



## COMMENTS OF THE CENTER FOR CLIMATE AND ENERGY SOLUTIONS

This document constitutes the comments of the Center for Climate and Energy Solutions (C2ES) on the request for information to help guide the House Select Committee on Climate Crisis to “investigate, study, make findings, and develop recommendations on policies, strategies, and innovations to achieve substantial and permanent reductions in pollution and other activities that contribute to the climate crisis, which will honor our responsibility to be good stewards of the planet for future generations.”

C2ES is an independent, nonprofit, nonpartisan organization dedicated to advancing strong policy and action to reduce greenhouse gas emissions, promote clean energy, and strengthen resilience to climate impacts. Through our Climate Innovation 2050 initiative, we have brought together more than three dozen leading companies from key sectors to examine potential pathways towards decarbonizing the U.S. economy. To date, our project has released:

- Six sectoral background briefs examining key challenges and opportunities in the decarbonization of U.S. [agricultural and land use](#), [buildings](#), [electric power](#), [industry](#), [oil and gas](#), and [transportation](#).
- A set of [near-term federal policy actions](#) that could garner bipartisan support and strengthen the foundation for comprehensive long-term solutions.
- A report, [Pathways to 2050: Scenarios for Decarbonizing the U.S. Economy](#), that presents and draws insights from three alternative scenarios for decarbonizing the U.S. economy.
- A report, [Getting to Zero: A U.S. Climate Agenda](#), that outlines the policies needed over the coming decade to put the United States on the path to carbon neutrality by 2050.

*Getting to Zero* recommends a long-term national policy framework as well as other key sector-specific and cross-sectoral policies at the federal, state and local levels. It includes references to an extensive set of analyses underlying these recommendations. Climate Innovation 2050 has addressed many of the questions under this request and our comments reflect information drawn from our sectoral background briefs, near-term policy recommendations and *Pathways to 2050* report, as well as our *Getting to Zero* decarbonization strategy.

The views expressed here are those of C2ES alone and do not necessarily reflect the views of members of the C2ES Business Environmental Leadership Council (BELC) or other companies participating in the Climate Innovation 2050 initiative.

## Sector-Specific Policies

**1. What policies should Congress adopt to decarbonize the following sectors consistent with meeting or exceeding net-zero emissions by mid-century? Where possible, please provide analytical support that demonstrates that the recommended policies achieve the goal.**

### **a. Transportation**

While an economy-wide carbon pricing program will encourage lower-carbon transportation, its impact on the sector will be limited, as fuel represents only a small portion of the cost of owning and operating a vehicle. Strong complementary policies are thus especially critical in the transportation sector. Key strategies for decarbonizing the sector include accelerating the deployment of zero-emission vehicles (ZEVs), building out the charging and fueling infrastructure these vehicles require, supporting a wider range of personal mobility options, and decarbonizing other modes of transportation, including aviation, rail, and shipping. Additional steps Congress can take to decarbonize the transportation sector can be found in *Getting to Zero*. Key recommendations include:

- Congress should direct the Environmental Protection Agency to establish a greenhouse gas performance standard ensuring that half of new light-duty vehicle sales are zero-emission vehicles by 2035, and a similarly ambitious standard for medium- and heavy-duty trucks.
- Congress should extend the current electric vehicle tax credit, make it available as a point-of-sale rebate, and expand it to include all new zero-emission vehicles, including fuel cell electric vehicles and medium- and heavy-duty trucks.
- States should develop comprehensive long-range plans to accelerate the deployment of zero-emission-vehicle charging and refueling infrastructure. Congress should fund the development of these state plans and should provide funding to states that have plans to construct charging and refueling infrastructure.
- Congress should establish a performance standard that freezes aviation emissions at 2020 levels, allowing for the use of biofuels and offsets, modeled on the Carbon Offsetting and Reduction Scheme for International Aviation.

**b. Electric power. The Select Committee would like policy ideas across the electricity sector but requests specific comment on two areas:**

*i. If you recommend a Clean Energy Standard, how should it be designed?*

A clean energy standard should include program flexibility by defining clean electricity more broadly than just renewables, and allowing market-based credit trading to facilitate lower-cost compliance. (Our [Clean Energy Standards: State and Federal Policy Options and Considerations](#) provides an in-depth overview of the design choices that can make up a clean energy standard.) Moreover, a clean energy standard should allow utilities to trade between different types of qualified clean energy, effectively establishing a market-based carbon price. Other types of performance standards could be established for all of the major sectors of the economy; allowing trading across sectors would yield an economy-wide carbon price. Offering covered entities the option of an alternative compliance payment or applying a transfer tax on source-to-source transactions could also raise revenue, though not at the level of cap-and-trade or carbon tax policies.

*ii. How can Congress expedite the permitting and siting of high-voltage interstate transmission lines to carry renewable energy to load centers.*

Creating a 21st-century grid to facilitate the decarbonization of the economy requires strong leadership from the federal government. In 2005, Congress granted the Federal Energy Regulatory Commission (FERC) new authorities under the Federal Power Act to expand, modernize, and improve the reliability of the nation's transmission grid. This included the designation of national interest energy transmission corridors, where the commission could override state authorities when necessary on siting decisions. Court challenges, however, have stymied its use of these authorities. Congress should direct FERC to develop a comprehensive, long-range infrastructure strategy and should more clearly establish its authority on siting decisions. 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).

In addition, Congress should prioritize the siting of climate-critical infrastructure, including grid upgrades (and hardening, to better protect customers from weather-related outages), and other key resources such as storage batteries and energy pipelines.

**c. Industry**

Given its tremendous diversity, its heavy reliance on large quantities of heat, and the fundamental nature of many core manufacturing processes, the industrial sector is especially challenging to decarbonize. Economywide carbon pricing, as recommended in *Getting to Zero*, can drive some emissions reductions across the sector, but a wide range of complementary policies are also needed. Priorities over the next decade include developing innovative lower-carbon manufacturing processes, setting standards to drive energy efficiency, electrification and other forms of fuel switching, and safeguarding the competitiveness of energy-intensive, trade-exposed sectors.

Additional details on what Congress should do decarbonize the industrial sector is in our *Getting to Zero* report. Key recommendations include:

- Congress should increase funding to develop and commercialize alternative thermal heat technologies and to develop innovative industrial processes with much smaller greenhouse gas footprints.
- The federal government should undertake a benchmarking process to establish intensity-based greenhouse gas objectives for major subindustries.
- Congress should extend and increase the existing 45Q tax credit for carbon capture to support the capture of process and onsite energy-related emissions, and should provide tax credits for energy efficiency improvements.
- Federal, state, and local governments should support the deployment of combined heat and power systems.
- An economywide carbon pricing program should include provisions aimed at safeguarding competitiveness and minimizing carbon leakage risks.
- The United States should ratify the Kigali Amendment phasing down the use of hydrofluorocarbons and Congress should provide EPA with clear authority to take the steps necessary to implement it.

#### **d. Buildings**

Decarbonizing the buildings sector (both residential and commercial) requires improving energy efficiency and switching to lower-carbon energy sources—in particular, to electricity. Over the long term, reducing the carbon embedded in building materials will also be critical. Key challenges include the tremendous diversity of buildings, the slow turnover of the building stock, and the competing financial interests of owners, occupants, and lenders. Priorities over the coming decade include establishing overarching goals for decarbonizing the building sector, implementing targeted measures to electrify buildings and to improve the energy efficiency of buildings and appliances, and helping building owners and occupants finance building upgrades.

Additional details on what Congress should do decarbonize the building sector is in our *Getting to Zero* report. Key recommendations include:

- State and local governments should set overarching goals for the decarbonization of commercial and residential buildings, and should regularly update their building codes to require the use of available and affordable energy efficiency measures and other carbon-reducing practices.
- Federal, state, and local governments should provide incentives for building owners and homeowners to switch from fossil fuel-powered to electric appliances such as electric space and water heating systems.
- All states should authorize Property Assessed Clean Energy (PACE) programs to help finance energy-related improvements in both residential and commercial buildings.
- States and localities should encourage the use of energy savings performance contracts in public buildings to improve energy efficiency, reduce emissions, and save taxpayer money.

#### ***2. What policies should Congress adopt to ensure that the United States is a leader in innovative manufacturing clean technologies; creating new, family-sustaining jobs in these sectors; and supporting workers during the decarbonization transition?***

See responses to question 3, 4, and 5.

#### ***3. What policies should Congress adopt to ensure that environmental justice is integral to any plan to decarbonize these sectors?***

Policies to decarbonize the U.S. economy must be bold, but they must also be equitable. They must bring everyone into a zero-carbon future, including frontline communities, such as low-income communities and communities of color, and those whose economic fortunes have been closely tied to high-emitting energy sources and industries.

Additional details on what Congress should do to ensure that environmental justice is integral to decarbonizing these sectors is in our *Getting to Zero* report. Key recommendations include:

- Policies that could increase the cost of energy should include mechanisms to minimize any cost burden on low-income populations and small businesses.

- A share of climate investment should be dedicated to deploying solutions and infrastructure in historically marginalized communities, including urban tree planting, energy efficiency retrofits, community solar, electric vehicle charging, and low- and zero-carbon public transit.
- Congress should increase support to communities in transition to train workers and foster new industries that can contribute to a stable economy and tax base.

## Cross-Cutting Policies

### 4. Carbon Pricing:

**a. What role should carbon pricing play in any national climate action plan to meet or exceed net zero by mid-century, while also minimizing impacts to low- and middle-income families, creating family-sustaining jobs, and advancing environmental justice? Where possible, please provide analytical support to show that the recommended policies achieve these goals.**

A central element of any national climate plan enacted by Congress should be a market-based policy that effectively creates an escalating, economy-wide price on carbon emissions.

An economy-wide market-based policy could take many forms (e.g., cap and trade, carbon tax, and tradeable performance standard). Depending on the type of market-based policy Congress chooses to enact, some or all of the following design principles should be applied:

- **Environmental integrity.** A market-based policy should be robust enough to deliver timely emissions reductions and include mechanisms that provide environmental certainty that the emissions goals will be met.
- **Predictability and transparency.** The policy should be stable and predictable to ensure that investment and innovation are incentivized. This could include a predictable escalation rate in a tax-based approach or a price floor in a cap-and-trade program. Any program changes should be phased in or introduced with sufficient advance notice.
- **Competitiveness.** The policy should include safeguards to protect the competitiveness of energy-intensive, trade-exposed industries and prevent emissions “leakage” to other countries. These safeguards could include preferential emissions allocations for energy-intensive, trade-exposed industries under a cap-and-trade program or a border tax adjustment under a carbon tax.
- **Cost containment.** The policy should include measures to reduce price volatility and moderate unexpectedly high compliance costs. Depending on the type of market-based policy established, these could include the banking and borrowing of allowances, emissions offsets, a ceiling and floor on allowance prices, or a credit, dividend, or refund to cover program costs for certain types of participants.
- **Alignment with state policies.** The policy should provide for an economy-wide framework while allowing states the option of continuing existing market-based programs, provided they are deemed equivalent (or more stringent) and do not impose an undue burden on participants.
- **Inclusion of complementary federal measures.** The policy should provide for complementary federal measures needed to accelerate key technologies and to address other market failures. It also should retain or establish back-stop regulatory authorities that can be employed if emissions reduction targets are not being met.

**b. How could sectoral-specific policies, outlined in questions 1-3, complement a carbon pricing program?**

While pricing is a cornerstone of a long-term decarbonization strategy, the market “pull” of an economy-wide price signal must be complemented by other policies that either create a market “push” (e.g., by supporting the development of critical technologies) or address other types of market failures (e.g., the split incentives between a building owner and occupant). Such complementary policies, as outlined in questions 1–3, are recommended throughout the *Getting to Zero* report. The need for such policies depends on the given sector and on the timing and strength of a carbon pricing program.

**5. Innovation:**

**a. Where should Congress focus an innovation agenda for climate solutions? Please identify specific areas for federal investment and, where possible, recommend the scale of investment needed to achieve results in research, development and deployment.**

Rapidly accelerating low-carbon innovation will be essential to reaching carbon neutrality by mid-century. Top priorities over the coming decade are to establish and implement a long-range low-carbon research and development agenda, significantly scale up federal resources for low-carbon innovation, and optimize the low-carbon innovation system. Additional details on what policies Congress should adopt to foster innovation is in our *Getting to Zero* report. Key recommendations include:

- Congress should establish decarbonization as a principal objective of the research mission of all relevant federal agencies and should direct the White House to lead an interagency innovation effort, including research, development, demonstration, and deployment strategies aimed at carbon neutrality in the transportation, power, buildings, and industry, land use, and oil and gas sectors.
- Congress should ramp up funding for climate-related research and development to at least \$20 billion per year by 2030, including \$2 billion per year for the Advanced Research Projects Agency–Energy, and should provide \$50 billion to \$100 billion over the next decade for high-impact demonstration projects.
- The federal government should strengthen administrative capacity and management practices to ensure the efficient and timely use of research funding and should consult closely with the private sector and other non-government stakeholders in developing and executing the low-carbon innovation agenda.

*Getting to Zero* also identifies a number of innovation priorities, including; clean electricity, carbon capture utilization and storage, energy storage, advanced clean fuels, advanced manufacturing, renewable thermal energy, advanced computing, and advanced agriculture.

**b. How can Congress incentivize more public-private partnerships and encourage more private investment in clean energy innovation?**

The government’s success in fostering a robust innovation ecosystem will depend on its ability to strengthen and simplify public-private collaboration. Congress should—in establishing a long-term statutory framework—vest The White House with the responsibility of engaging the private sector and other non-government stakeholders in the development of the low-carbon innovation agenda. The national laboratories must prioritize technology transfer efforts, and the government should scale up new institutional models

fostering collaboration among industry, academia, and public researchers, such as DOE's Energy Innovation Hubs. Additional priorities include scaling up programs such as the U.S. Department of Agriculture's Agriculture Advanced Research and Development Authority and bolstering interagency and public-private partnerships such as the Manufacturing USA institutes.

Additional details on what Congress can do to incentivize more public-private partnerships and to encourage more private investment in clean energy innovation is in our *Getting to Zero* report.

## **Agriculture**

### **6. What policies should Congress adopt to reduce carbon pollution and other greenhouse gas emissions and maximize carbon storage in agriculture?**

U.S. agricultural activities produce a variety of greenhouse gas emissions, but the land sector as a whole is a net greenhouse gas sink, with soils and vegetation absorbing significant quantities of CO<sub>2</sub> from the atmosphere. Increasing this land-based sequestration to help offset remaining emissions from other sectors will be essential to achieving carbon neutrality. Priorities over the coming decade include strengthening incentives and capacity for carbon sequestration on farms and in forests, reducing on-farm emissions from fertilizers and livestock, bringing lower-carbon food products to market, and reducing food waste throughout the system, from farmer to consumer.

Additional details on what policies Congress should adopt to reduce emissions and maximize carbon storage in agriculture can be found in *Getting to Zero*. Key recommendations include:

- Congress should strengthen incentives for farmers to adopt carbon-sequestering growing practices by authorizing them as emission offsets in an economywide carbon pricing program, and through lower interest rates for farm loans, lower crop insurance premiums, and other changes to the federal crop insurance program.
- Congress should fund the U.S. Department of Agriculture to develop improved soil carbon measurement methods and equipment, and to develop food, fiber, and biomass crops that require fewer inputs and can better sequester carbon.
- Local governments should implement and support composting programs that use post-consumer food waste to produce fertilizer or use biodigesters to generate biogas.

### **7. What policies should Congress adopt to help farmers, ranchers, and natural resource managers adapt to the impacts of climate change?**

Agricultural extension services should be empowered (with funds, staff and access to climate data) to provide accurate, locally relevant information about climate impacts to growers. All agricultural extension offices should have literature about climate impacts for farmers that request it.

Federal crop insurance should provide incentives to farmers employing resilient farming practices.

## Oceans, Forestry and Public Lands

### ***8. How should Congress update the laws governing management of federal lands, forests, and oceans to accelerate climate adaptation, reduce greenhouse gas emissions and maximize carbon storage?***

The land use sector will play a vital role in achieving carbon neutrality across the economy by producing “negative emissions” to offset the remaining emissions of sectors, such as industry, that are especially challenging to decarbonize. An economy-wide carbon pricing program could steer significant resources toward enhanced farm and forest sequestration if it allows for the trading of—or invests some of the revenues in—these emission offsets. Whether in advance of or in parallel with carbon pricing, other measures are also needed to conserve and expand lands with sequestration potential and to actively promote sequestration on farms as well as in forests. In regards to forests, Congress should further boost funding for the U.S. Forest Service’s efforts to restore forests, increase resilience to wildfires, and provide technical and financial support for private forest owners in areas at risk.

Moreover, federal agencies should assess the climate-related impacts of proposals at the programmatic level that expand oil and natural gas leasing on federal lands.

## Non-CO2 Greenhouse Gases

### ***9. What policies should Congress adopt to reduce emissions of non-CO2 greenhouse gases, including methane, nitrous oxide, and fluorinated gases?***

Intentional and unintentional releases of methane account for a majority of the oil and gas industry’s direct greenhouse gas emissions. Apart from the regulation of emissions, a wide range of federal policies shape investment and information flows that influence the carbon intensity of the nation’s energy supply. Many of these policies, including those relating to oil and gas, need to be updated to better align with a mid-century carbon-neutrality goal.

Several federal tax provisions directly or indirectly subsidize oil and gas production. Congress should mandate a comprehensive review of federal energy subsidies to ensure that they favor lower-carbon energy sources and contribute to carbon neutrality. This should include a review of tax provisions, such as deferred tax payments for capital expenses related to fossil fuel development and drilling. Based on the results of this review, Congress should amend the tax code and other provisions to phase federal subsidies away from higher-carbon energy sources and toward lower-carbon energy sources, including fossil fuels with carbon capture.

Hydrofluorocarbons (HFCs), unlike other greenhouse gases, are intentionally manufactured and used in a variety of applications such as refrigeration, air conditioning, aerosols, fire protection, and solvents. When released to the atmosphere, HFCs create hundreds to thousands of times more warming than an equivalent amount of CO<sub>2</sub>. The Kigali Amendment to the Montreal Protocol calls for a global phasedown of HFCs, and American companies are leaders in the development of alternatives. To promote the rapid adoption of these safer alternatives in the United States, and to ensure U.S. firms a strong role in the global phasedown, the United States should ratify the Kigali Amendment and Congress should provide EPA with clear authority to take the steps necessary to implement it.



Additional recommendations on what Congress can do to reduce non-CO<sub>2</sub> greenhouse gases are contained in our *Getting to Zero* report.

## **Carbon Removal**

### ***10. How can Congress accelerate development and deployment of carbon removal technology to help achieve negative emissions?***

Technologies to directly capture of CO<sub>2</sub> from the atmosphere can produce the “negative emissions” likely needed to achieve carbon neutrality (alongside natural sequestration approaches such as afforestation and reforestation). The continued refinement of traditional post-combustion capture technologies is essential to reducing the cost of direct air capture.

- Congress should strongly ramp up research and development to cut the cost of direct air capture, now an estimated \$400 to \$700 per ton CO<sub>2</sub>, to less than \$100 per ton. The National Academy of Sciences has recommended that federal funding, a total of \$11 million to date, be ramped up to \$1.5 billion over 15 years and cover all phases of direct air capture RDD&D.
- As direct air capture technologies advance, Congress should amend 45Q or establish a new tax credit for CO<sub>2</sub> from air capture of \$100 per ton or more. (The current credit for stored or utilized CO<sub>2</sub>, regardless of how captured, ranges from \$35 to \$50 per ton.)

## **Resilience and Adaptation**

### ***11. What policies should Congress adopt to help communities become more resilient in response to climate change? The Select Committee welcomes all ideas on resilience and adaptation but requests comments on three specific questions:***

C2ES’s resilience program has hosted workshops to help cities engage with their business communities to learn about climate risks and adaptation opportunities. We have researched and hosted meetings with corporations to learn how they are impacted by climate change and to discuss improved disclosure of risks to shareholders. This past spring, we supported researchers at universities trying to bridge private, public and academic approaches to climate risk and resilience. Currently, we are examining how cities’ economic competitiveness might be affected by credit ratings agencies, insurance companies, property values and tax bases responses to climate risk. In these discussions, a few barriers to resilience and opportunities to overcome them have arisen multiple times:

- More research, as well as pilots carried out by communities and federal agencies, are needed to explore the opportunities of adaptive infrastructure and policy. Adaptive solutions are designed to be flexible and responsive to changing climate conditions over time. This concept is often discussed in terms of structural solutions like bridges, levees, and stormwater systems (which are built for a long service life, which is increasingly complex in a changing climate) but is also very relevant for non-structural solutions like planning processes, neighborhood programs, and other community adaptation initiatives.
- As more adaptation projects are planned and implemented, a single repository for information about performance and response of different resilient and adaptive infrastructure designs is needed. Only through nation-wide field testing can performance standards for different innovative resilient solutions be understood. This documentation and information sharing can help to normalize

“alternative” infrastructure solutions that communities and federal agencies are less likely to employ (even if they are likely to be more effective at reducing risk).

- A federal-level task force or research initiative is needed to understand the potential dynamics of future coastal retreat (and possibly other climate migration). States and cities are beginning to acknowledge the possible need for retreat, but because it could affect large coastal areas, disproportionately displace low-income and long-term coastal residents, and trigger inter-state migration, this should be coordinated on a national level.
- More diverse funding sources and innovative finance mechanisms can be established by Congress to help communities invest in resilience projects. For instance, a national resilience or infrastructure bank could improve communities’ ability to execute projects with the primary goal of enhancing local resilience. A national resilience or infrastructure bank could also leverage public and private sector dollars to expand the pool of funds available for pre-disaster spending.
- Federal grant programs and most funding streams focus on new projects, but continued maintenance and repair of stormwater, wastewater, transportation, navigation, and other infrastructure is needed to enhance resilience.
- There is ripe opportunity to engage the private sector on adaptation policies and solutions. Corporations are concerned about the preparedness of the communities they work in. When climate events disrupt transportation, power, water or affect employees and customers, corporate bottom lines are impacted. Adaptation policies should enable and encourage leveraging private investments, and enhance private-public partnerships. As businesses large and small assess the risks they and their community face, providing opportunities for them to invest in resilience instead of pulling investments from areas with climate risk, could be a key component to ensuring a resilient future less focused on climate winners and losers, but on understanding and managing risk in communities and economic sectors across the country.

**a. What adjustments to federal disaster policies should Congress consider to reduce the risks and costs of extreme weather and other effects of climate change that can no longer be avoided?**

The benefits of pre-disaster mitigation are well documented: it provides returns on investment, saves the federal government money, reduces funds and staff needed in recovery efforts after disasters, and can help families and neighborhoods avoid the pain and disruption of natural disasters.

In addition, current federal disaster policies do not allow cities and states to take responsibility for climate resilience and inhibits resilience action. Concepts like a disaster deductible help hold cities and states accountable for planning for disasters. That concept could take an additional step of requiring (and financially supporting) a threshold of resilience investment as well as saving for disaster costs in order to qualify for federal disaster assistance. Communities should be supported with funds and assistance in doing proactive recovery planning before disasters occur. Proactive recovery planning can address the recency bias that adaptation planning in the wake of a disaster can have, where there is a focus only on the disaster that occurred, not the full suite of impacts an area can expect.

After disasters, the local economies of cities that were already planning for disasters (e.g., New York City and Houston) are less affected than cities devastated by events without any funding.

While it is critical to help communities after disasters, the imbalance of resources going to post-disaster response and the relative lack of funding and emphasis on resilience has incentivized communities to be mostly reactive to climate risk.

**b. How can Congress better identify and reduce climate risks for front-line communities, including ensuring that low and moderate-income populations and communities that suffer from racial discrimination can effectively grapple with climate change?**

Any pre-disaster mitigation/resilience initiative should include specific provisions for low-income households, communities of color, or otherwise vulnerable populations. This needs to be defined locally, as vulnerability varies greatly between urban and rural, and coastal and inland, areas.

Any community receiving federal funds or support for adaptation should demonstrate how issues of racial, income and other socioeconomic disparities will be overlaid with climate risk in their vulnerability assessments, and how adaptation planning and programs will avoid enhancing those disparities and inequities.

**c. What standards and codes should Congress consider for the built environment to ensure federally-supported buildings and infrastructure are built to withstand the current and projected effects of climate change?**

No response.

## **Climate Information Support**

***12. Our understanding and response to the climate crisis has relied on U.S. climate observations, monitoring and research, including regular assessment reports such as the National Climate Assessment. What policies should Congress adopt to maintain and expand these efforts in order to support solutions to the climate crisis and provide decisionmakers – and the American people – with the information they need? Where possible, recommend the scale of investment needed to achieve results.***

Empowering state climate offices, integrated sciences assessments, and other state- and/or university-led initiatives will enhance local understanding of climate risks and how to use scenario analyses to make decisions. Communities need downscaled, high-quality, consistent data, and rely on university systems for affordable analyses. Increasing funding and staffing for these state-level initiatives will provide communities with access to more localized, trusted climate information. Programs at universities can also be coordinated with other schools to provide mid-career training to engineers, city planners, landscape architects, and other professionals who can contribute to a more resilient future.

Congress should also continue to support the climate monitoring, research, and national climate assessments carried out by federal agencies, as that data and reporting is the starting point for all local decision making about adaptation and resilience policy.

**13. The climate crisis requires a global response. U.S. leadership is critical for successful global solutions. What policies should Congress adopt to support international action on the climate crisis?**

Congress should support continued U.S. participation in the Paris Agreement, the development of successive “nationally determined contributions” commensurate with the increased ambition of domestic U.S. policies, and increased funding to other countries to help them reduce their emissions and cope with climate impacts.

***In addition to your responses to any of these questions, please include any other specific policies that you think Congress should adopt to solve the climate crisis and adapt to the impacts of climate change.***

Additional policies will be need to mobilize private capital toward decarbonization. They should include:

- Congress should direct the Securities and Exchange Commission to require public companies to disclose material climate-related financial risks under a range of climate scenarios and their strategies for managing those risks.
- Congress should require the Federal Reserve to integrate consideration of climate-related risks into the periodic stress testing required of major financial institutions.
- Congress should create a national green bank to leverage private investment in clean energy, energy efficiency, and other activities contributing to decarbonization. More states and localities should also create green banks for use in their own markets.

Additional policies measures can continue to advance carbon capture, utilization, and storage (CCUS) and build a market for captured carbon. Top policies over the coming decade include:

- Congress should strongly ramp up research and development to cut the cost of direct air capture, and should establish a direct air capture tax credit, possibly by amending 45Q.
- Congress should reauthorize and increase funding for the Department of Energy’s carbon capture program and should extend both the “begin construction” and claiming deadlines for the 45Q tax credit for carbon capture, utilization, and storage.
- Creating a “CO<sub>2</sub> superhighway”—a network of pipelines connecting sources of CO<sub>2</sub> to locations where it will be utilized or stored—should be a national priority in any major infrastructure legislation, with the aim of substantially completing such a network by 2030

Digitalization can play a significant role in moving the economy toward carbon neutrality. Policies to promote digitalization should include:

- Congress and the Department of Energy should prioritize RDD&D efforts that enable systems-based efficiency through digital technologies, and should support the development of real-time measurement and verification protocols for systems-level efficiencies in buildings, industry, and transportation.
- All levels of government—federal, state, and local—should lead by example by requiring agencies to procure digital solutions, documenting the related energy efficiencies and cost-savings and publicizing the lessons learned.

- Congress should fund and oversee the scaling and accelerated deployment of broadband infrastructure nation-wide, especially in rural areas.

Bioenergy has significant potential to contribute to decarbonization across multiple sectors of the economy.

Policies to promote bioenergy should include:

- The Department of Energy should partner with businesses on pilot demonstrations of bioenergy with carbon capture and storage to study its emissions-reducing or negative-emissions potential and to encourage commercial development.
- Federal agencies should work collaboratively to develop consistent methodologies to more accurately assess the net emissions benefits of biofuels.
- States should provide incentives to the power and industrial sectors to use low-carbon bioenergy and bioenergy with carbon capture and storage in place of carbon-intensive fuels.

Hydrogen has significant potential to contribute to decarbonization as a valuable zero-emission energy carrier across multiple sectors of the economy. Policies to promote hydrogen should include:

- The Department of Energy should partner with industry to accelerate the development of low-carbon pathways to produce hydrogen and to develop alternative industrial processes that rely on hydrogen instead of fossil fuels.
- Congress should fund the development of state and regional plans to kickstart the buildout of storage, pipeline networks, and other infrastructure to support higher levels of hydrogen use across sectors.
- Congress and states should provide incentives for the adoption of technologies employing hydrogen, such as hydrogen fuel cells.