across a wide range of sectors. Many of these companies also joined a recent statement organized by C2ES publicly urging President Biden and the new Congress to work together, and pledging to work with them, toward ambitious, durable, bipartisan climate solutions.[1] C2ES is grateful to these companies for their contributions to these efforts.

C2ES offers these recommendations in the hope that our elected federal leaders—recognizing the grave risks of climate change, and heeding the concerns of scientists, investors, state and local leaders, businesses, and a strong and growing majority of Americans—work across the aisle to seize this vital opportunity to dramatically scale up U.S. climate efforts.

SETTING THE COURSE

Addressing the climate crisis requires—and the Biden Administration has pledged—an all-of-government approach. With his appointments and nominations to key positions, President Biden has assembled the strongest team ever to lead the government's response to climate change. With his initial executive actions, he has already launched a wide range of efforts to dramatically strengthen that response. These include rejoining the Paris Agreement and directing agencies to initiate processes to strengthen climate-related regulations and to ensure the full consideration of science and climate-related costs and benefits in federal rulemaking.[2] Several additional actions would help to ensure strategic alignment across the executive branch, alignment between the United States' domestic and international climate policies, and close consultation with key stakeholders.

To prepare a new U.S. contribution under the Paris Agreement:

- The White House should lead a process engaging business, labor, state and local officials, and other key stakeholders to inform the development of a new "nationally determined contribution" (NDC) in time for the next U.N. Climate Change Conference this coming November in Glasgow, Scotland. The new NDC, which will express a U.S. target for 2030, should be in line with the goal of carbon neutrality by 2050 and, to be credible to the international community, must be grounded to the maximum degree feasible in established or foreseeable domestic policy.

To drive the overall decarbonization of the federal government:

- The White House should direct federal agencies to develop and implement agency-wide greenhouse gas reduction plans to achieve net-zero emissions, inclusive of their owned and operated facilities and fleets, and key, high greenhouse gas-emitting supply chains, no later than 2050. These plans should leverage the government's vast procurement power to help strengthen markets for low- and zero-carbon technologies and products (see below).

To mobilize strong climate action across the United States:

- The White House and federal agencies should seek every opportunity to engage closely with states, cities, and companies already taking the lead on climate change in order to learn from their experiences, build on their momentum, and better enable them to continue strengthening their efforts. The Administration also should be as transparent as possible in the development of its climate priorities and policies, and provide full opportunity for meaningful input from citizens, state and local governments, the private sector, and other stakeholders.

ECONOMY-WIDE CARBON PRICING

The most economically efficient means of driving decarbonization across the economy is a market-based policy that creates an escalating, economy-wide price on carbon emissions. The Business Roundtable recently declared "a clear price signal...the most important consideration for encouraging innovation, driving efficiency, and ensuring sustained environmental and economic effectiveness."[3] The climate subcommittee of the U.S. Commodity

Futures Trading Commission has similarly concluded that "financial markets will only be able to channel resources efficiently to activities that reduce greenhouse gas emissions if an economy-wide price on carbon is in place at a level that reflects the true social cost of those emissions."[4]

While an important pillar of a long-term decarbonization strategy, economy-wide pricing must be complemented by a wide range of other policies like those recommended here. Economy-wide pricing can take different forms including: a carbon tax, which sets a price on each unit of pollution; a cap-and-trade system, which sets a declining cap on total emissions, allocates a corresponding quantity of emission allowances, and allows emitters to trade them; and a system of mandatory sector-based performance standards with trading.

In addition to driving decarbonization, some market-based strategies can generate significant revenue. This can be used to support climate mitigation and/or resilience efforts, address impacts on low-income households

BOX 1: ECONOMIC STIMULUS

This box highlights recommendations from throughout this brief that would contribute significantly to post-pandemic economic recovery:

- Congress should provide additional flexibility to the Department of Energy's Loan Program Office to ensure full utilization of more than $43 billion in existing loan authority for clean energy projects.
- Congress should meaningfully extend, expand, and establish transferable, longer-term tax incentives for a range of clean electricity technologies (e.g., solar; wind; battery storage; nuclear; geothermal; carbon capture, utilization, and storage; renewable natural gas; biofuels; hydrogen and other low-carbon fuels) and provide direct pay options where possible to improve accessibility and reduce reliance on tax equity markets.
- Congress should expand funding to help farmers and rural small businesses adopt renewable energy systems and make energy efficiency improvements.
- Congress should expand and reform the existing electric vehicle tax credit to make it available to all new, and certain used, zero emission vehicles and to make it refundable at the point of sale.
- Congress should extend the tax credit for electric vehicle charging and alternative refueling facilities, raise the current cap of $30,000, and make credits available as cash grants to spur investment.
- Congress should reauthorize the Section 48C Advanced Manufacturing Tax Credit, increase its funding to at least $2.5 billion per year through 2025, expand it to include other critical decarbonization technologies, and provide direct options for companies with limited tax liability.
- Congress should ensure that the Weatherization Assistance Program is fully funded at the levels authorized in the Energy Act of 2020, and that the newly authorized repairs under the Healthy Homes program are successfully integrated into the program's efforts.
- Congress should reinstate and fund the Energy Efficiency and Conservation Block Grant program enabling state, local, and tribal governments to promote building retrofits, renewable energy, and the purchase of energy-efficient and non-fossil appliances.
- Congress should increase funding for the U.S. Department of Agriculture Natural Resources Conservation Service (including the Environmental Quality Incentives Program, Conservation Reserve Program, and Wetlands Reserve Program) for forest, agricultural land, grassland, and wetland restoration projects.
- Congress should increase funding for the Bureau of Land Management to inventory abandoned oil and gas wells on public lands and should establish a reclamation fund to plug and reclaim them.
- Congress should increase funding for programs to help expand high-speed broadband infrastructure and access for low-income and rural communities.

and affected workers and communities, or address broader fiscal concerns. A pricing policy must include provisions to ensure environmental integrity, address environmental justice concerns, safeguard the global competitiveness of U.S. industry, provide for equivalent state programs, and provide for the appropriate use of offsets, including for carbon removal.

To establish a federal price on carbon:

- The Administration and Congress should immediately begin consultations on the design of an economy-wide carbon pricing program contributing to the achievement of carbon neutrality by 2050—including the program's form and scope, and the use of any potential revenues—with the aim of enactment in the 117th Congress.

INNOVATION

Decarbonizing the U.S. and global economies requires the rapid development and deployment of a wide array of low- and zero-carbon technologies. Impressive advances in technologies such as wind and solar power have begun to bend the emissions curve, but a significant portion of the remaining emissions reductions will require technologies that are not yet commercially available.[5]

Historically, the United States and other countries have underinvested in energy innovation, while private sector investment has tended to focus on mature technologies. Additional factors, including complex supply chains and complicated regulatory environments that benefit incumbent technologies, have also created a burdensome market environment for emerging clean technologies.

Rapidly developing a broader array of decarbonizing technologies will not only help the United States reduce its emissions more cost-effectively, but will also create domestic jobs and industries, and strengthen U.S. competitiveness in the rapidly growing clean energy market. Many policies recommended elsewhere in this brief will create market "pull" for cleaner technologies, but other steps are needed to "push" promising new technologies toward market readiness. The United States must prioritize decarbonization across its innovation agenda, boost investment in a broad range of technologies across all stages of development, and build the administrative capacity needed to effectively manage these investments.

To focus and strengthen federal efforts on the climate innovation challenge:

- Congress should establish decarbonization as a principal objective of the research mission of all relevant federal agencies. This will ensure that federal agencies executing federal research, development, demonstration, and deployment (RDD&D) activities will prioritize long-term decarbonization goals through their efforts.
- The U.S. Department of Energy (DOE) should undertake updates to both the quadrennial technology review (QTR) and quadrennial energy review (QER). The QTR would help assess technological gaps and opportunities and help to better target federal resources toward highest-impact efforts. The QER, focused on articulating an integrated view of policies and actions needed to advance a low-carbon energy future, could serve as an important stakeholder engagement opportunity for the new administration.

To strengthen investment in climate innovation:

- Congress should significantly scale up support for climate-related RDD&D to at least $20 billion per year by 2030, including at least $2 billion per year for Advanced Research Projects Agency–Energy (ARPA-E). In the near-term, Congress should fully appropriate funding for programs authorized in the Energy Act of 2020. Long-term priorities should include energy storage; bioenergy; advanced manufacturing; digitalization; clean thermal; advanced nuclear; hydrogen; geothermal; and carbon capture, storage, and utilization (CCUS), direct air capture, and other carbon removal technologies.
- Congress should dedicate $50 billion to $100 billion of decarbonization innovation funding over the next decade to high-impact demonstration projects. Translating successful, early-stage applied research into commercially competitive technologies often requires support at the critical intermediary step of technology demonstration. Federal support at this

stage is especially important in the case of technologies requiring large-scale demonstration projects that carry technical, policy, and market risks—such as advanced nuclear, CCUS, and carbon removal technologies.

- Congress should provide additional flexibility to DOE's Loan Program Office to ensure full utilization of more than $43 billion in existing loan authority under the Title 17 Innovative Clean Energy Loan Guarantee Program. Congress should also expand the list of eligible technologies to include power system infrastructure and medium- and heavy-duty vehicles and, to ease barriers to private sector participation, should make all current funding available through an open solicitation, should limit and defer administrative costs, and should expand credit subsidies to better leverage private capital.

POWER

A zero-emission power sector is a critical linchpin in decarbonizing the U.S. economy, as other sectors such as transportation, buildings, and industry turn increasingly to electrification to reduce their own fossil fuel reliance. The power sector must simultaneously meet this growing demand for electricity and continue to decarbonize its supplies, while also ensuring reliability, affordability, resilience to climate change, and security.[6]

BOX 2: INFRASTRUCTURE

This box highlights recommendations from throughout this brief that could be components of a comprehensive federal infrastructure package:

- Congress should invest in grid modernization and resiliency to better connect areas with strong renewable resources to areas of high power demand.
- Congress should direct the Federal Energy Regulatory Commission and the Department of Energy to develop a long-term infrastructure strategy establishing clear priorities for staged expansion and enhancement of the grid, including the designation of high-priority, high-voltage transmission routes.
- Congress should extend the tax credit for electric vehicle charging and alternative refueling facilities, raise the current cap of $30,000, and make credits available as cash grants to spur investments.
- Congress should fund state and local governments to develop and implement comprehensive long-range plans to accelerate zero-emitting vehicle charging and refueling infrastructure.
- Congress should facilitate the expansion of carbon dioxide transportation infrastructure to carry captured carbon dioxide from industrial facilities and power plants to locations where it can be utilized or permanently stored.
- Congress should establish a National Climate Bank to: deploy commercialized clean energy technologies and energy efficiency programs in low- and moderate-income communities; bolster green infrastructure and climate resilience projects otherwise lacking sufficient private investment; provide technical assistance to support existing state green banks; and provide initial capitalization and technical assistance to help establish new state green banks.
- Congress should increase funding for programs to help expand high-speed broadband infrastructure and access for low-income and rural communities.
- Congress should create a Federal Emergency Management Agency resilience grant program that provides sustained funding and technical assistance for states, cities, communities, and tribes to develop longer-term resilience strategies and implement resilience projects.

Due to the growth of renewables and a shift from coal to natural gas, greenhouse gas emissions from the sector have steadily declined over the last 15 years, falling over 27 percent between 2005–2018.[7] Many of the country's leading electric utilities have set goals to achieve carbon neutrality by 2050 or sooner. Fuller deployment of existing technologies can bring the sector much closer to net zero, but fully achieving that goal will require a broader array of technologies, such as improved storage, advanced digital solutions, advanced nuclear, and natural gas and biomass generation with CCUS.

Decarbonization can be most effectively accelerated through a technology-neutral approach that promotes broader deployment of established zero-carbon sources in the near-term (e.g. solar, wind, hydro, and geothermal), rewards economically vulnerable technologies for their climate benefits (e.g. existing nuclear and hydro), and provides an ongoing incentive for the development of new zero-carbon options. Upgrading the nation's electrical grid is also essential to ensure that the power sector can transition to clean energy while meeting growing power demand. Other policy priorities include reforming electricity markets to favor clean electricity generation.

To set goals and overall strategy:

- The White House should form and lead an interagency initiative engaging with the power sector and other key stakeholders to develop a coordinated set of complementary policies to help utilities meet their emissions reduction commitments and to achieve net-zero power well ahead of mid-century.

To incentivize low-carbon power generation:

- In the absence of economy-wide carbon pricing, Congress should enact a market-based clean electricity standard (CES) setting a clear pathway toward carbon neutrality. The CES should set targets for the percentage of electricity sales that must be met via clean electricity sources (e.g., solar, wind, hydro, nuclear, geothermal, fossil fuels with CCUS) and/or through the use of carbon removal. In general, the more flexibility utilities have in choosing the technologies they deploy to meet the standard, the more cost-effective the program will be. Allowing utilities to trade clean energy credits would also help lower costs; this flexibility should be complemented by measures to reduce impacts on communities bearing disproportionate air pollution burdens.
- Congress should also meaningfully extend, expand, and establish transferable, longer-term tax incentives for a range of clean electricity technologies (e.g., solar, wind, storage, nuclear, geothermal, CCUS, renewable natural gas, biofuels, hydrogen and other low-carbon fuels), allow entities to opt out of tax normalization provisions, and provide direct pay options where appropriate to improve accessibility and reduce reliance on tax equity markets.
- Given the uncertain political prospects of a federal CES, the U.S. Environmental Protection Agency (EPA) should immediately convene stakeholder discussions to establish pathways for reducing power plant emissions. In the absence of a statutory CES, EPA should proceed with establishing achievable emission standards for new and modified power plants. EPA should signal its intent to periodically strengthen these standards as technology improves and to require that all new generation be zero-emitting well ahead of 2050.

To strengthen the reach, reliability, and performance of the power grid:

- Congress should invest in grid modernization and resiliency to better connect areas with strong renewable resources to areas of high power demand; provide grid operators the ability to manage rapidly changing power mixes and flexible demand; and better manage weather-related threats, natural disasters, and cyber-attacks.
- Congress should direct the Federal Energy Regulatory Commission (FERC) and DOE to develop a long-term infrastructure strategy. This infrastructure strategy should be informed by a multi-stakeholder process and establish clear priorities for staged expansion and enhancement of the grid, including the designation of high-priority, high-voltage transmission routes (co-located, where feasible, with existing rights of way).
- Congress should more clearly establish FERC and DOE authority over inter-regional siting decisions, while ensuring that federal agencies consider the potential effects of infrastructure projects on disadvantaged and marginalized communities.

To improve the competitiveness of low- and zero-carbon sources in power markets:

- FERC should find new ways to compensate low- and zero-emission resources in energy, capacity, and

ancillary markets in anticipation of changing dynamics (e.g., increasing quantities of variable renewable electricity and energy storage, greater participation from very low fuel cost generators, more available flexible demand), including by facilitating carbon pricing where feasible in wholesale power markets, taking into account any existing or anticipated federal or state carbon pricing policies.

- FERC should also work cooperatively with states setting ambitious electricity decarbonization targets to ensure that its policies do not hinder states' abilities to meet their goals.

To strengthen rural access to energy efficiency and renewable energy programs:

- Congress should increase funding to the Rural Energy Savings Program to help rural utilities and other energy service companies provide loans to consumers in rural areas to implement energy upgrades (e.g., more efficient lighting and building, expanded energy storage, on- and off-grid renewable energy systems).
- Congress should also expand funding for Rural Energy for America Program (REAP) to further provide grants and loans to farmers and rural small businesses to purchase or install renewable energy systems or make energy efficiency improvements.

TRANSPORTATION

Transportation is the largest direct source of greenhouse gas emissions in the United States, accounting for 28.3 percent of total emissions in 2018. While most of these emissions come from light-duty cars and trucks, heavy-duty freight transportation is responsible for about 23.2 percent of transport emissions, and aviation and maritime could represent significant percentages of future emissions growth.[8] Emissions have risen over the last two decades due to increased travel and the purchase of larger, more polluting vehicles.[9]

While continued improvement in vehicle efficiency can help to reduce emissions, a more promising strategy to decarbonize the transport sector is transitioning to lower-carbon fuels, notably electricity. However, electric vehicles (EVs) and other zero-emitting vehicles (ZEVs) face significant barriers to widespread deployment including a lack of charging and fueling infrastructure and higher up-front costs (even though lifetime costs are lower) than internal combustion vehicles. At the same time, the strong incumbency of internal combustion poses obstacles to replacing existing fleets with ZEVs, particularly as the typical lifetime of cars and light trucks in the United States is 13–15 years.[10]

Federal policymakers will need to execute a multi-step approach to decarbonizing the transportation sector that includes ambitious federal standards to improve emissions performance, stronger incentives for the purchase of ZEVs, and stronger investment in the charging and fueling infrastructure needed to facilitate wide-scale adoption of non-fossil fuel vehicles.

To set goals and overall strategy:

- The White House should form and lead an interagency initiative working with states, automakers, and other key transportation stakeholders to develop a coordinated set of complementary policies ensuring that by 2050 all light-duty vehicles on the road are ZEVs.

To drive continuous improvement in vehicle performance:

- EPA should work in tandem with California and other states to establish uniform greenhouse gas performance standards for light-duty vehicles that increase in stringency on a timeline sufficient to ensure that all light-duty vehicles on the road in 2050 are ZEVs. Similarly ambitious greenhouse gas standards should be established to ensure that all new sales of medium- and heavy-duty vehicles are ZEVs by 2050.

To create stronger incentives for consumers:

- Congress should expand and reform the existing EV tax credit to make it available to all new, and qualified used, ZEVs and to make it refundable at the point of sale.
- Congress should provide substantially higher incentives for medium- and heavy-duty ZEVs, offsetting their higher initial costs, and should also repeal the federal excise tax on heavy-duty ZEVs.

To expand ZEV infrastructure:

- Congress should extend the tax credit for EV

charging and alternative refueling facilities and raise the current cap of $30,000, which provides too little incentive for projects with high upfront costs such as hydrogen refueling stations. Credits should also be made available as cash grants to support investments where there is insufficient tax liability to benefit from tax credits.

- Congress should fund state and local governments to develop and implement comprehensive long-range plans to accelerate the deployment of ZEV charging and refueling infrastructure. Congress should also expand funding through existing channels such as the Better Utilizing Investments to Leverage Development program and the Diesel Emissions Reduction Act. These programs should capitalize on the potential of state and local government procurement to site and deploy ZEV infrastructure that also benefits communities broadly. Priority should be given to charging and refueling infrastructure installed at workplaces, multi-unit dwellings, and low-income communities, including grants for necessary electrical upgrades to older single- and multi-family dwellings, and to meeting the needs of medium- and heavy-duty vehicles.

INDUSTRY

The industrial sector is especially challenging to decarbonize given its tremendous diversity, its heavy reliance on large quantities of heat, and the fundamental nature of many core manufacturing processes. Although industrial emissions have generally declined in recent years with improved energy efficiency and the move from coal to natural gas, rising production driven by growing demand and declining energy prices would make the sector the largest source of U.S. emissions by 2030.[11]

Switching to clean power through electrification and improving industrial efficiency though digitalization can both help to reduce the sector's emissions. More fundamental challenges to industrial decarbonization include developing new technologies to generate large volumes of "clean heat" and reducing process-related emissions by developing cleaner processes for producing products such as cement, steel, and plastic. Stronger investment in RDD&D, as recommended above, will be critical on both fronts. Even with rapid innovation, however, significant emissions are still likely in 2050, making carbon capture and carbon removal essential strategies for achieving carbon neutrality.

Stronger federal standards can help drive decarbonization across the industrial sector, while targeted incentives can help spur low-carbon industries and job creation, particularly in areas disadvantaged by the transition from fossil fuels. Additional measures will be needed to protect the competitiveness of U.S. industries producing globally traded goods as they decarbonize (see trade recommendations below).

To provide industry an overarching incentive to decarbonize:

- EPA should undertake a benchmarking process to establish intensity-based greenhouse gas objectives for the major industrial subcategories. These objectives should be used to determine how a company or facility is treated within an economy-wide carbon pricing system or, alternatively, as a basis for mandatory, tradeable performance standards, such as clean product standards applied to both domestic and imported products.[12] The benchmarking process, informed by programs already implemented in Canada and Europe, would highlight best practices and promote industry-wide learning.

To accelerate research and development of technologies to decarbonize industry:

- Congress should elevate the Advanced Manufacturing Office (AMO) within DOE to better enable it to coordinate related RDD&D efforts across the department. Building on existing R&D consortia and other successful public-private partnerships will enable AMO to strengthen American leadership on emerging low-carbon industrial technologies. Priorities should include clean thermal heat, low-carbon manufacturing processes, and additive and circular manufacturing.

To drive investment and jobs through the decarbonization of industry:

- Congress should reauthorize the Section 48C Advanced Manufacturing Tax Credit, increase its funding to at least $2.5 billion per year through 2025, expand it to include other critical decarbonization technologies, and provide direct options for companies with limited tax liability. Reauthorizing

and revamping the tax credit—originally authorized in 2009 to support the manufacture of eligible clean technologies—could spur new industry in areas negatively impacted by the transition away from fossil fuels.[13] Projects should be prioritized based on their potential to reduce greenhouse gas emissions, create domestic jobs, and contribute to a just transition.

To promote the deployment of carbon capture:

- Following the recent extension of Section 45Q of the US tax code, which provides a performance-based tax credit for eligible CCUS projects, Congress should lower the minimum eligibility threshold for direct air capture projects and provide a direct pay option for project developers to help move projects stalled during the pandemic by constrained tax equity markets.
- Congress should facilitate the expansion of carbon dioxide transportation infrastructure, to carry captured carbon dioxide from industrial facilities and power plants to locations where it can be utilized or permanently stored.[14] These projects, which will create jobs in rural areas and in the hard-hit energy sector, should be supported by:
  - o Making carbon dioxide pipeline projects eligible for low-interest federal loans and designating them as "pollution control equipment" to allow abatement of property taxes.
  - o Authorizing and funding regional demonstration projects featuring large-volume, long-distance interstate trunk lines linking multiple industrial facilities and power plants to move captured carbon dioxide to utilization and geologic storage sites.
  - o Directing EPA to grant states primary authority ("primacy") to approve Class VI (saline) carbon dioxide storage facilities.

BUILDINGS

Commercial and residential buildings account for a significant portion of U.S. greenhouse gas emissions—27.2 percent in 2018.[15] Decarbonizing the building sector requires significantly improving energy efficiency and reducing reliance on fossil fuels, primarily through increased electrification. Given the long lifetimes of buildings, decarbonization efforts must focus both on ensuring that new construction is climate-smart and on retrofitting the nation's vast existing building stock.

In addition to reducing emissions, improved energy efficiency produces net cost savings over time. Lower residential energy bills are especially beneficial to low-income households, which typically must devote a higher portion of their income to energy expenses.[16] However, stronger incentives and standards are needed to overcome the higher upfront costs of energy-saving measures and the challenge of "split incentives"—with, for instance, owners bearing the cost of energy upgrades while tenants realize the resulting savings.[17] Measures also are needed to accelerate the shift from on-site fossil fuel combustion to appliances such as heat pumps that run on electricity or geothermal heating.

In the near term, strong federal investment in efficiency upgrades can contribute to the post-pandemic economic recovery by creating jobs for local contractors, particularly in low-income and disadvantaged communities. In the longer term, state and local governments will play the primary role in decarbonizing the building sector but will need strong support from the federal government in the form of strong incentives, standards, and technical assistance.

To spur efficiency upgrades and fuel switching:

- Congress should continue to provide tax incentives for upgrades that increase efficiency and lower emissions in commercial and residential buildings. These upgrades can include switching to high-efficiency appliances and using electric heat pumps for space and water heating. Where feasible, these incentives should be provided as direct cash rebates. To leverage more private investment, real estate investment trusts (REITs) should be allowed to monetize these tax incentives.

To target assistance to low-income, marginalized, and disadvantaged communities:

- Congress should reinstate and fund the Energy Efficiency and Conservation Block Grant (EECBG)

program enabling state, local, and tribal governments to promote building retrofits, renewable energy, and the purchase of energy-efficient and non-fossil appliances. The EECBG was authorized in 2007 and funded by the American Recovery and Investment Act (ARRA) in 2009. From 2009 to 2015, EECBG grants helped reduce energy use and emissions while producing local economic benefits and generating billions of dollars in energy savings.[18]

- Congress should ensure that the Weatherization Assistance Program (WAP) is fully funded at the levels authorized in the Energy Act of 2020, and that the newly authorized repairs under the Healthy Homes program are successfully integrated into WAP's efforts.[19] WAP provides grants to states, tribes, and territories to contract with local agencies to deliver weatherization services to low-income households. In 2019, WAP provided weatherization services to approximately 35,000 homes, which supported 8,500 jobs and produced average household savings of $283 in annual energy costs.[20]

To increase the efficiency of lighting, heating, cooling, and other end-use technologies:

- DOE should prioritize reviewing and updating existing energy efficiency standards for residential appliances and consider expanding the reach of standards for commercial and industrial appliances. These standards save the average household approximately $320 a year and have cumulatively avoided more than 3 billion tons of carbon emissions.[21] DOE is required to regularly update energy efficiency standards for over 60 residential and commercial appliances and equipment but has lagged during the last four years.[22]

To support state and local efforts:

- Congress should fund technical assistance to state and local governments to support their adoption of updated building codes requiring the use of available and affordable energy efficiency technologies and systems and other carbon reduction measures. These should include favoring building materials with low embodied carbon content and ensuring electrification, adoption of digital energy management systems, and EV readiness in commercial and residential buildings. Congress should fund DOE's State Energy Program to provide additional incentives, such as energy efficiency grants, to jurisdictions that have adopted the most up-to-date building codes.

SHORT-LIVED CLIMATE POLLUTANTS

In addition to reducing carbon dioxide emissions across the economy, stronger efforts also are needed to reduce emissions of two other potent greenhouse gases—hydrofluorocarbons (HFCs) and methane. Both are considered short-lived climate pollutants, as they do not persist in the atmosphere as long as carbon dioxide, but both also have a stronger warming effect. Methane, for instance, is over 80 times more potent than carbon dioxide over a 20-year time frame. Near-term efforts to reduce these short-lived pollutants can therefore produce more immediate climate benefits. A global phasedown of HFCs could reduce temperature rise this century by an estimated 0.5 degrees Celsius.[23]

U.S. manufacturers have taken a lead in developing climate-safe alternatives to HFCs, which are used primarily in refrigeration and air conditioning, and the United States is now well positioned to join other countries in a global phase-down. In December, Congress enacted bipartisan legislation authorizing EPA to phase down U.S. use of HFCs on a timeline consistent with the Kigali Amendment to the Montreal Protocol, which was negotiated in 2016 but has not yet been ratified by the United States.[24]

One of the largest sources of methane emissions is the production, processing, and distribution of oil and natural gas. The private sector has begun voluntary efforts to reduce methane leakage from oil and gas operations. Stronger measures are needed both to reduce methane leakage throughout the value chain and to reduce methane emissions from the flaring of natural gas during oil and gas production.

To ensure swift global action to phase down the use of HFCs:

- Congress should ratify the Kigali Amendment to the Montreal Protocol to help ensure comparable action by other countries and to create markets for

U.S.-produced HFC substitutes.

- EPA should move swiftly to exercise its new authority to implement a graduated, 85 percent phasedown of the production and consumption of regulated HFCs over a 15-year timeframe, consistent with the Kigali Amendment.

To dramatically reduce methane emissions:

- EPA should establish rigorous standards reflecting the latest science and technology to reduce methane emissions across the oil and gas value chain. These standards should cover methane emissions from natural gas flaring, venting, and unintentional leaks during production, processing, transmission, and storage. They also should provide flexibility for the adoption of fast-evolving leak detection and control technologies such as drone-mounted sensors and satellite monitoring.
- The Bureau of Land Management (BLM) should develop and enforce equally stringent regulations to prevent waste by minimizing methane leakage and flaring from oil and gas operations on public and tribal lands. Also, BLM and EPA should coordinate closely to minimize regulatory overlap and provide a means for projects to comply with comparable EPA, state, local, or tribal requirements in lieu of BLM requirements.

NATURE-BASED SOLUTIONS

Agriculture and other land uses are a significant source of U.S. greenhouse gas emissions, but the land sector as a whole is a net greenhouse gas sink, with soils and vegetation absorbing significant quantities of carbon dioxide from the atmosphere. Significantly increasing this land-based sequestration to help offset emissions from other sectors will be essential to achieving carbon neutrality economy-wide. Some studies have estimated that increased land sequestration has the potential to offset up to 45 percent of U.S. economy-wide emissions in 2050.[25]

Farmers can play a significant role in addressing climate change by adopting "regenerative" agricultural practices that sequester carbon while also improving water retention and quality and soil productivity.[26] The emergence of voluntary and regulatory carbon markets can provide both farmers and private forest owners with additional incentives to adopt carbon-sequestering practices and generate new sources of revenue. Improving the measurement of the carbon captured through such measures will be key to advancing these market-based approaches and ensuring high-quality offsets that are additional and permanent.

The federal government can most effectively advance nature-based solutions by facilitating the land sector's participation in emerging carbon markets and by strengthening direct incentives for conservation efforts across a wide range of rural and urban landscapes.

To guide U.S. sequestration efforts:

- The U.S. Department of Agriculture (USDA), in consultation with the National Oceanic and Atmospheric Administration (NOAA), should establish objectives for increasing the net carbon stock of American forests, agricultural lands, grasslands, wetlands, and coastal blue carbon ecosystems. These objectives would help guide federal investment in land-based carbon sequestration programs and account for the dynamic nature of carbon sequestration in ecosystems over the long term.

To support on-the-ground efforts:

- Congress should increase funding for the USDA Natural Resources Conservation Service (including the Environmental Quality Incentives Program, Conservation Reserve Program, and Wetlands Reserve Program) for forest, agricultural land, grassland, and wetland restoration projects. Though these programs are not climate-specific, their existing infrastructure and landowners' familiarity with them provide an opportunity for large increases in funding for carbon sequestering practices and projects. These programs should focus on reducing upfront costs for landowners and supporting smaller farmers.
- Congress should also increase funding for the U.S. Forest Service's Urban and Community Forestry

Program to help local and tribal governments, community groups, and others maintain and restore community forests, prioritizing support to underserved urban and rural communities.

- Congress should establish a new conservation corps program at USDA and the Department of the Interior for restoration and green infrastructure projects that increase carbon sequestration and improve community resilience, prioritizing projects in low-income communities.

To incentivize sustainable farming and forestry practices:

- Congress should fund USDA to develop improved soil carbon measurement methods and technologies, and to collect soil carbon data as part of USDA's National Resources Inventory. Enhanced soil carbon data could improve understanding of the factors affecting soil carbon stocks in different regions, farming systems, and soil types.
- Congress should fund USDA to help farmers and forest owners participate in voluntary and any future regulatory carbon markets by developing standards for carbon offsets, including methodologies to ensure the additionality and permanence of offsets; systems for verifying, monitoring, and reporting; and certification of third-party verifiers. Voluntary carbon markets will play an increasingly important role in decarbonization especially as more companies set ambitious net-zero targets and the demand for climate finance for nature-based solutions increases.

DIGITAL INFRASTRUCTURE

One critical priority—both in facilitating decarbonization across the economy and in strengthening the economic prospects of rural and low-income communities—is the expansion of broadband infrastructure.

Access to reliable, high-speed internet service has proven invaluable during the COVID-19 pandemic, allowing people to work, learn, and receive medical attention while sheltering in place. Broadband expansion, including the extension of 5G wireless networks, can help facilitate the deployment of digital technologies to reduce energy use and emissions across the economy.[27]

However, the pandemic has brought into even clearer focus a significant digital divide. As of 2019, 37 percent of rural Americans, 44 percent of low-income households, and about 40 percent of racial minorities do not have high-speed broadband at home.[28] Limited access to broadband is a major impediment to jobs creation and economic development particularly in remote rural areas.[29] The expansion of broadband infrastructure, such as 5G wireless networks, must serve to narrow, rather than reinforce or exacerbate, the digital divide.

To expand broadband infrastructure nationwide:

- Congress should provide a short-term tax credit and/or accelerated depreciation for new investments in fixed-line and wireless broadband infrastructure, incentivize deployment of 5G to help with "last mile" challenges of connecting customers to the network, and structure these benefits to promote capacity-sharing partnerships between utilities and service providers to encourage community broadband access and grid modernization.

To improve broadband access and affordability in rural and low-income communities:

- Congress should increase funding for programs like USDA's Rural Development Broadband ReConnect Program to help expand high-speed broadband in underserved and unserved areas.
- Congress should also increase funding and improve upon programs to expand broadband access for low-income households. For instance, the Federal Communications Commission Lifeline program could allow households to have two connections (e.g., one mobile and one fixed broadband) and could designate cable operators—key providers of home broadband—as "Eligible Telecommunications Carriers." Granting this certification would allow cable operators to offer discounts on services that would be paid through the federal universal service fund.[30]

CLIMATE JUSTICE

The harmful impacts of climate change—and of our strategies to address climate change—fall disproportionately across society. U.S. climate policy must ensure a just, equitable transition to a zero-carbon economy. This includes both addressing "environmental justice," by easing chronic and new burdens on low-income and historically marginalized communities, and ensuring a "just transition," by helping to build a sound economic future for communities and workers disadvantaged by the transition away from high-carbon fuels.

Pollution and poor health outcomes disproportionately impact low-income communities and communities of color, often as a result of systemic inequities and chronic underinvestment.[31] Many of these communities now face the added burden of climate impacts such as extreme heat and increased flooding. Some communities, meanwhile, face uncertain economic futures as they see jobs and tax bases disappear with the transition away from fossil fuels.

The federal government should address climate justice both holistically, by making it a priority across all aspects of climate decision-making, and through programs directing resources to the communities most in need.

To address disproportionate impacts on low-income, disadvantaged, and marginalized communities:

- Congress should increase funding for federal grant programs focused on environmental justice including the EPA Environmental Justice Small Grants Program, Environmental Justice Collaborative Problem-Solving Cooperative Agreement Program, and the Community Action for a Renewed Environment Grant Program. Congress should also authorize and fund a new grant program to assist communities disproportionately affected by pollution or climate change through projects such as technical assistance to communities to identify and monitor environmental health problems and through investments in climate resilience, building retrofits, nature-based solutions, and microgrids.
- EPA should update and expand its Environmental Justice Screening and Mapping Tool (EJSCREEN) to help direct assistance to disadvantaged and marginalized communities threatened by the cumulative impacts of climate change, economic and racial inequity, and multisource pollution.
- Federal agencies overseeing the siting of energy, transportation and other infrastructure should thoroughly analyze, and do all within their authorities to minimize, potential harmful impacts on low-income, disadvantaged, and marginalized communities, especially those bearing disproportionate pollution burdens.
- The White House should establish an Environmental and Climate Justice Division within the U.S. Department of Justice to work with EPA's Office of Civil Rights to strengthen and coordinate enforcement of health, environmental, and civil rights laws with an emphasis on protecting marginalized communities.

To support workers and communities affected by the energy transition:

- Congress should establish and fund a multi-agency program, building on the Obama Administration's POWER+ Plan, to leverage and target federal economic, workforce development, health, and community resources to assist fossil fuel-dependent communities in the energy transition, starting with coal communities.
- Congress should reauthorize the coal mine reclamation fee and authorize the Abandoned Mine Reclamation Fund to accelerate the distribution of funds to support economic revitalization and diversification and the redevelopment of reclamation sites. The current authorization for the coal reclamation fee expires in September 2021, but there are about 5,200 abandoned coal mines across the country, and an estimated $11 billion in unfunded reclamation costs.[32]
- Congress should increase funding for BLM to inventory abandoned oil and gas wells on public lands and should establish a reclamation fund to plug and reclaim them. EPA estimates there are about 3.2 million abandoned wells across the United States.[33] Increased investment in reclamation efforts would create jobs in communities long dependent on high-carbon industries.

FINANCE

Investors, companies, and financial regulators have begun to recognize and respond to the risks that climate change poses to financial assets and to the stability of the U.S. financial system. Pressed by investors, many companies have taken up the recommendations of the Task Force on Climate-Related Financial Disclosures to provide fuller disclosure of both physical risks (from climate change itself) and transition risks (from societal responses to climate change). Stronger regulatory guidance would improve the value and consistency of these disclosures, enabling markets to more appropriately value high- versus low-carbon investments.

Beyond specific investment risks, regulators are growing increasingly concerned about climate-related risks to the financial system as a whole, for instance, through impacts on real estate values, insurance losses, default rates, and supply chains. In September 2020, a subcommittee of the U.S. Commodity Futures Trading Commission described climate change as "a major risk to the stability of the U.S. financial system and to its ability to sustain the American economy," and outlined a series of measures to address those risks.[34] In November 2020, the Federal Reserve Bank for the first time highlighted climate change as a risk to the financial system, saying it adds a "layer of economic uncertainty and risk that we have only begun to incorporate into our analysis of financial stability."[35]

In addition to stronger efforts by regulators to understand, highlight, and guard against climate-related financial risks, Congress has a role to play in deploying public resources to leverage stronger private investment in efforts nationwide to reduce emissions and to strengthen climate resilience.

To ensure full consideration of climate-related financial risks in investment decisions:

- The U.S. Securities and Exchange Commission (SEC) should strengthen guidance to companies on how to assess climate-related financial risks so they can more reliably disclose any such material risks, and their strategies for managing them, in the mandatory disclosures required of publicly traded companies. Guidance for assessing and reporting material climate-related financial risks should be informed by a multi-stakeholder working group of publicly traded companies, investors, issuers, rating agencies, standard-setting organizations, and nongovernmental organizations. The guidance should encompass both physical and transition risks, address the use of climate scenarios, build on existing systems and frameworks, provide for different metrics relevant to different sectors, and avoid undue burden on companies.

To safeguard the stability of the U.S. financial system:

- The Financial Stability Oversight Council (FSOC), charged with identifying and responding to risks to the stability of the U.S. financial system, should examine how to incorporate climate-related financial risks as part of its regular monitoring and oversight functions and, along with state regulators, build capacity across FSOC's member agencies on best practices for incorporating, monitoring, and managing climate-related risks.
- The Federal Reserve should move immediately to strengthen its understanding of climate-related financial risk and should develop transition and physical climate risk indicators for the financial system; incorporate these indicators into financial stability analyses and monitoring; and determine how to integrate them into its supervision of financial institutions, including through the establishment of climate-risk stress testing, informed by scenario analysis, under appropriate time horizons. Where feasible and advisable, the Federal Reserve should harmonize its efforts with those of the Network of Central Banks and Supervisors for Greening the Financial System, which the Federal Reserve recently joined.

To mobilize investment in mitigation and resilience projects:

- Congress should establish a National Climate Bank to: deploy commercialized clean energy technologies and energy efficiency programs in low- and moderate-income communities; bolster green infrastructure and climate resilience projects otherwise lacking sufficient private and local government investment; provide technical assistance to support existing state green banks; and provide initial capitalization and technical assistance to help establish new state green banks. Several states around the country—including Connecticut, Hawaii, Michigan, Nevada, New York, and Rhode Island—operate green banks. In all of its efforts, a National Climate Bank should transparently engage the private financial sector to better focus its efforts on financing gaps and enabling private investment.

TRADE

International trade has a tremendous impact on global emissions. In 2015, 27 percent of global carbon dioxide emissions were linked to the buying and selling of goods between nations.[36] Yet, climate has not traditionally been addressed through trade agreements and measures. More closely aligning trade and climate policy can help to accelerate emissions reductions globally and can protect and enhance the competitiveness of U.S. workers and industries.

A principal concern is the treatment of energy-intensive, globally-traded goods such as cement and chemicals. As the United States takes steps to reduce emissions, U.S. producers of such goods may be at a disadvantage against competitors in countries with weaker climate policies. An accompanying risk is "leakage" of emissions from the United States to those countries. Better quantification of the carbon content of globally traded goods can help manage those risks, for instance through the establishment of carbon border adjustments like those under development in the European Union.

More broadly, elevating climate change as a consideration in multilateral and bilateral trade agreements can help liberalize trade in climate-benefiting goods and services and use access to U.S. markets as a means of inducing stronger climate action by other countries. Finally, different forms of trade assistance can help boost U.S. exports of low-carbon technologies and help developing countries achieve their climate goals.

To better reflect climate priorities in international trade agreements:

- The United States Trade Representative and Congress should work to integrate climate considerations into future multilateral and bilateral trade agreements, and amendments to existing agreements, and should work with other countries to develop new agreements geared specifically toward advancing climate objectives. Priorities should include: finalizing a global environmental goods agreement to reduce tariff and non-tariff barriers to climate-smart goods and services; reducing fossil fuel subsidies, with appropriate consideration of the economic needs and decarbonization goals of developing countries; and promoting comparable carbon standards in trade-exposed sectors to minimize carbon leakage.

To strengthen U.S. exports of low-carbon technologies:

- The U.S. Export-Import Bank (EXIM) and the U.S. International Development Finance Corporation (DFC) should scale up U.S. exports of clean energy technologies around the world. EXIM should provide additional low-carbon financing to support increased deployment of renewables and DFC should promote climate-smart investments in the developing world. Priority should be given to countries that have made strong climate commitments and require support to meet them.

To prepare for potential carbon border adjustments:

- The White House should establish an interagency effort to develop and apply metrics to measure the carbon intensity of heavily traded carbon-intensive products produced domestically and imported. The data can be used in developing industry emissions/product benchmarks and in federal procurement of low-carbon products. The data can also be used to inform measures, such as carbon border adjustments, to avoid carbon leakage and protect U.S. competitiveness.

FEDERAL PROCUREMENT

As the nation's largest landlord, employer, fleet operator, and purchaser of goods and services, the federal government has both the opportunity and responsibility to leverage its procurement power to drive the decarbonization of the U.S. economy.[37] In FY2019 alone, the government spent over $586 billion on contracts for goods and services, purchasing power that can be used to stimulate markets for a wide range of low- and zero-carbon innovations.[38] In addition to reducing the government's carbon footprint, many of these technologies and products can also save taxpayer money by lowering the government's energy costs.

The Administration can lead by example by using its executive powers to drive decarbonization across the

government through improved energy efficiency and the purchase of clean power, ZEVs, and other low-carbon goods and services.

To leverage the federal government's buying power:

- The White House should direct agencies to use their procurement processes to drive down emissions from facilities, vehicles, and other goods and services within their supply chains.
- Agencies should collaborate through a coordinated federal smart building strategy to improve energy efficiency, lower energy costs, and reduce greenhouse gas emissions by utilizing performance-based contracts and by purchasing low- and zero-carbon power through market instruments (e.g., retail renewable energy certificates, power purchase agreements). Energy savings performance contracts (ESPCs), which allow agencies to partner with energy service companies to implement energy savings and facility improvements with no upfront cost to taxpayers, have been used to finance more than $7.17 billion in efficiency improvements at federal facilities over the past 10 years.[39]
- Agencies should purchase ZEVs for all light-, medium-, and heavy-duty vehicles in their fleets, where available, and in vehicle classes where ZEVs are not yet commercially available, they should purchase low-emission, alternative-fuel vehicles. To support this increased deployment of ZEVs, the federal government should install EV charging stations at all federal workplaces. It should also require that the fleets of transportation/shipping vendors include a minimum percentage of ZEV and low-emission alternative-fuel vehicles.
- Agencies should prioritize the purchase of other lower-GHG emitting, environmentally sustainable products and services where available, including products manufactured with lower embodied greenhouse gas emissions (e.g., cement, steel).[40] They should deploy digital measurement, reporting, and verification (MRV) technologies to track supply chain emissions, and incorporate standardized lifecycle emissions accounting, data transparency, and third-party verification.
- The White House should also explore how federal agencies can support greater market uptake of carbon removal technologies and approaches via procurement under any initiatives requiring greenhouse gas reductions across the government.

RESILIENCE

Climate change is increasing the frequency and intensity of natural disasters such as forest fires, floods, droughts, and extreme temperatures, inflicting rising costs on communities and businesses across the country. One important indicator is that 2020 was the sixth consecutive year in which the United States experienced 10 or more events each causing over $1 billion in losses.[41] U.S. gross domestic product is projected to decline 1.2 percent for every degree Celsius that global temperatures rises.[42]

Historically, U.S. policy has in many cases been more reactive than proactive in addressing climate-related risks. As climate change alters the landscape of risk, a lack of accurate, up-to-date, and accessible information on existing and projected climate risks prevents local authorities, businesses, and other decision-makers from adequately managing these risks.[43] Often, the rising costs of climate impacts are disproportionately borne by low-income and marginalized communities, which, in addition to facing heightened risks from climate change, also encounter greater barriers in accessing post-disaster assistance.[44]

By bolstering and better coordinating federal resources, policymakers can help strengthen state, local, and private sector resilience efforts, both pre- and post-disaster, and can help protect U.S. taxpayers from the rising costs of disaster relief. Many resilience strategies, such as wildfire risk management, can also create rural jobs and contribute to post-pandemic economic recovery.

To coordinate federal climate resilience efforts:

- The White House should establish a resilience council to guide, coordinate, and track implementation of federal resilience actions across agencies. While federal resources provide valuable information and tools, no agency or comprehensive governmental effort has been established to develop a coordinated federal climate resilience strategy.[45]

To support state, local, and private sector resilience efforts:

- Congress should establish a Climate Risk Information Service to provide centralized, authoritative, and accessible climate risk information and to set federal data standards on projection scenarios and timelines. Congress should also fund university-led initiatives to help local governments and businesses assess climate risks and potential impacts on local economies, infrastructure, and public health. Incorporating updated climate science data will be key to assessing the likelihood of climate impacts so that decision-makers can better account for risks in planning processes.[46]
- Congress should create a Federal Emergency Management Agency (FEMA) resilience grant program that provides sustained funding and technical assistance for states, cities, communities, and tribes to develop longer-term resilience strategies and implement resilience projects. Applicants should be required to develop hazard mitigation plans that identify and prioritize projects for implementation. Grants should be prioritized for low-income and high-risk communities.
- Congress should permanently authorize the Department of Housing and Urban Development's Community Development Block Grant – Disaster Recovery (CDBG-DR) program and provide a sustained level of funding to ensure speedier assistance after disasters occur.[47] It should, in addition, prioritize funding for proactive resilience planning and projects, especially in low-income communities, to build resilience to future disasters, reducing recovery costs and saving lives.

To better protect public and private property against rising flood risks:

- Congress should codify the Federal Flood Risk Management Standard to reduce flood risk by requiring the use of protective design standards and forward-looking climate science when building or rebuilding federally-funded buildings and infrastructure, including projects funded through CDBG-DR or other programs.
- Congress should increase funding for the National Flood Insurance Program to update its flood insurance rate maps using forward-looking climate risk data, and to create new maps for currently unmapped areas, which account for more than half of U.S waterways and shorelines.[48] Updated maps would better assist planners and builders in determining which areas are suitable for development and increase home- and businessowners' awareness of their risks.

To reduce wildfire risk:

- Congress should boost funding for the U.S. Forest Service and BLM to increase forest resilience to wildfires on public lands and provide technical and financial support for private forest owners in areas at risk. The rising number and severity of wildfires threatens communities across the country, with nearly 53,000 fires damaging over 9.5 million acres in 2020.[49] Strategies such as thinning overcrowded forests and utilizing prescribed fires can limit the accumulation of vegetation responsible for fueling extreme wildfires.[50]

CONCLUSIONS

With the devastating human and economic toll of the climate crisis becoming ever clearer, and with the window for decisive action to avert far worse quickly narrowing, the start of a new Administration and a new Congress provides the United States a vital opportunity to significantly scale up its climate response. This brief has outlined a comprehensive set of policies to drive innovation, reduce emissions, strengthen resilience, remedy inequities, and bolster the post-pandemic economic recovery. C2ES strongly urges our elected federal leaders to work across the aisle and seize the opportunities now before them to achieve ambitious, just, durable, bipartisan climate solutions.

ENDNOTES

1 "Top companies call for ambitious U.S. climate policy," Center for Climate and Energy Solutions, accessed January 22, 2021, https://www.c2es.org/content/top-companies-call-for-ambitious-us-climate-policy.

2 See "Paris Climate Agreement," The White House, last modified January 20, 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/20/paris-climate-agreement; "Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis," The White House, last modified January 20, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-public-health-and-environment-and-restoring-science-to-tackle-climate-crisis; "Modernizing Regulatory Review," The White House, last modified January 20, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/modernizing-regulatory-review.

3 Business Roundtable, *Addressing Climate Change Principles and Policies* (Arlington, VA: Business Roundtable, 2020), https://s3.amazonaws.com/brt.org/Business-RoundtableAddressingClimateChangeReport.September2020.pdf.

4 Commodity Futures Trading Commission's Climate-Related Market Risk Subcommittee of the Market Risk Advisory Committee, *Managing Climate Risk in the U.S. Financial System* (Washington, DC: Commodity Futures Trading Commission, 2020), https://www.cftc.gov/sites/default/files/2020-09/9-9-20%20Report%20of%20the%20Subcommittee%20on%20Climate-Related%20Market%20Risk%20-%20Managing%20Climate%20Risk%20in%20the%20U.S.%20Financial%20System%20for%20posting.pdf.

5 International Energy Agency, *Energy Technology Perspectives 2020 - Special Report on Clean Energy Innovation* (Paris, France: International Energy Agency, 2020), https://www.iea.org/reports/clean-energy-innovation.

6 See Ashley Lawson, *Decarbonizing U.S. Power* (Arlington, VA: Center for Climate and Energy Solutions, 2018), https://www.c2es.org/document/decarbonizing-u-s-power; and Stephen Naimoli and Sarah Ladislaw, *Climate Solutions Series: Decarbonizing the Electric Power Sector* (Washington, DC: Center for Strategic and International Studies, 2020), https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/200512__Naimoli_Ladislaw_Climate_v3_WEB%20FINAL.pdf?9v3JsO0B4FnGnyO0QKeY41f0mwnJb9ra.

7 See Table 2-11 from U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018* (Washington, DC: U.S. Environmental Protection Agency, 2020), https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf.

8 See U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018*; Ashley Lawson and Fatima Maria Ahmad, *Decarbonizing U.S. Transportation* (Arlington, VA: Center for Climate and Energy Solutions, 2018), https://www.c2es.org/document/decarbonizing-u-s-transportation; and European Parliament, *Greenhouse gas emissions from shipping: waiting for concrete progress at IMO level* (Luxembourg City, Luxembourg: Policy Department for Economic, Scientific, and Quality of Life Policies, 2020), https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/652754/IPOL_BRI(2020)652754_EN.pdf.

9 Stephen Naimoli and Nikos Tsafos, *Climate Solutions Series: Decarbonizing Global Transport* (Washington, DC: Center for Strategic and International Studies, 2020), https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/20720_Naimoli_Tsafos_Decarbonizing%20Global%20Transport_V6_UPDATED%20FINAL.pdf.

10 David Keith, Samantha Houston, and Sergey Naumov, "Vehicle fleet turnover and the future of fuel economy," *Environmental Research Letters,* Vol. 14, No. 2, https://iopscience.iop.org/article/10.1088/1748-9326/aaf4d2.

11 Doug Vine and Jason Ye, *Decarbonizing U.S. Industry* (Arlington, VA: Center for Climate and Energy Solutions, 2018), https://www.c2es.org/document/decarbonizing-u-s-industry.

12 Ben King et al., *Clean Products Standard: A New Approach to Industrial Decarbonization* (New York, NY: Rhodium Group, 2020), https://rhg.com/research/clean-products-standard-industrial-decarbonization.

13 U.S. Department of Energy, *Fact Sheet: 48C Manufacturing Tax Credits* (Washington, DC: U.S. Department of

Energy), https://www.energy.gov/sites/prod/files/FACT%20SHEET%20--%2048C%20MANUFACTURING%20TAX%20CREDITS.pdf.

14 National Academy of Sciences, *Negative emissions technologies and reliable sequestration: a research agenda* (Washington, DC: The National Academies Press, 2019), doi.org/10.17226/25259.

15 See Table ES-3 from U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018*.

16 Joint Center for Housing Studies of Harvard University, *Rental Affordability* (Cambridge, MA: Joint Center for Housing Studies of Harvard University, 2017), https://www.jchs.harvard.edu/sites/default/files/05_harvard_jchs_americas_rental_housing_2017.pdf.

17 Jessica Leung, *Decarbonizing U.S. Buildings* (Arlington, VA: Center for Climate and Energy Solutions, 2018), https://www.c2es.org/document/decarbonizing-u-s-buildings.

18 Oak Ridge National Laboratory, *National Evaluation of the Energy Efficiency and Conservation Block Grant Program: Executive Summary* (Oak Ridge, TN: Oak Ridge National Laboratory, 2015), https://www.energy.gov/sites/prod/files/2015/10/f27/EECBG_Report_Executive%20Summary_Final.pdf.

19 Consolidated Appropriations Act of 2021, H.R. 133, 116th Congress, Division Z Sec. 1011 (2020).

20 U.S. Department of Energy, "Weatherization works!" (Washington, DC: U.S. Department of Energy, 2019), https://www.energy.gov/sites/prod/files/2019/07/f64/WAP-Fact-Sheet-2019.pdf.

21 See "Energy efficiency and you," U.S. Department of Energy, accessed January 22, 2021, https://www.regulations.doe.gov/eecompass/energy-efficiency; and U.S. Department of Energy, *Saving Energy and Money with Appliance and Equipment Standards in the United States* (Washington, DC: U.S. Department of Energy, 2016), https://www.energy.gov/sites/prod/files/2016/10/f33/Appliance%20and%20Equipment%20Standards%20Fact%20Sheet-101416.pdf.

22 See "Find Products," ENERGY STAR, accessed January 22, 2021, https://www.energystar.gov/products/energy-star-most-efficient; and Andrew deLaski, "DOE publishes four new efficiency standards, bowing to court order" ACEEE blog, January 10, 2021, https://www.aceee.org/blog-post/2020/01/doe-publishes-four-new-efficiency-standards-bowing-court-order.

23 Steve Seidel et al., *Not-in-Kind Alternatives to High Global Warming HFCs* (Arlington, VA: Center for Climate and Energy Solutions, 2016), https://www.c2es.org/site/assets/uploads/2016/10/not-in-kind-alternatives-high-global-warming-hfcs.pdf.

24 Consolidated Appropriations Act of 2021, H.R. 133, 116th Congress, Division S Sec. 103 (2020).

25 White House Council on Environmental Quality, *United States Mid-Century Strategy for Deep Decarbonization* (Washington, DC: White House, 2016), https://unfccc.int/files/focus/long-term_strategies/application/pdf/mid_century_strategy_report-final_red.pdf.

26 Elliot Diringer et al., *Getting to Zero: A U.S. Climate Agenda* (Arlington, VA: Center for Climate and Energy Solutions, 2019), https://www.c2es.org/site/assets/uploads/2019/11/getting-to-zero-a-us-climate-agenda-11-13-19.pdf.

27 Doug Brake, *A U.S. National Strategy for 5G and Future Wireless Innovation* (Washington, DC: Information Technology & Innovation Foundation, 2020), https://itif.org/sites/default/files/2020-national-strategy-5G-wireless.pdf.

28 "Internet/Broadband Fact Sheet," Pew Research Center, last modified June 12, 2019, https://www.pewresearch.org/internet/fact-sheet/internet-broadband/#home-broadband-use-over-time.

29 Adie Tomer et al., *Digital prosperity: How broadband can deliver health and equity to all communities*, Metropolitan Policy Program (Washington, DC: The Brookings Institution, 2020), https://www.brookings.edu/wp-content/uploads/2020/02/20200227_BrookingsMetro_Digital-Prosperity-Report-final.pdf.

30 Tom Wheeler, "Broadband in red and blue states: Three solutions to low-income internet access," *TechTank*, September 9, 2020, https://www.brookings.edu/blog/techtank/2020/09/09/broadband-in-red-and-blue-states-three-solutions-to-low-income-internet-access.

31 American Public Health Association, *An Introduction to Climate Change, Health, and Equity: A Guide for Local Health Departments* (Washington, DC: American Public Health Association), https://www.apha.org/-/media/files/pdf/topics/climate/apha_climate_equity_introduction.ashx?la=en&hash=B40A6A0109D9C5474B7C7362176BEA9E9DFC16CC.

32 "About Abandoned Mines," Bureau of Land Management, accessed January 22, 2021, https://www.abandonedmines.gov/about_coal_mines. See also "e-AMLIS Advanced Query," Office of Surface Mining Reclamation and Enforcement, accessed January 22, 2021, https://amlis.osmre.gov/QueryAdvanced.aspx.

33 U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018*.

34 Commodity Futures Trading Commission's Climate-Related Market Risk Subcommittee of the Market Risk Advisory Committee, *Managing Climate Risk in the U.S. Financial System*.

35 Board of Governors of the Federal Reserve System, *Financial Stability Report – November 2020* (Washington: Board of Governors, 2020), https://www.federalreserve.gov/publications/2020-november-financial-stability-report-purpose.htm.

36 Norihiko Yamano and Joaquim Guilhoto, *CO2 emissions embodied in international trade and domestic final demand: Methodology and results using the OECD Inter-Country Input-Output Database*, (Paris, France: Organisation for Economic Cooperation and Development, 2020), doi.org/10.1787/8f2963b8-en.

37 Stephen Seidel and Jason Ye, *Leading by Example 2.0: How Information and Communication Technologies Help Achieve Federal Sustainability Goals* (Arlington, VA: Center for Climate and Energy Solutions, 2013), https://www.c2es.org/document/leading-by-example-2-0-how-information-and-communication-technologies-help-achieve-federal-sustainability-goals.

38 U.S. Government Accountability Office, "A Snapshot of Government-wide Contracting for FY 2019 (infographic)," Watchblog, May 26, 2020, https://blog.gao.gov/2020/05/26/a-snapshot-of-government-wide-contracting-for-fy-2019-infographic.

39 Federal Energy Management Program, *Federal Government FY 2019 Efficiency Performance* (Washington, DC: U.S. Department of Energy, 2020), https://www.energy.gov/sites/prod/files/2020/07/f76/FY2019-performance-findings.pdf.

40 EPA's Recommendations of Specifications, Standards, and Ecolabels are tools to help federal agencies meet their sustainability goals and comply with procurement regulations. These Recommendations may list options for lower carbon products. See U.S. Environmental Protection Agency, "Recommendations of Specifications, Standards, and Ecolabels for Federal Purchasing," last modified August 28, 2020, https://www.epa.gov/greenerproducts/recommendations-specifications-standards-and-ecolabels-federal-purchasing.

41 "U.S. Billion-Dollar Weather and Climate Disasters," NOAA National Centers for Environmental Information (NCEI), accessed January 22, 2021, https://www.ncdc.noaa.gov/billions.

42 See Solomon Hsiang et al., "Estimating economic damage from climate change in the United States," *Science* 356 no. 6345 (June 2017): 1362–1369, doi.org/10.1126/science.aal4369

43 See J. Alfredo Gómez, *Climate Information: A National System Could Help Federal, State, Local, and Private Sector Decision Makers Use Climate Information*, GAO-16-37 (Washington, DC: U.S. Government Accountability Office, 2015), https://www.gao.gov/assets/680/673823.pdf; and J. Alfredo Gómez, *Climate Change: Opportunities to Reduce Federal Fiscal Exposure*, GAO-19-625T (Washington, DC: U.S. Government Accountability Office, 2019), https://www.gao.gov/assets/700/699605.pdf.

44 See Substance Abuse and Mental Health Services Administration, *Disaster Technical Assistance Center Supplemental Research Bulletin: Greater Impact: How Disasters Affect People of Low Socioeconomic Status*, (Rockville, MD: Substance Abuse and Mental Health Services Administration, 2017), https://www.samhsa.gov/sites/default/files/dtac/srb-low-ses_2.pdf; and

Robert Lempert et al., "Reducing Risks Through Adaptation Actions" in *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, eds. Dave Reidmiller et al., (Washington, DC: U.S. Global Change Research Program, 2018), 1309–1345, doi.org/10.7930/NCA4.2018.CH28.

45 Mark Gaffigan, *Climate Resilience: A Strategic Investment Approach for High-Priority Projects Could Help Target Federal Resources*, GAO-20-317T (Washington, DC: U.S. Government Accountability Officer, 2019), https://www.gao.gov/assets/710/702236.pdf.

46 J. Alfredo Gómez, *Climate Information: A National System Could Help Federal, State, Local, and Private Sector Decision Makers Use Climate Information*.

47 "Community Development Block Grant Disaster Recovery Program," U.S. Department of Housing and Urban Development, last modified January 6, 2021, https://www.hud.gov/program_offices/comm_planning/cdbg-dr.

48 Association of State Floodplain Managers, *Flood Mapping for the Nation: A Cost Analysis for Completing and Maintaining the Nation's NFIP Flood Map Inventory* (Madison, WI: Association of State Floodplain Managers, 2020), https://asfpm-library.s3-us-west-2.amazonaws.com/FSC/MapNation/ASFPM_MaptheNation_Report_2020.pdf.

49 Katie Hoover and Laura Hanson, *Wildfire Statistics*, IF10244 (Washington, DC: Congressional Research Service, 2021), https://crsreports.congress.gov/product/pdf/IF/IF10244.

50 "Resilient Landscapes," U.S. Forest Service, last modified February 20, 2020, https://www.fs.usda.gov/managing-land/fire/resilient-landscapes.

Other Climate Innovation 2050 Resources:

Getting to Zero: A U.S. Climate Agenda
https://www.c2es.org/document/getting-to-zero-a-u-s-climate-agenda/

Pathways to 2050: Scenarios for Decarbonizing the U.S. Economy
https://www.c2es.org/document/pathways-to-2050-scenarios-for-decarbonizing-the-u-s-economy/

Restoring the Economy with Climate Solutions: Recommendations to Congress
https://www.c2es.org/document/restoring-the-economy-with-climate-solutions-recommendations-to-congress/

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